<u>R</u>esilience, <u>E</u>thnicity and <u>A</u>doles<u>C</u>ent Mental <u>H</u>ealth

REACH

- Name of the Principal Investigator (PI)   Professor Craig Morgan
- Name of the PI's host institution for the project   King's College London
- Proposal full title   Resilience, Ethnicity and Adolescent Health
- Proposal short name   REACH
- Proposal duration in months   60

The overarching aim of REACH is to examine questions on the developmental origins of mental health problems in diverse populations in the UK.

1 State of the Art

Studies of the epidemiology of mental health problems in adult migrant and minority ethnic populations have produced two generally consistent findings. First, the incidence and the prevalence of psychotic disorders are notably high in many, but not all, migrant and minority ethnic populations in a number of EU and non-EU countries.[1] However, there have been no concerted efforts to tackle this, which stems, in part, from a lack of knowledge about why rates are elevated. Evidence has begun to accrue that suggests exposures to adverse social contexts and experiences during the life course are the most likely candidate explanations for the high rates.[2] However, the evidence remains at a broad level and a key next step is to more precisely delineate the relevant risk and protective factors, and the intervening mechanisms, such that concrete strategies for prevention can be developed and implemented. Second, in contrast to the evidence for psychosis, there is no consistent evidence that the incidence or prevalence of other mental health problems, such as depression and anxiety, are elevated in minority ethnic groups, a finding that appears to hold across contexts.[3] This is surprising. Many migrant and minority ethnic populations live in economically and socially deprived areas, have poorer housing, higher rates of unemployment, and are exposed to high levels of discrimination and racism, all of which have been associated with an increased likelihood of emotional distress. It may be that there are countervailing protective factors that ameliorate the risks associated with these exposures in some populations. However, as noted, these exposures appear to be associated with an increased risk of psychosis, which raises intriguing and important questions about the origins and manifestations of emotional distress in different ethnic groups. Further, we know most mental health problems begin during adolescence.[4] This, then, may be an important developmental stage in understanding how patterns of, and disparities in, mental health problems by ethnic group in adulthood emerge. However, there is limited work on mental health and ethnicity in adolescence and findings are inconsistent.[5]

2 Aims and Objectives

The overarching aim of REACH is to examine the developmental origins of mental health problems in diverse ethnic groups. To achieve this, we will conduct, in south London (UK), a school-based accelerated cohort study (see Figure 1) with a nested sub-study. The sample (target total n, 2760) will comprise 3 cohorts recruited from ethnically diverse schools at ages 11-12 (school year 7), 12-13 (school year 8) and 13-14 (school year 9), which we will follow at one-year and two-years. To investigate novel questions on the developmental origins of mental health problems in adolescents we will collect extensive data at each time point: a) on a range of mental health problems; b) on a range of risk and protective factors, and c) in a nested sub-sample of 552, on putative psychological and biological (i.e., HPA axis related) mechanisms.

REACH has 3 objectives (and related hypotheses – see Appendix).

2.1 Objective 1 (Developmental Trajectories)

To examine developmental trajectories of mental health, both in general and by ethnic group. Having identified trajectories using advanced statistical techniques (i.e., growth mixture modelling) we will test hypotheses about how these differ between ethnic groups. This then leads into our second and third objectives.

2.2 Objective 2 (Risk and Resilience)

To examine the socio-developmental origins of mental health problems, both in general and in relation to any observed differences between ethnic groups. To meet this aim we will examine main, cumulative, and interaction effects of a series of risk and protective factors on trajectories of mental health. We will then test a series of hypotheses about how these factors might explain ethnic differences, in particular focusing on the role of exposures that involve violence and threat and on the modifying effects of protective factors.

2.3 Objective 3 (Mechanisms)

To examine candidate psychological and biological mechanisms that might link socio-environmental factors with mental health problems. To meet this objective, in our sub-sample, we will examine whether the effects of socio-environmental risk factors are mediated via negative affect, cognitive schema, and attributional styles and whether those exposed to socio-environmental risk factors show increased HPA axis activation (i.e., increased cortisol levels measured using hair samples). We will then test novel hypotheses about specificity of these mechanisms for different ethnic groups.

