ENVIRONMENTAL-RISK (E-RISK) LONGITUDINAL TWIN STUDY
CONCEPT PAPER FORM

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Provisional Paper Title: Protective factors for psychotic experiences amongst adolescents exposed to multiple forms of victimization

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Background:

In our recent paper, we investigated protective factors in relation to age 12 psychotic symptoms amongst children exposed to multiple types of victimization (poly-victimization) in the E-Risk cohort. The current concept paper aims to follow up on these findings by considering multi-level protective factors in relation to psychotic experiences at age 18 amongst Study members poly-victimized during adolescence. It is important to extend the existing analyses to psychotic experiences at this later time-point as late-adolescence coincides with the peak age at which psychotic disorders are typically diagnosed, and experiences at this developmental stage have been found to be associated with greater psychiatric comorbidity than those occurring earlier in adolescence.[1] Thus these findings on psychotic experiences at age 18 may have greater clinical relevance and potentially inform early intervention efforts.

Our recent study found that a range of individual, family and community-level characteristics were associated with a reduced likelihood of psychotic symptoms emerging at age 12 amongst poly-victimized children. Specifically, having a relatively high IQ, more positive atmosphere at home, and living in areas with higher levels of neighborhood social cohesion were found to be protective against childhood psychotic symptoms amongst those exposed to poly-victimization. We intend to consider whether these factors are also protective amongst individuals exposed to poly-victimization during adolescence in relation to psychotic experiences at age 18, as well as some additional potentially protective factors that are now available given the new data available from the latest phase.

Individual-Level Factors

Higher IQ levels were found to be protective for psychotic symptoms amongst poly-victimized children in our recent study. This is consistent with literature which has found that children with elevated IQ levels do not display the early neurodevelopmental impairments which have previously been linked to the development of schizophrenia in adulthood.[2] In terms of potential mechanisms, it is possible that a relatively high IQ could facilitate the development of effective coping styles which have previously been found to bolster resiliency against mental health problems,[3,4] and therefore they could also be protective against the onset and persistence of psychotic symptoms. Higher IQ may also promote cognitive flexibility which has been associated with an absence of psychopathology.[5] It will be interesting to consider whether elevated IQ levels are found to be protective at this later age-18 time point.

Personality factors have been excluded from the list of individual characteristics given that age 5 temperament measures were not found to be protective in our earlier study when considering age 12 outcomes.

An additional factor to consider in terms of its protective effects is exercise. Exercise has been found to have beneficial effects in terms of reducing emotional and behavioral problems.[6,7] In terms of potential mechanisms, a systematic review[8] found that a number of studies were suggestive of positive short-term effects of exercise on self-esteem. Low self-esteem has been linked to the severity of hallucinations and delusions,[9] and been found to partially mediate the association between victimization exposure and psychotic symptoms.[10] Therefore, it is possible that exercise may be protective in relation to mental health outcomes through its positive influence on

self-esteem, which could be particularly beneficial to those exposed to victimization.

Another potential mechanism through which exercise may be protective for psychotic experiences amongst poly-victimized individuals is via stress reductions. Authors have highlighted how exercise may act as a natural means to prevent the adverse consequences of psychological stress in terms of the biological and neurological changes it can trigger.[11,12] In addition, exercise has been found to increase plasticity amongst patients with schizophrenia[13] and to attenuate brain volume changes as well as increase thickness in areas of the left cortex, in schizophrenia patients.[14] Combined, this body of research suggests it would be interesting to consider whether exercise was found to be protective amongst poly-victimized adolescents given this measure is available for the first time in the age-18 dataset.

Adaptive coping strategies are another individual-level factor that may exert protective effects amongst those who are at risk of developing mental health problems. It has been found that adaptive coping behaviors were associated with symptom improvement as well as better social functioning amongst individuals at high risk for psychosis.[15,16] Given the E-Risk cohort has coping strategy measures at age 18, it will be interesting to see whether those who do not have psychotic experiences during adolescence, despite their exposure to poly-victimization, show any specific coping strategies.

Family-Level Factors

We also found that a more positive atmosphere at home was protective for childhood psychotic symptoms in the poly-victimized group which is consistent with prior research that has highlighted the protective effects of family stability in the context of adversity,[17] and conversely how more chaotic living situations can increase the risk of early psychotic symptoms[18] and adult psychosis.[19] It is thought that the home environment may provide children with a safe, nurturing environment that acts as a refuge, which in turn, may lessen the harmful effects of their experiences on cognitive and emotional processes.[20] Therefore, we will explore whether this family-level factor is also protective against psychotic experiences amongst poly-victimized adolescents.

