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1 **Trauma, resilience and mental health in migrant and non-migrant youth:**  
2 **An international cross-sectional study across six countries**

3  
4 Justine M Gatt<sup>1,2\*</sup>, Rebecca Alexander<sup>1,2</sup>, Alan Emond<sup>3</sup>, Kim Foster<sup>4</sup>, Kristin Hadfield<sup>5</sup>, Amanda Mason-  
5 Jones<sup>6</sup>, Steve Reid<sup>7</sup>, Linda Theron<sup>8</sup>, Michael Ungar<sup>9</sup>, Trecia Wouldes<sup>10</sup>, Qiaobing Wu<sup>11</sup>

6 <sup>1</sup> Neuroscience Research Australia, Randwick NSW 2031, Australia

7 <sup>2</sup> School of Psychology, University of New South Wales, Sydney NSW 2052, Australia

8 <sup>3</sup> Centre for Child and Adolescent Health, University of Bristol Medical School, Bristol BS8 2BN, UK

9 <sup>4</sup> Australian Catholic University, Australia

10 <sup>5</sup> Department of Biological and Experimental Psychology, Queen Mary University of London, UK

11 <sup>6</sup> Department of Health Sciences, University of York, University Rd, York, YO10 5DD, UK

12 <sup>7</sup> Primary Health Care Directorate, University of Cape Town, South Africa

13 <sup>8</sup> Department of Educational Psychology, University of Pretoria, South Africa

14 <sup>9</sup> Resilience Research Centre, Dalhousie University, Canada

15 <sup>10</sup> Department of Psychological Medicine, The University of Auckland, Auckland 1142, New Zealand

16 <sup>11</sup> Department of Applied Social Sciences, The Hong Kong Polytechnic University

17  
18  
19 **\*Corresponding author:** Dr Justine M Gatt; Phone (+61293991812); Postal address: Neuroscience Research  
20 Australia, Barker St, Randwick Sydney NSW 2031 Australia. E-mail address: [j.gatt@neura.edu.au](mailto:j.gatt@neura.edu.au)

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32 **ABSTRACT**

33 Resilience is a dynamic process of positive adaptation to significant adversity. While there has been substantial  
34 focus on risks and negative outcomes associated with youth migrancy, there is limited evidence of the  
35 relationship between the adversity of migration, and resilience, wellbeing and positive mental health in  
36 adolescents. This international study aimed to explore the differences in resilience, wellbeing, and mental  
37 health behaviors in migrant and non-migrant adolescents tested across six countries (Australia, New Zealand,  
38 UK, China, South Africa, and Canada) with varying levels of trauma exposure. The study was a cross-sectional  
39 survey design with a convenience sample of 194 10-17-year-old migrants and non-migrants. The migrant  
40 sample included both ‘internal’ migrants (change of residence within a country) and ‘external’ migrants  
41 (change of residence across national borders) for comparison. Across the sites, migrants reported a higher  
42 mean number of traumatic events for the past year than non-migrants, with internal migrants reporting more  
43 events than external migrants overall. South African adolescents reported a higher mean number of traumatic  
44 events for the past year than all other sites. External migrants reported higher resilience scores yet reduced  
45 prosocial behaviors relative to internal migrants and non-migrants, whereas both internal and external migrants  
46 reported higher peer problems than non-migrants. When considering the interacting effects of trauma, the  
47 presence or absence of trauma did not appear to impact migrant scores in terms of resilience wellbeing, or  
48 conduct problems. In comparison, trauma-exposed non-migrants showed detriments relative to trauma-  
49 exposed migrant peers for all of these measures. In conclusion, the survey tool was found to be reliable and  
50 acceptable for use in international studies of different samples of adolescent migrants. Overall, migrant  
51 adolescents showed greater resilience resources than non-migrants and, although the migrants experienced  
52 more traumatic events, the impact of trauma on mental health outcomes was greater in the non-migrants. There  
53 is a need for further research with larger prospective sample sizes to investigate how levels of resilience and

54 wellbeing vary over time and across countries, and ways resilience can be promoted in adolescents exposed  
55 to trauma, regardless of migrancy status.