3 Methodology

3.1 Design

To meet our study objectives, we will conduct, over a five-year period, an accelerated cohort study with a nested sub-study. **Accelerated Cohort Study** At baseline (Time 1 (T1)) we will construct three school-based cohorts: school year 7 (aged 11-12 years), school year 8 (aged 12-13 years), and school year 9 (aged 13-14 years), each comprising around 920 adolescents. Each cohort will be followed at one-year (Time 2 (T2)) and two-years (Time 3 (T3)). This design creates overlaps between the cohorts at School Years 8, 9 and 10 and, in effect, covers a five-year period (school years 7 to 11) in two years (see Figure below). **Nested Sub-Study** From each cohort we will construct, at T1, a sub-sample of 184 (total n, 552) for more detailed investigation both at T1 and T2.

3.2 Samples

3.2.1 Cohorts

(1) Baseline At T1, we will recruit around 920 adolescents for each cohort (total n, 2,760) from 10 to 12 schools in the south London boroughs of Lambeth and Southwark (see below for sample size justification). We have chosen these boroughs because they have large numbers from minority ethnic groups and they constitute the area in which much of the research on ethnicity and adult psychosis has been conducted in the UK, thereby maximising the relevance and comparability of the study to previous research. Initial recruitment will involve three steps: 1) we will seek active consent from each identified school; 2) we will provide parents/carers of all eligible pupils with an information pack and give them the opportunity to opt their child out of the study; and 3) on the day of initial (T1) assessment, we will seek active consent from each eligible pupil. This procedure is identical to that employed in numerous other studies conducted in schools (e.g.,[6,7]).

(2) Follow-up At one year (T2) and two years (T3), we will seek to follow all those who participate at T1. We will do this through the participating schools. The re-recruitment procedure will be identical to recruitment at T1. Allowing for school moves, exclusions, absenteeism, and refusals, we anticipate an attrition rate of around 10% per follow-up. On this basis, we anticipate following, of the original cohorts, 90% at T2 and 80% at T3.

Figure 1. Accelerated Cohort Study design.

	School Year 7	School Year 8	School Year 9	School Year 10	School Year 11
	age 11-12	age 12-13	age 13-14	age 14-15	age 15-16
Time 1 (n, 2,760)	C1 (n, 920)	C2 (n, 920)	C3 (n, 920)	-	-
Time 2 (n, 2,484)	-	C1 (n, 828*)	C2 (n, 828*)	C3 (n, 828*)	-
Time 3 (n, 2,208)	-	-	C1 (n, 736†)	C2 (n, 736†)	C3 (n, 736†)

C1, Cohort 1; C2, Cohort 2; C3, Cohort3. Dashed lines indicate points where cohorts overlap. C1 and C2 overlap at School Year 8; C1, C2 and C3 overlap at School Year 9; and C2 and C3 overlap at School Year 10. * assuming 10% loss to follow-up; † assuming 20% loss to follow-up

3.2.2 Nested Sub-Study

(1) Baseline From each T1 cohort we will recruit a sub-sample of 184 from each cohort (total n, 552) for more detailed investigation. Pupils will be informed that a sub-sample will be selected at random for this. At this stage, active consent from both parents and pupils will be sought.

(2) Follow-up At T2, we will re-recruit for re-assessment all those in the nested sub-sample at T1. The recruitment procedure will be identical to that at T1. Assuming an attrition rate of around 10%, we anticipate following around 497 of the original sub-sample (90%; 497/552). We will not fully re-assess this sample at T3.

3.2.3 Sample Size Calculations

Our study is primarily powered to ensure a total cohort sample sufficient to test hypotheses concerning the impact of socio-environmental factors on a persistent trajectory of mental health problems within each of our main ethnic groups. Using bullying as an example, within each ethnic group, a sample size across the cohorts of at least 460 will have 80% power to detect a difference of 0.2 in exposure to bullying (equivalent to a risk ratio of 2.00 and an odds ratio of 2.67), assuming a prevalence of bullying of 0.2 in those with a persistent trajectory (~ 10% of the sample) and 0.4 in those with a low trajectory (~85% of the sample). Of the main ethnic groups of interest, black Caribbeans will form the smallest proportion of the sample at around 20%. Therefore, to have at least 460 of black Caribbean ethnicity, an overall sample of 2,300 is required (i.e., 2,300 x 0.2 = 460). Taking into account loss to follow-up (~10% at T2) and applying an inflation factor to account for clustering of exposures and outcome in schools (10%), the total required sample at the outset of the study then is 2,760, i.e. 920 per school year.

3.4 Data Collection

Data will be obtained at two levels: 1) questionnaire data on all participants (n, 2,760); and 2) interview and assessment data and biological samples on the sub-sample (n, 552). (See Appendix, Table 1.)

3.4.1 Cohorts at T1, T2 and T3 (1) Questionnaire All participating pupils will complete, in class, a structured, computer assisted questionnaire at T1, T2 and T3. At T2 and T3, questions – where necessary and appropriate – will relate to the preceding year. All items in the questionnaire are derived from measures that have been used and validated in previous studies of adolescent populations. The questionnaire will comprise 108 items in 4 sections covering basic information, mental health, risk (e.g., significant events, peer bullying and other victimisation events, and discrimination), and protective factors (e.g., social networks, social support, cultural integration, coping strategies), and will take around 60 minutes to complete.

3.4.2 Nested Sub-Sample at T1 and T2: Assessments and Samples At T1 and T2, all pupils who are selected and consent to participate in the sub-study will complete, with two trained researchers, an interview on mental

health and on victimisation, and assessments of psychological processes (e.g., cognitive schema, , emotion recognition, attributional styles), and provide a saliva sample for DNA and a hair sample for cortisol. In addition, we will a) complete by phone, with each parent who consents, parent versions of questionnaires and interviews completed with pupils (plus questions on any abnormality or developmental delay in speech and/or motor function and on family history of mental disorder); and b) ask form tutors for each pupil to complete the Teacher Report Form, which evaluates behaviour problems in school.

3.5 Data Analyses

Cutting-edge analytic approaches will be employed to meet our objectives and test our hypotheses. For example, growth mixture modelling will be used to a) identify latent growth trajectories (i.e. categorical latent variables) that account for heterogeneity in patterns of change in mental health problems over time and b) integrate these growth trajectories for the different cohorts. Multilevel regression techniques will be used in all analyses of main, cumulative and interaction effects on mental health problems to account for clustering by school. Finally, multilevel mediation analyses will be used to parse total effects of exposures on mental health problems into direct and indirect effects via hypothesised mechanisms.

4 References (1)

1. Bourque F, van der Ven E, Malla A. *Psychol Med* 2011;41(5):897-910. **2.** Morgan C, Charalambides M, Hutchinson G, Murray RM. *Schizophr Bull* 2010;36(4):655-664. **3.** Morgan C. In: Thornoicroft G, Szmukler G, Mueser K, Drake RE, eds. *Oxford Textbook of Community Mental Health*. Oxford: Oxford University Press; 2011. **4.** Kessler RC, Amminger GP, Aguilar-Gaxiola S, Alonso J, Lee S, Ustun TB. Age of onset of mental disorders: a review of recent literature. *Curr Opin Psychiatry* 2007; **20**(4): 359-64. **5.** Goodman A, Patel V, Leon D. *BMC Public Health*. 2008;8:258. **6.** Harding S, Whitrow M, Maynard MJ, Teyhan A. *Int J Epidemiol* 2007;36(3):512-517. **7.** Laurens KR, Hodgins S, Maughan B, et al. *Schizophr Res* Feb 2007;90(1-3):130-146.