Sibling Warmth and Maternal Warmth were not found to be protective in our previous paper hence have been excluded from our proposed list of protective factors to consider for age 18 outcomes.

Community-Level Factors

Higher levels of neighborhood social cohesion were also found to be associated with a reduced likelihood of childhood psychotic symptoms emerging in the poly-victimized group in our previous paper. This is in keeping with previous studies that have found supportive relationships between neighbors promote positive parenting practices and may protect against the adverse effects of maltreatment.[21,22] It will be interesting to consider whether social cohesion has protective effects in relation to psychotic experiences at the later age-18 time-point amongst those exposed to poly-victimization during adolescence.

It seems plausible that higher levels of support from an adult could be protective in relation to psychotic experiences amongst those exposed to multiple forms of victimization. This is consistent with reports that reduced social networks are common amongst those who develop psychotic phenomena,[23] and that social support may buffer the effects of some forms of victimization on adult psychosis.[24] The ability to directly access a supportive adult or general perceptions of a supportive environment may facilitate adolescents to more quickly obtain help with any distress they are experiencing and cope with it better,[25] as well as potentially accessing normalizing explanations for their anomalous experiences which may reduce the likelihood of developing clinically-relevant psychotic symptoms.[26] Therefore, we will also explore whether social support is protective against the development of psychotic experiences amongst poly-victimized adolescents.

Specifically, this project will investigate the following research questions:

1. How many Study members who were exposed to multiple types of victimization during adolescence do not report psychotic experiences at 18 years of age? Also, what proportion of Study members who were exposed to poly-victimization during both childhood and adolescence do not report psychotic experiences at 18 years of age?

2. Are protective factors (individual, family, community factors) associated with a reduced likelihood of age-18 psychotic experiences emerging amongst those exposed to poly-victimization? Firstly we will consider protective factors in relation to those exposed to poly-victimization during adolescence, next we will consider protective factors amongst those exposed to poly-victimization in both childhood and adolescence.

3. Are these protective factors specifically protective amongst those exposed to poly-victimization or are they also protective in the general population sample, in relation to psychotic experiences at age 18?

Statistical analyses:

All analyses will be conducted in Stata version 11 and adjusted for the non-independence of twin observations using the Huber-White estimator. Analyses will additionally be controlled for the potentially confounding effects of gender and family socio-economic status.

1. Firstly we will present the proportion of Study members exposed to (i) poly-victimization during adolescence, and (ii) poly-victimization in both childhood and adolescence who do and do not report psychotic experiences at age 18 along with binary logistic regressions of the associations between each poly-victimized group (i) and (ii) with the outcome (presence/absence of any 18 psychotic experiences at age 18).

2. A series of binary logistic regression analyses will be conducted to understand whether individual, family and community-level factors are associated with a reduced likelihood of psychotic experiences emerging amongst the sub-group of Study members exposed to poly-victimization in adolescence and next, amongst the sub-group exposed to poly-victimization both in childhood and adolescence. Multi-variate analysis will be run for any factors found to be protective in relation to psychotic experiences amongst the poly-victimized groups in order to ascertain the independent protective effects of these factors in relation to age-18 psychotic experiences.

3. Finally, we will include an interaction term for each protective factor x poly-victimization in the binary logistic regression analysis to explore whether these protective factors are specifically protective against psychotic experiences amongst poly-victimized individuals or if they are also protective in the sample more broadly.

4. Additionally, sensitivity analyses will be conducted with the verified psychotic symptoms at age 18 as the outcome variable, and we will also explore the protective factors in relation to those with an absence of psychotic symptoms (or experiences) at both ages 12 and 18.

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Required Variables:

General Information

FAMILYID	Unique family identifier
ATWINID	Twin A ID (ex chkdg)
BTWINID	Twin B ID (ex chkdg)
RORDERP5	Random Twin Order
RISKS	Sample Groups
COHORT	Cohort
SAMPSEX	Sex of Twins: In sample
ZYGOSITY	Zygosity
SESWQ35	Social Class Composite

Individual Characteristics

FSIQ12E	Full Scale IQ (INF, MR & DS), 12E
PHYACTE18	Physical activity (overall) - P18 – Elder
COP1 (Phase 18 Booklet)	Coping Strategies - Talk with other people about it
COP2 (Phase 18 Booklet)	Coping Strategies - Talk with a therapist/counsellor
COP4 (Phase 18 Booklet)	Coping Strategies - Exercise
COP13 (Phase 18 Booklet)	Coping Strategies - Take steps right away to solve the problem