## 56 **INTRODUCTION**

57 Understanding the mechanisms that underpin resilience to trauma is a surging field of enquiry in mental health  
58 research, particularly in adolescents. The impact of migration is another public health challenge and is  
59 sometimes precipitated by adversity experienced in the home country or region. Worldwide there are  
60 approximately 35 million migrants between the ages of 10 and 24, which represent 17% of the total migrant  
61 population. Of those, 9 million (25%) are in the 10-14 year age group and 11 million (32%) are in middle to  
62 late adolescence (15-19) (WHO, 2014). There are two basic types of migration; internal and external. Internal  
63 migration usually refers to a change of residence within a country such as movement from rural to urban  
64 settings or movement from state to state. External migration refers to a change of residence over national  
65 boundaries or moving to a different country. External migrants can be further classified into people who  
66 followed legal and illegal migrant routes, and refugees. The motivation for these different types of migration  
67 often differs, and which can provide diverse challenges to the migrant before and after their arrival in their  
68 new home (Perreira & Ornelas, 2013; Wiese, 2010). However, current research is unclear as to whether there  
69 are common challenges for internal and external adolescent migrants and how these challenges may affect  
70 adolescence and the transition from childhood to adulthood during this crucial stage of development (OECD,  
71 2010; UNICEF, 2010; UNICEF New Zealand, 2015). This is unfortunate because adolescence is a key decade  
72 in the life-course where physical health, mental health and behavioral problems can arise that will have an  
73 ongoing impact throughout adulthood.

74 Many of the risk factors for mental health and behavioral problems begin during adolescence and include  
75 tobacco use, harmful use of alcohol and cannabis and unhealthy diets (Patton et al., 2016). The onset of mental  
76 disorders such as depression and anxiety disorders typically occur in childhood and adolescence, with 20% of

77 the world's children and adolescents experiencing mental disorders, half of those beginning prior to age 14  
78 (Kessler et al., 2007). Left untreated, these conditions can severely impact development, educational  
79 attainment and place young people at higher risk of suicide (Viner et al., 2011). Substance abuse, conduct  
80 problems and mental disorders in adolescence are often triggered by psychological trauma, either by direct  
81 experience of a traumatic event such as interpersonal violence or through secondary traumatic stress that  
82 occurs when a close family member or friend has experienced a traumatic event (Herzog, Fleming, Ferdik, &  
83 Durkin, 2016; Kisiel, Summersett-Ringgold, Weil, & McClelland, 2017). The kind, number and complexity  
84 of traumas experienced in early life have a differential impact on psychological and behavioral difficulties  
85 (Chu, Williams, Harris, & Bryant, 2013; Flaherty et al., 2013). In addition, children exposed to trauma may  
86 continue to develop new symptoms over time as they encounter additional developmental or environmental  
87 challenges and stressors (Bonanno & Mancini, 2012; Hobfoll & de Jong, 2014; Soleimanpour, Geierstanger,  
88 & Brindis, 2017). Yet, it is still unclear as to why some children exposed to trauma develop emotional and  
89 behavioral problems while others do not (Kisiel et al., 2017).

90 Resilience as a construct is the process of positive adaptation and/or recovery from trauma or adversity  
91 (Masten, 2011). Multiple systems are understood to interact to provide the resources required for resilience  
92 (Alexander & Gatt, In Press; M. Ungar, 2011). Factors that have been associated with resilience in childhood  
93 and adolescence, include positive caregiver, family and peer relationships, religion, school environment and  
94 personal characteristics such as self-regulation and coping skills (Kisiel et al., 2017; Masten & Osofsky, 2010;  
95 Stratta et al., 2015). Low resilience to adversity puts individuals at higher risk of developing psychiatric  
96 problems with depression, anxiety and conduct disorder being the most common (Cicchetti, 2013; Hughes et  
97 al., 2017).

98 Research in adolescent migrants have identified protective factors for mental health, suggestive of resilience  
99 processes (Betancourt et al., 2014; Fazel, Reed, Panter-Brick, & Stein, 2012; Perreira & Ornelas, 2013;  
100 Sotomayor-Peterson & Montiel-Carbajal, 2014; Wiese, 2010). In one study, pre-migration poverty combined

101 with clandestine entry in the United States increased the risk for symptoms related to post-traumatic stress  
102 disorder (PTSD) (Perreira & Ornelas, 2013). Post-migration discrimination and poor neighborhoods also  
103 increased the risk for PTSD whereas a positive family environment and social support mitigated risk (Perreira  
104 & Ornelas, 2013). In a review of the mental health of refugee children resettled in high-income countries, risk  
105 of developing mental health problems was associated with trauma exposure, parental exposure to violence,  
106 loss of parent(s), limited family support, violence and discrimination in the host country, feeling disconnected  
107 to school, and neighborhood violence (Fazel et al., 2012). Protective factors included stable settlement and  
108 social support in the host country, psychological wellbeing of the parents/guardians and religious beliefs (Fazel  
109 et al., 2012). Overall however, most studies have largely focused on vulnerability or risk in refugee populations  
110 relative to non-migrants with little focus on comparisons with immigrant youth, or within immigrant groups  
111 defined more broadly (e.g., immigrant youth who migrated at some undefined point in time, and/or second-  
112 generation immigrant youth with first-generation immigrant parents), with most, if not all, studies conducted  
113 within the one country, with no comparison across multiple country sites (Beiser & Hou, 2016; Chau,  
114 Baumann, Kabuth, & Chau, 2012; Sirin, Ryce, Gupta, & Rogers-Sirin, 2013; Tummala-Narra, 2015).

115 Recognizing the gaps in our understanding of mental health in adolescent migrants, an international  
116 collaboration was established through the World Universities Network to investigate resilience (WUN, 2017).  
117 The aim of this collaboration is to establish a longitudinal study that would identify the mechanisms or  
118 processes that promote physical and mental wellbeing and prevent mental illness despite exposure to the  
119 adversity brought about by adapting to a new culture and the challenges of transitioning through adolescence.  
120 This collaboration includes a multidisciplinary group of researchers from Australia, Canada, China, New  
121 Zealand (NZ), South Africa and the United Kingdom (UK). Through this collaboration a questionnaire was  
122 designed and piloted in these countries with the intention of comparing the resilience of adolescent migrants  
123 with non-migrants. The questionnaire was based on an in-house literature review of resilience in adolescent  
124 migrants, and qualitative data collected during focus groups in the NZ, South Africa, and the UK. The sites

125 chosen for focus group discussions offered diverse contexts for the study, and were linked to the World  
126 Universities Network and had the resources and expertise to conduct qualitative interviews.

127 This aim of this report is to use our pilot data to explore the impact of country-specific factors, migrancy and  
128 trauma exposure on resilience, wellbeing and mental health among migrant and non-migrant adolescents aged  
129 10-17 in countries where there are high rates of internal and external migration. The overall hypotheses are  
130 that migrants and non-migrants might vary in behaviour and mental health outcomes by virtue of differences  
131 in exposure to trauma and adversity, and that higher resilience would be associated with better wellbeing,  
132 fewer symptoms of mental illness and fewer behavioral problems. The specific questions addressed in this  
133 study are the following: (1) Are the measures of resilience, wellbeing, mental health, and behavior reliable  
134 across country sites? (2) Do differences exist between migrant and non-migrant adolescents (controlling for  
135 any site differences) in trauma exposure? (3) Are there differences between migrants and non-migrants in  
136 behavioral and mental health outcomes? and (4) How is trauma and migration related to resilience, behavior  
137 and wellbeing?

## 138 **MATERIALS AND METHODS**

139 This pilot study, conducted across six countries: Australia, Canada, China, NZ, South Africa and the UK, used  
140 a cross-sectional survey design with a convenience sample of 194 10-17 year-old migrant and non-migrant  
141 youth. Migrants included internal migrants who had moved within a country, and external migrants who had  
142 moved across national borders.

### 143 **Participants**

144 The sample comprised 194 adolescents from: Australia ( $n=25$ ), Canada ( $n=21$ ), China ( $n=77$ ), NZ ( $n=33$ ),  
145 South Africa ( $n=28$ ) and the UK ( $n=10$ ). Participants ranged in age from 10-17 years ( $M=13.9$ ,  $SD=1.36$ ), with  
146 the sample made up of 52% males ( $n=101$ ), 46% females ( $n=89$ ), and 2% sex undisclosed ( $n=4$ ). Within the

147 sample, 77% of participants were migrants and 23% were non-migrants. Table 1 contains a breakdown of  
148 migrant status across research sites.

149 Youth were recruited from schools (Australia, UK, China), youth centres (South Africa), an after-school  
150 program for migrants (Canada), or community networks (New Zealand) (Table 1). Details regarding  
151 participant recruitment per site are as follows. In Australia, head teachers from several independent NSW  
152 schools were approached for study participation. For participating schools, the head teacher forwarded study  
153 information to students and their parents for written consent. Head teachers then organised testing days and  
154 times for students to complete the questionnaires during school hours with a research team member. In the  
155 UK, youth were recruited from two state secondary schools in Bristol: after written informed consent was  
156 obtained from a parent, the students completed the questionnaires during school hours with a research team  
157 member. In China, youth were recruited from one secondary school in the city of Guangzhou, Guangdong  
158 province, where many migrants concentrate. The school principle helped select one class randomly from each  
159 of the three grades (grade 7<sup>th</sup> – 9<sup>th</sup>), collected informed consent from the students and their parents, and  
160 arranged the time for students to complete the survey in class, with the presence of a research team member.  
161 In South Africa, youth centre staff acted as gatekeepers. They advertised the study and provided any interested  
162 youth with consent forms (which needed to be co-signed by a parent/caregiver). In Canada, participants were  
163 sampled through an after-school program run by the YMCA Centre for Immigrant Programs. An information  
164 sheet and consent form was sent to all parents of children in the program and then those children with a  
165 completed consent form were able to participate in the study. Students completed the questionnaire during the  
166 after-school program time. And in New Zealand, families with adolescents in the target age group were  
167 identified through advertisements posted in community centres and through WUN research staff and student  
168 networks.

169 Ethics approval was sought and gained from the respective sites according to the local Human Research Ethics  
170 Committee processes (Australia; University of New South Wales Human Research Ethics Committee:

171 HC15672; Canada; Dalhousie University Social Sciences and Humanities Research Ethics Board: REB 2015-  
172 3666; China; Chinese University of Hong Kong; New Zealand; The University of Auckland Human Ethics  
173 Committee: 015968; South Africa: North-West University Humanities and Health Research Ethics  
174 Committee: NWU-HS-2015-0234; United Kingdom; University of Bristol Faculty of Medicine Research  
175 Ethics Committee: ref 2016/26061). Written and/or verbal information was provided to all participants.  
176 Informed verbal and/or written consent was obtained from parents and informed verbal or written assent was  
177 gained from youth.

178 INSERT TABLE 1 ABOUT HERE

## 179 **Measures**

180 A questionnaire was developed using established measures from the literature and information derived from  
181 qualitative focus groups with youth in three of the participating countries. The questionnaire commenced with  
182 a series of demographic questions (e.g., gender, country of birth, ethnicity), followed by questions about  
183 participants' family structure, schooling experiences, neighbourhood, personal and familial health, as well as  
184 trauma exposure (see Figure 1 legend for a list of trauma exposure items). The battery also contained the  
185 following measures: (1) Child and Youth Resilience Measure (CYRM-28) (Michael Ungar & Liebenberg,  
186 2011); (2) Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003); (3) Warwick-  
187 Edinburgh Mental Well-being Scale (WEMWBS) (Tennant et al., 2007); (4) COMPAS Wellbeing Scale  
188 (COMPAS-W) (Gatt, Burton, Schofield, Bryant, & Williams, 2014); (5) Depression, Anxiety, Stress Scale  
189 (DASS-21) (Lovibond & Lovibond, 1995); (6) Strengths and Difficulties Questionnaire (SDQ) (Goodman,  
190 2001); (7) CRAFFT Screening Tool for Adolescent Substance Abuse (Knight et al., 1999); and (8)  
191 Acculturation, Habits, and Interests Multicultural Scale for Adolescents (AHIMSA) (Unger et al., 2002). Here  
192 we report results for the first seven questionnaires, as the data for the AHIMSA questionnaire has been  
193 published separately (Wu et al., 2018).

194 Psychometric properties for the measures used are well-established. The Child and Youth Resilience Measure-  
195 28 (CYRM-28) is a 28-item measure of child and youth resilience that measures individual, peer, family and  
196 community resources implicated in resilience processes (Liebenberg, Ungar, & Vijver, 2012). Responses are  
197 scored using a 5-point scale ranging from *1 = does not describe me at all* to *5 = describes me a lot*, where  
198 higher scores indicate greater resilience. Factor analyses confirmed three latent variables (i.e., individual  
199 characteristics; relationships with caregivers; and contextual elements contributing to a sense of belonging).  
200 These inter-related variables have been shown to load onto a single resilience factor (Daigneault, Dion, Hébert,  
201 McDuff, & Collin-Vézina, 2013; Liebenberg et al., 2012). Internal reliability for the CYRM-28 is good, with  
202 Cronbach's  $\alpha$  reported as ranging between .65 and .91 for the three latent variables (Liebenberg et al., 2012).

203 The Connor-Davidson Resilience Scale (CD-RISC) is a widely used measure of youth trait resilience  
204 comprising 25 items measured on a 5-point scale ranging from *0 = not at all* to *4 = true nearly all of the time*  
205 (Connor & Davidson, 2003). Original factor analysis revealed a five factor model where factor one referred to  
206 personal competence, tenacity and high standards, factor two related to trusting one's instincts, tolerance of  
207 negative affect and a strengthening effect of stress, factor three corresponded to acceptance of change and  
208 positive relationships, factor four to personal control and factor five to spiritual influences (Connor &  
209 Davidson, 2003). Internal reliability tests reported Cronbach's  $\alpha$  for the full scale at 0.89 and item-total  
210 correlations ranged between 0.30 and 0.70. Test-retest reliability was good with an intraclass correlation  
211 coefficient of 0.87. Convergent validity was established through positive correlations between the CD-RISC  
212 and Kobasa's measure of hardiness (Kobasa, 1979) (Pearson  $r = 0.83$ ,  $P < .0001$ ) and the Sheehan Social  
213 Support Scale (SSS) (Sheehan, 1983) (Spearman  $r = 0.36$ ,  $P < .0001$ ). Negative correlations have been  
214 established with the Perceived Stress Scale (PSS-10) (Cohen, Kamarck, & Mermelstein, 1983) (Pearson  $r =$   
215  $0.76$ ,  $P < .001$ ), the Sheehan Stress Vulnerability Scale (SVS) (Sheehan, 1983) (Spearman  $r = -0.32$ ,  $P < .0001$ ),  
216 the Sheehan Disability Scale (SDS) (Sheehan, 2008) (Pearson  $r = -0.62$ ,  $P < .0001$ ) (Connor & Davidson, 2003).

217 The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) is a measure of wellbeing containing 14  
218 positively worded items relating to positive attributes of mental health (e.g. Item 1: *I've been feeling optimistic*  
219 *about the future*; Item 5: *I've had energy to spare*), and is measured on a 5-point scale ranging from 1 = *none*  
220 *of the time to 5 = all of the time*. The WEMWBS has been quantitatively validated in a student and adult UK  
221 population, as well as with Chinese and Pakistani ethnic minority groups in the UK (Stewart-Brown et al.,  
222 2011; Taggart et al., 2013; Tennant et al., 2007). Initial assessment showed content validity was good with  
223 confirmatory factor analysis revealing a single *wellbeing* factor (GFI =0.93, AGFI=0.8, RMSEA=0.055).  
224 Internal reliability tests of the scale reported Cronbach's  $\alpha$  at 0.89; suggesting some item redundancy, item  
225 total correlations ranged from 0.52 and 0.80. Test-retest reliability for the WEMWBS was high (0.83) at one  
226 week and was found to discriminate between youth and adult populations well (Stewart-Brown et al., 2011).  
227 The WEMWBS was also robust in measuring wellbeing in different ethnic populations (Taggart et al., 2013).

228 The COMPAS Wellbeing Scale (COMPAS-W) is a composite measure of wellbeing comprising six  
229 subcomponents: Composure during stress, Own-worth, Mastery over the environment, Positivity,  
230 Achievement and Satisfaction with physical, psychological health and social relationships (Gatt et al., 2014).  
231 The 26-item scale accounts for both hedonic (i.e., subjective) and eudaimonic (i.e., psychological) wellbeing  
232 constructs, with individual subscales measured using a 5-point scale ranging from 1 = *strongly disagree* to 5  
233 = *strongly agree*. A composite wellbeing score is produced from the sum of the subscale scores. Construct  
234 validity for the COMPAS-W had been established through strong correlations with other measures of physical  
235 and psychological health behaviors, such as the World Health Organization Quality of Life scale (WHOQOL-  
236 BREF) ((WHO), 1998), the Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985),  
237 the Internal Control Index (ICI) (Duttweiler, 1984), and the Emotion Regulation Questionnaire (Gross & John,  
238 2003). Internal consistency for the COMPAS-W is strong (average  $r = 0.71$ ; Wellbeing  $r = 0.84$ ) and test-  
239 retest reliability was robust across a 12-month period (average  $r = 0.62$ ; Wellbeing  $r = 0.82$ ) (Gatt et al., 2014).

240 The Depression Anxiety Stress Scale (DASS-21) is 21-item measure of state depression, anxiety and stress  
241 (Lovibond & Lovibond, 1995). The DASS-21 is made up of three subscales for depression, anxiety and stress  
242 respectively, which are each measured on a 4-point scale ranging from *0 = never to 4 = almost always*. DASS  
243 subscales have been shown to correlate well with other measures of depression and anxiety, such as the Beck  
244 Depression Inventory (BDI) (Beck, Steer, & Carbin, 1988) and the Beck Anxiety Inventory (BAI) (Steer &  
245 Beck, 1997) (Lovibond & Lovibond, 1995). The DASS has been found to differentiate clinical and non-clinical  
246 populations, as well as to discriminate between different clinical diagnostic groups (Brown, Chorpita,  
247 Korotitsch, & Barlow, 1997; Lovibond & Lovibond, 1995). Internal consistency for each subscale of the  
248 DASS-21 was good in a recent non-clinical sample (Cronbach's  $\alpha$  was reported at .91, .80, and .84 for  
249 Depression, Anxiety and Stress, respectively) (Sinclair et al., 2012).

250 The Strengths and Difficulties Questionnaire (SDQ) is a screening tool used to assess the psychological  
251 adjustment of children and youths (Goodman, 2001). The 25-item scale is made up of positively and negatively  
252 worded statements (e.g., Item 1: *I am considerate of other people's feelings*; Item 2: *I am restless, overactive*  
253 *and cannot stay still for long*). Participants respond to statements using a 3-point scale from *0 = not true*; *1 =*  
254 *somewhat true*; and *2 = certainly true*. Factor analysis supported a five-factor model, which included (1)  
255 emotional symptoms, (2) conduct, (3) hyperactivity-inattention, (4) peer relationships, and (5) pro-social  
256 behaviour (Goodman, 2001). Internal consistency was sound with Cronbach's  $\alpha$  reported at 0.73 for the scale  
257 (Goodman, 2001). In a U.S. sample, Cronbach coefficients for subscale scores ranged from fair ( $\alpha = 0.43$ ) for  
258 Peer Problems to excellent for Total Difficulties ( $\alpha = 0.83$ ) and Impairment scores ( $\alpha = 0.80$ ), and good to  
259 excellent for other subscales ( $\alpha = 0.63$ – $0.77$ ) (Bourdon, Goodman, Rae, Simpson, & Koretz, 2005). Test-retest  
260 reliability was reasonable across a four to six month period ( $\alpha = 0.62$ ) (Goodman, 2001).

261 The CRAFFT is a 6-item screening test used to assess adolescents for substance use and abuse (Knight et al.,  
262 1999). Items ask directly about substance use (e.g., Item 2: *Do you ever use alcohol or drugs to relax, feel*  
263 *better about yourself or fit in?*) and require a simple *Yes/No* response, with items summed for a final score.

264 CRAFFT scores have been shown to correlate strongly with substance use classifications: (1) *no use*, (2)  
265 *occasional use*, (3) *problem use*, (4) *abuse* and (5) *dependence* (Spearman's  $r = 0.72$ ,  $p < .001$ ), and scores  
266 above 2 are indicative of *problem use*, *abuse* and *dependence* categories (Knight, Sherritt, Shrier, Harris, &  
267 Chang, 2002).

268 The Acculturation, Habits and Interests Multicultural Scale for Adolescents (AHIMSA) is a measure of  
269 cultural identification in adolescents (Unger et al., 2002). AHIMSA comprises seven items and generates  
270 scores for four sub-scales: (1) Country of Residence Orientation (Assimilation), (2) Other Country Orientation  
271 (Separation), (3) Both Countries Orientation (Integration), and (4) Neither Country Orientation  
272 (Marginalization) (Unger et al., 2002). Three of the sub-scales correlated with subscales of a modified  
273 Acculturation Rating Scale for Mexican-Americans-II, with English language usage, providing initial  
274 evidence of construct validity (Cuellar, Arnold, & Maldonado, 1995). Internal consistency of the sub-scales  
275 was acceptable, with Cronbach's  $\alpha$  ranging from 0.50 (Marginalisation) to 0.79 (Assimilation and Integration)  
276 (Unger et al., 2002).

## 277 **Procedure**

278 The questionnaire was administered verbally (UK, New Zealand, South Africa) or completed by youth in hard  
279 copy (Canada, China) or via computer using Qualtrics survey software (Australia) (Qualtrics, 2005); however,  
280 there were no differences in item content or ordering of items between the different administered versions. All  
281 research sites completed the full test battery, with the exception of the UK and South Africa for which  
282 participants did not complete the COMPAS-W Scale, and China for which participants did not complete the  
283 CRAFFT. In the UK, the WEMWBS wellbeing scale was preferred as a measure of wellbeing as this site had  
284 comparative data on this age group for another sample, and so the COMPAS-W was not administered to keep  
285 testing time minimal. Similarly in South Africa, the COMPAS-W was not administered due to ethical concerns  
286 that the administration of a second wellbeing questionnaire (in addition to the WEMWBS) would make the

287 testing time too long. In China, the CRAFFT was not administered as it was not culturally acceptable to ask  
288 participants about the use of drugs and alcohol. Measures were translated and back-translated into Mandarin  
289 for the China cohort. All other country cohorts completed the questionnaire in English.

## 290 **Statistical Analysis**

291 Data were collected from each research site and compiled into a single data file using the SPSS Statistics 24  
292 package. Internal reliability of each questionnaire was evaluated across the sample and per site using Cronbach  
293 Alpha.

294 Mean differences in trauma exposure frequency was evaluated between migrants versus non-migrants  
295 (controlling for site), as well as non-migrants versus internal and external migrants using univariate ANOVA.  
296 Variation in the type of event per group was examined using crosstabs chi-square analysis. This analysis was  
297 repeated to also compare differences between sites.

298 To then consider whether trauma exposure in the past year moderated the impact of mental health in migrants  
299 versus non-migrants, we examined the interaction effects of trauma exposure x migrancy status on mental  
300 health and resilience outcomes using univariate ANOVA, covarying for age, sex, site differences and whole  
301 life trauma exposure. This analysis included a comparison of external vs internal migrants vs non-migrants. **A**  
302 ***p* value significance threshold of 0.05 was adopted in all analyses.**

## 303 **RESULTS**

### 304 **Internal reliability**

305 Internal reliability of each questionnaire across and within each site is shown in Table 2. Across the sample,  
306 all questionnaires showed high internal reliability. High internal reliability for most questionnaires was also  
307 evident within site, with some exceptions (e.g., lower estimates for the CYRM-28 and WEMWBS in the UK

308 sample, likely due to its smaller sample size of 10; and lower estimates for the CRAFFT in the Australian,  
309 Canadian and UK samples, likely due to increased variability in substance use/abuse within these sites).

310 INSERT TABLE 2 ABOUT HERE

### 311 **Mean differences in trauma exposure**

312 Figure 1 presents the frequency (percentage) of types of childhood traumatic events reported across the sample,  
313 for both the past year and lifetime. Mean total events reported for the past year and lifetime were 1.26 ( $\pm 1.53$ )  
314 and 2.54 ( $\pm 1.85$ ), respectively.

315 We next considered differences in traumatic events reported in migrant versus non-migrant groups, controlling  
316 for site differences. There were no significant differences between migrants and non-migrants in the total mean  
317 traumatic events reported over the *lifetime* ( $F=3.70$ ,  $p=.056$ ). There was however a significant difference in  
318 the total mean traumatic events reported in the *past year* ( $F=5.55$ ,  $p=.019$ ), with migrants reporting a higher  
319 mean number of events ( $M=1.43$ ,  $SD=1.62$ ) than non-migrants ( $M=0.71$ ,  $SD=0.97$ ). There were also  
320 differences between types of trauma reported by migrants and non-migrants. Relative to non-migrants,  
321 migrants reported more episodes of combat experience in war (NM: 0%, M: 13% exposure,  $p=.010$ ) and death  
322 of a family member or close friend (NM: 44%, M: 62% exposure,  $p=.034$ ) in their lifetime, plus more episodes  
323 of death of a family member or close friend than non-migrants in the past year (NM: 16%, M: 34%,  $p=.048$ ).