APPENDICES

1 Study Hypotheses

In relation to Objective 1, we will test the following primary hypotheses:

H1.1   At each time point and in each cohort, there will be variations in mental health problems by ethnic group (e.g., more externalising problems and unusual experiences among minority groups)

H1.2   There will be variations in trajectories of mental health problems over time by ethnic group (e.g., more with a 'persistent' trajectory in minority groups)

In relation to Objective 2, we will test the following primary hypotheses:

H2.1   Socio-environmental exposures at T1 and T2 involving elements of violence and threat (e.g., physical bullying, victim of assault, etc.) will be most strongly associated with a persistent trajectory, overall and in each of the main ethnic groups

H2.2   The effect of each socio-environmental exposure will be modified by each protective factor (i.e., social network, social support, coping strategies, cognitive ability), such that odds of a persistent trajectory will be highest in those exposed and for whom protective factors are absent or low

H2.3   Any observed differences between black Caribbean, black African, and white British groups in odds of persistent experiences will be accounted for, at an individual level, primarily by socio-environmental exposures involving violence and threat and discrimination

H2.4   Each protective factor will have similarly modifying effects in all ethnic groups, but will be less common or lower in black Caribbean and black African groups compared with white British

H2.5   The odds of a persistent trajectory will be highest in black Caribbean and black African groups when school level own group ethnic density is low

In relation to Objective 3, we will test the following primary hypotheses:

H3.1   Associations between socio-environmental risk factors and trajectories of mental health problems will be at least partially mediated via negative affect (i.e., emotional distress), cognitive schema and biases, and sttributional style and, uniquely, these mediation effects will be similar across all ethnic groups

H3.2   HPA axis activation will be greater in black Caribbean and black African adolescents compared with white British in the context of socio-environmental factors

2 Study Questionnaires and Assessments

Table 1. Questionnaire at T1, T2 and T3.

Domain	Questionnaire, item, measure
Basic Information	Date of birth
	Gender
	Postcode
	Place of birth of pupil and parents
	Language
	Self-reported ethnicity
	Religion
Mental Health	Strengths and Difficulties Questionnaire (Goodman, 1998)
	(25 item questionnaire covering presence and impact of emotional problems, conduct problems, hyperactivity and inattention, peer relationship problems, and prosocial behaviour over past 6 months)
	Adolescent Psychotic Symptom Screener (Kelleher, 2011)
	(8 items on the presence of unusual thoughts and feelings – 2 items on hallucinatory experiences, 6 on delusional experiences – with additional questions on timing, frequency, impact, context, conviction, and a description of the experience)
	Short mood and feelings questionnaire (Angold, 1995)*
	(13 items on symptoms/experiences of depression in the past 2 weeks)
	Generalised Anxiety Disorder Scale (Spitzer, 2006)*
	(7 items on symptoms/experiences of anxiety in the past 2 weeks)
	1 item on self-harm from the Development and Adolescent Wellbeing Assessment (DAWBA) (Goodman, 2000)
	6 items on troublesome behaviour from the DAWBA (Goodman, 2000)
Risk	
Socioeconomic Status	Family Affluence Scale (Wardle, 2002)
	(4 item index of common indicators of wealth - ownership of car, computer, number of bedrooms in household, and number of yearly holidays)
	Self-reported free school meal status
	Parental employment status
Family Structure	1 item on who the pupil currently lives with
	1 item on reason not living with mum or dad, if applicable
Family health	1 item on participant's physical health
	2 items on parents' physical and mental health
	1 item on siblings' mental health
	2 items on participant's height and weight
Life events	Adolescent-appropriate Life Events Checklist (Heubeck & O'Sullivan, 1998)
	(16 item checklist; items include death of someone close, parental separation/divorce, serious accident or illness, being a victim of crime)
	9 items assessing other difficult experiences, including accidents (family); school exclusions; foster care; family money problems; parental alcohol misuse; migration; homelessness.
Peer Bullying	Revised Olweus Bully/Victim Questionnaire (Olweus, 1996)

Domain	Questionnaire, item, measure
	(4 items covering physical, verbal, relational, and cyber bullying)
Discrimination	2 items on unfair treatment due to race and religion
Substance Use	3 items on smoking
	1 item on alcohol use
	4 items on cannabis use
	1 item on other substance use
Neighbourhood	1 item on length of time lived in neighbourhood
	4 items on perception of neighbourhood (Smith, 2012)
Street Gangs	3 items from the British Crime Survey for 10-15 year olds (Milard, 2010), and 3 items from the Eurogang Survey (Medina, 2013)
Protective	
Social Networks	1 item on number of friends
	2 items on peer and adult confidants
	1 item on loneliness
	1 item on best friends in own year group at school (for Social Network Analysis)
	2 items on internet use
Family Relationships and Social Support	Parental Bonding Instrument, short version (Parker , 1979)
	(12-item questionnaire on parental care and parental control)
	3 items on perceived quality of relationships with parents/carers and siblings
	Multidimensional Scale of Perceived Social Support (Zimet, 1990)
	(12 item questionnaire on perceived support from family, friends, and others)
Help & Support	11 + 3 items on contact with a range of formal helping agents for emotional or behavioural difficulties (e.g. school counsellors, mental health professionals) (Green, 2005)
School Environment	5 items on perception of school environment/climate (McNeelyet al., 2002)
Cultural Integration	2 items on how many friends are from the pupil's ethnic group and how many from other ethnic groups (Bhui et al., 2005a and 2005b; Berry, 2004)
Coping Strategies	Children's Coping Strategies Checklist (Ayers et al., 1996)
	(26 item questionnaire assessing four types of coping: distraction, support seeking, active, avoidant)
Mechanisms	
Sleep	Child Report Sleep Patterns Questionnaire (Meltzer, 2013)
	(9 item questionnaire on frequency, duration, and quality of sleep)
Physical activity	Physical Activity Questionnaire for Children (Kowalski, 2004)
	(9 items on frequency, intensity, and types of activities in past seven days

*T1 and T3 only.

Table 2. Assessments and Samples at T1 and T2.

Domain	Questionnaire, Interview, Task
Mental Health	Adolescent Psychotic Symptom Screener (Kelleher, 2011)
	(8 items on the presence of unusual thoughts and feelings – 2 items on hallucinatory experiences, 6 on delusional experiences – with additional questions on timing, frequency, impact, context, a description of the experience)
	Child and Adolescent Self-Harm Questionnaire (Madge, 2008)
	(7 items on presence and nature of self-harm behaviours)
	Development and Adolescent Wellbeing Assessment (Goodman, 2000)
	(structured interview on depression, anxiety, conduct disorder, and, where applicable, PTSD)
Risk	
Victimisation and other adversities	Revised Olweus Bully/Victim Questionnaire (Olweus, 1996)
	(4 items covering physical, verbal, relational, and cyber bullying)
	Juvenile Victimisation Questionnaire (Finkelhor, 2011)
	(Semi-structured interview on four domains of victimisation: crime, maltreatment, peer, and witnessing violence)
	Adolescent-appropriate Life Events Checklist (Heubeck & O'Sullivan, 1998)
	(16 item checklist; items include death of someone close, parental separation/divorce, serious accident or illness, being a victim of crime)
Mechanisms	
Social cognition	Emotion Recognition-40 Test (ER-40; Gur, 2001)
	(computerised task assessing facial emotion recognition)
	Children's Attributional Style Questionnaire-Revised (CASQ-R) (Kaslow, 1991)
	(24 item structured questionnaire on attributional styles: internal/external; stable/unstable; global/specific)
	Brief Core Schema Scales (Fowler, 2006)
	(24 item measure of core schematic beliefs about self and others)
Cortisol	Hair sample
	(two small hair samples, approx. 3 cm in length, from the back of the scalp to assess chronic stress response [HPA axis activation])
Mindfulness	Child and Adolescent Mindfulness Measure (Greco, 2011)
	(10 item questionnaire on dimensions of mindfulness [i.e., present moment awareness])
Resilience	Responses to Stress Questionnaire (RSQ) (Connor-Smith, 2000)
	(structured questionnaire assessing coping and involuntary responses to stress)
Other	
IQ	Shortened Wechsler Abbreviated Scale of Intelligence – Second Edition (WASI-II) (two tasks assessing vocabulary and matrix reasoning and provides a reliable measure of general cognitive ability)
DNA	Saliva sample collected using Oragene DNA kit for research

references (2) measures

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