Family Environment Variables

HOMEM12	State of the home - Mum Intv
HOMEC12	State of the home - Twin Intv
CHSTIM12	Child Stimulation - Mum Intv
CHSTIC12	Child Stimulation - Twin Intv
HAPPHM12	Happy Home - Mum Intv
CHAOSM12	Chaos in the home - Mum Intv
CHAOSC12	Chaos in the home - Twin Intv

Outside Home Environment Variables

adultec12	Adult Involvement – Elder
s2cohe	Neighborhood Social Cohesion
SOCSUPE18	Social Support scale - P18 - Elder

Victimization Variables

polyve512	Extent of Polyvictim, 5-12, E-Twin

vctzcone18	Conventional victimization severity - P18 - Elder
vctzmale18	Maltreatment victimization severity - P18 - Elder
vctzpere18	Peer victimization severity - P18 - Elder
vctzsexe18	Sexual victimization severity - P18 - Elder
vctzfame18	Family victimization severity - P18 - Elder
vctzinte18	Internet victimization severity - P18 - Elder
vctznege18	Neglect victimization severity - P18 - Elder
POLYVCTZE18	Poly-victimization count - P18 - Elder
POLYVE512C	Extent of Polyvictim(Truncated @3), 5-12, E-Twin

We would also like to use the latent class polyvictimization variable across childhood and adolescence derived by Avshalom and Renate.

Age 12 Outcome

PSYSYMP01E12 Psychosis Symptom Count-Verified Coding-Elder - 0, 1+ - Elder

Age 18 Outcome

psysymp01e18	Age-18 adolescent psychotic symptoms – elder
psyexpce18	Age-18 adolescent psychotic experiences categorical – elder
psyexpcy18	Age-18 adolescent psychotic experiences categorical – younger

Data Security Agreement

Provisional Paper Title	Protective factors for psychotic experiences amongst adolescents exposed to multiple forms of victimization
Proposing Author	Eloise Crush
Today's Date	21/02/17

Please keep one copy for your records
(Please initial your agreement)

EC I am current on Human Subjects Training (CITI (www.citiprogram.org) or training in human subject protection through my post or courses.

EC My project is covered by Duke or King's IRB OR I have /will obtain IRB approval from my home institution.

EC I will treat all data as "restricted" and store in a secure fashion.

EC I will not share the data with anyone, including students or other collaborators not specifically listed on this concept paper.

EC 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 E-Risk Study cannot be shared because the Study Members have not given informed consent for unrestricted open access. Speak to Terrie or Avshalom for strategies for dealing with data sharing requests from Journals.

EC Before submitting my paper to a journal, I will submit my draft manuscript and scripts for data checking, and my draft manuscript for co-author mock review, allowing three weeks.

EC I will submit analysis scripts and new variable documentation to project data manager after manuscript gets accepted for publication.

EC I will return all data files to the Data Manager after the project is complete. Collaborators and graduates of DPPP may not take a data file away from the DPPP office. The data remains the property of the Study and cannot be used for further analyses without express, written permission.

EC I will ensure geographical location information, including postcodes or geographical coordinates for the E-Risk study member's homes or schools, is <u>never</u> combined or stored with any other E-Risk data (family or twin-level data)

Signature: 

CONCEPT PAPER RESPONSE FORM

A. To be completed by the proposing author

Proposing Author: Eloise Crush

X I have read the E-Risk data-sharing policy guidelines and agree to follow them

Provisional Paper Title: Protective factors for psychotic experiences amongst adolescents exposed to multiple forms of victimization.

Potential co-authors: Helen Fisher, Louise Arseneault, Andrea Danese, Sara Jaffee (+ anyone else interested)

Potential Journals: JCPP, Schizophrenia Bulletin, Psychological Medicine

Intended Submission Date (month/year): June 2017

Please keep one copy for your records and return one to Louise (louise.arseneault@kcl.ac.uk)

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:

☐ Conceptualizing and designing the longitudinal study

☐ Conceptualizing and collecting one or more variables

☐ Data collection

☐ Conceptualizing and designing this specific paper project

☐ Statistical analyses

☐ Writing

☐ Reviewing manuscript drafts

☐ Final approval before submission for publication

☐ Acknowledgment only, I will not be a co-author

Signature: