



DUNEDIN STUDY CONCEPT PAPER FORM

Provisional Paper Title: Social isolation from childhood to mid-adulthood: Mental and physical health outcomes

Proposing Author: Roy Lay-Yee

Author's Email: r.layyee@auckland.ac.nz

P.I. Sponsor: Barry Milne

(if the proposing author is a student or colleague of an original PI)

Today's Date:

12 August 2021

Please describe your proposal in 2-3 pages with sufficient detail for helpful review.

Objective of the study:

Introduction

An acute marker of social connectedness is the degree to which an individual is isolated, i.e. lacking contact with others (Cacioppo et al., 2011; de Jong Gierveld et al., 2016). There has been growing recognition of social isolation as a significant threat to public health and well-being that requires organized intervention at a societal level (Holt-Lunstad et al., 2017; Leigh-Hunt et al., 2017). Social isolation can affect individuals at any age. Across the life course, the experience of social isolation can vary as each life stage has its specific circumstances (de Jong Gierveld et al., 2016). Questions of timing are crucial to understanding the complexity of social isolation and its effects: social isolation may have an earlier or later onset in life, and it may be transient or persistent. Longitudinal investigations of social isolation from childhood into adulthood are rare (e.g. Caspi et al., 2006). However, we have recently identified four distinct trajectory groups of social isolation from childhood to adulthood (low, increasing, decreasing, and high), and have demonstrated that these have different risk factor profiles (Lay-Yee et al., 2021).

There is evidence that social isolation has negative consequences for the child's social and

emotional functioning (Bukowski & Adams, 2005; Coplan et al., 2018; Laursen et al., 2007; Marryat et al., 2014). Social isolation occurring in childhood may have continuing adverse effects as children develop into adults (Danese et al., 2009). In particular, the emergent adult may suffer worse mental and physical health as a result of earlier social isolation (e.g. cardiovascular disease (Caspi et al., 2006), depression (Danese et al., 2009), hospitalization (Almquist, 2011), inflammation (Lacey et al., 2014), and suicide (Rojas, 2018)). Finally, the Covid-19 pandemic – with its forced strictures of distancing and quarantine – has heightened concerns about the long-term impacts of social isolation on population health (Pietrabissa & Simpson, 2020; Smith & Lim, 2020).

The impact of the duration and timing of social isolation has been less investigated, but has implications for policy. For example, if childhood social isolation has negative impacts regardless of whether isolation persists into adulthood, this would argue for prevention strategies targeted towards childhood. Conversely, if only long-lasting social isolation is associated with negative consequences, then this would argue for prevention strategies which involve either waiting until adolescence (to see which individuals have long-lasting social isolation), or targeting children in children with profiles suggestive of long-lasting social isolation (e.g., see Lay-Yee et al., 2021).

In this project, we aim to investigate the degree to which these trajectory groups are related to mental and physical health outcomes that have been most consistently associated with cross-sectionally assessed social isolation, namely depression and suicide (mental health), and cardiovascular risk factors and inflammation (physical health).

Objective

This proposal aims to investigate mental and physical health consequences in relation to different developmental trajectories.

Data sources

Social isolation in the Dunedin Study (Poulton et al., 2015) in childhood at ages 5-11 (Caspi et al., 2006; Danese et al., 2009), and again in adulthood at ages 26, 32, and 38, have been used to form trajectory groups (Lay-Yee et al., 2021)

Outcome data in the Dunedin Study will be assessed at ages 38 and 45.

Research Question

Does membership of ‘trajectory’ groups influence health outcomes? We hypothesize that patterns of social isolation in children and adults affect health outcomes. We expect that health outcomes will be worse in ‘child-onset’ versus ‘adult-onset’ groups, and even worse in the group with persistent social isolation.

Specifically, we will investigate:

- a) How does social isolation affect the following health outcomes:

- mental health - depression, suicide attempt;
 - physical health - cardiovascular factors, markers of inflammation, respiratory outcomes.
- b) Does the experience of social isolation at different life stages have different effects on these health outcomes?
- c) Does adult isolation have an effect on these health outcomes over and above that of childhood isolation (and vice versa); i.e., do the negative consequences of social isolation accumulate?

Data analysis methods:

We will use regression modelling to understand which adult health outcomes are predicted by persistent versus transient social isolation, with respect to different trajectory group membership (Lay-Yee et al., 2021; Nagin, 2005).

Variables needed at which ages:

Social isolation:

- *child isolation* was assessed by a collection of measures from ages 5 to 11. When a study member was 5, 7, 9, and 11 years old, their parent and teacher completed the Rutter Child Scale, reporting on two items that measure peer problems: ‘tends to do things on his/her own; is rather solitary’ and ‘not much liked by other children’. At each age, scores on these two scale items will be averaged across the two reporting sources (i.e. parent and teacher).
- *adult isolation* was assessed using *informant report* at ages 26, 32 and 38. At each of these ages, up to three informants whom the study member nominated as ‘knowing them well’ was mailed a questionnaire. At each age, scores on the item ‘seems lonely’ (0 = not a problem, 1 = bit of a problem, 2 = yes, a problem) will be averaged across informants.

These measures have been used to develop social isolation trajectory groups (Lay-Yee et al., 2021).

Health outcomes (adult):

- mental health – the mental health assessment using the Diagnostic Interview Schedule (DIS) allows for diagnoses and symptom scores for depression, and for whether or not the study member has attempted suicide. Suicide ideation will be assessed as a secondary measure.

- physical health - cardiovascular factors (obesity, blood pressure, HDL cholesterol, total cholesterol, Meredith et al., 2021); inflammation (C-Reactive protein [CRP], soluble urokinase plasminogen activator receptor [suPAR], Rasmussen et al., 2021), respiratory outcomes, including spirometry (FEV1/VC ratio) and diagnoses asthma.

Confounders (childhood):

A number of factors have been found to be associated with social isolation trajectory group membership (Lay-Yee et al., 2021), and these may potentially confound associations between social isolation and health outcomes. These include:

- Socio-economic status, measures at ages 0-15 using the Elley-Irving scales
- Experience of single parenting up to age 11
- Changes of residence up to age 11
- Maltreatment in childhood
- Self-control in childhood
- Worry/fearfulness from the Rutter problem behaviour scale (ages 5-11)

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

The theoretical significance of this study lies in its focus on the development of social isolation longitudinally, and its relation to important adult health and mental health outcomes (de Jong Gierveld et al., 2016). The study will elucidate the relative contribution of social isolation experienced at different stages of the life-course and add weight to evidence on its negative effects on adult health.

In terms of practice, understanding the influence of life-course differences in onset and the persistence of social isolation on adult health outcomes assists the design and implementation of interventions. This study goes further in enabling the specification of interventions to suit the sub-populations at most risk or individuals at different life stages, and in identifying vulnerable groups for the targeting of public services.

Finally, there may be a cautionary warning regarding the long-term effects of the Covid-19 pandemic: many children today who are experiencing prolonged social isolation during enforced lockdowns may, decades down the track in their adult future, be bearing the harmful consequences in terms of worse health – in this future, the prevalence of poor health among the population will be greater than the counterfactual (i.e. the hypothetical future where the pandemic had not occur) and this will have major implications for society as a whole.

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DATA SECURITY AGREEMENT

Provisional Paper Title	Social isolation from childhood to mid-adulthood: Mental and physical health outcomes
Proposing Author	Roy Lay-Yee
Today's Date	August 12, 2021

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.citifigrogram.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).
	<p>I will treat all data as "restricted" and store in a secure fashion. My computer or laptop is:</p> <ul style="list-style-type: none"> • 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.
	<p>I will not post data online or submit the data file to a journal for them to post.</p> <p><i>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></p>
	<p>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.</p> <p>The data remains the property of the Study and cannot be used for further analyses without an approved concept paper for new analyses.</p>

Signature: _____



CONCEPT PAPER RESPONSE FORM

A To be completed by the proposing author:

Provisional Paper Title	Social isolation from childhood to mid-adulthood: Mental and physical health outcomes
Proposing Author	Roy Lay-Yee
Other Contributors	Avshalom Caspi, Terrie Moffitt, Tim Matthews, Richie Poulton
Potential Journals	
Today's Date	
Intended Submission Date	

Please keep one copy for your records and return one to the proposing author

B. To be completed by potential co-authors:

Approved
 Not Approved
 Let's discuss, I have concerns

Comments: _____

Please check your contribution(s) for authorship:

<input type="checkbox"/>	Conceptualizing and designing the longitudinal study
<input type="checkbox"/>	Conceptualizing data collection protocols and creating variables
<input type="checkbox"/>	Data collection
<input type="checkbox"/>	Conceptualizing and designing this specific paper project
<input type="checkbox"/>	Statistical analyses and interpretation (or reproducibility check)
<input type="checkbox"/>	Writing
<input type="checkbox"/>	Reviewing manuscript drafts
<input type="checkbox"/>	Final approval before submission for publication
<input type="checkbox"/>	Agreement to be accountable for the work
<input type="checkbox"/>	Acknowledgment only, I will not be a co-author

Signature: _____