324 We then considered whether the differences in traumatic events reported in migrants versus non-migrants  
325 varied when stratifying by internal versus external migrants. There were no significant differences between  
326 migrants (internal vs external) and non-migrants in the total mean traumatic events reported over the *lifetime*  
327 ( $F=2.24$ ,  $p=.110$ ). There was however a significant difference in the total mean traumatic events reported in  
328 the *past year* ( $F=4.66$ ,  $p=.011$ ), with internal migrants reporting a higher mean number of events ( $M=1.59$ ,  
329  $SD=1.74$ ) than external migrants ( $M=1.05$ ,  $SD=1.26$ ) and non-migrants ( $M=0.71$ ,  $SD=0.97$ ). There were also

330 differences between exposure for certain types of events. For lifetime events (see Figure 2a), internal migrants  
331 reported a higher number of life threatening accidents (19%) relative to external migrants (7%) and non-  
332 migrants (4%,  $p=.009$ ). For past year events (Figure 2b), internal migrants reported a higher number of  
333 combat/war experiences relative to external migrants and non-migrants ( $M^I$ : 14%,  $M^E$ : 3%, NM: 0%,  $p=.015$ ),  
334 a higher number of life threatening accidents ( $M^I$ : 9%,  $M^E$ : 0%, NM: 0%,  $p=.030$ ), and death of a close family  
335 member or friend ( $M^I$ : 36%,  $M^E$ : 29%, NM: 16%,  $p=.039$ ).

336 We then examined reported traumatic event differences between the sites. There were no significant  
337 differences between sites in the total mean traumatic events reported over the *lifetime* ( $F=1.95$ ,  $p=.088$ ). There  
338 was a significant difference in the total mean traumatic events reported in the *past year* ( $F=5.25$ ,  $p<.0001$ ),  
339 with South African youth reporting a higher mean number of events ( $M=2.43$ ,  $SD=2.13$ ) relative to every other  
340 site: Australia ( $M=0.80$ ,  $SD=1.08$ ,  $p<.0001$ ), Canada ( $M=1.24$ ,  $SD=1.58$ ,  $p=.005$ ), China ( $M=1.29$ ,  $SD=1.47$ ,  
341  $p<.0001$ ), New Zealand ( $M=0.73$ ,  $SD=0.84$ ,  $p<.0001$ ), and the UK ( $M=0.80$ ,  $SD=0.92$ ,  $p=.003$ ). There were  
342 also differences between sites for exposure to specific types of traumatic events reported during the *lifetime*  
343 and *past year*. For lifetime events (see Figure 3a), significant differences between sites were evident for  
344 combat/war exposure ( $p=.0001$ ), witnessing serious injury/murder ( $p=.001$ ), attack/assault ( $p=.029$ ) and death  
345 of family member/close friend ( $p=.023$ ). There were also significant site differences for past year events (see  
346 Figure 3b) for combat/war exposure ( $p=.032$ ), life threatening accident ( $p=.023$ ), witnessing injury/murder  
347 ( $p=.001$ ), attack/assault ( $p=.001$ ), being threatened by a weapon, held captive or kidnapped ( $p=.0001$ ), and  
348 death of family member or close friend ( $p=.005$ ).

349 INSERT FIGURES 1, 2 AND 3 ABOUT HERE

### 350 **Main and interacting effects of trauma and migrancy on wellbeing and mental health outcomes**

351 To then consider whether trauma exposure in the past year moderated the impact of mental health in migrants  
352 versus non-migrants, we examined the interaction effects of trauma exposure x migrancy status on mental

353 health and resilience resources using univariate ANOVA, covarying for any age, sex, site differences and  
354 whole life trauma exposure effects. We also considered the added comparison of external migrants vs internal  
355 migrants vs non-migrants to evaluate whether type of migrancy had a differential impact.

356 There was no significant difference between migrants and non-migrants in their resilience resources as  
357 measured by the CYRM-28. When considering types of migration, a main effect was found for migrancy  
358 ( $F=3.37$ ,  $df=2$ ,  $p=.037$ ), whereby external migrants had a significantly higher CYRM-28 resilience score  
359 ( $M=119.03$ ,  $SE=2.73$ ) compared to internal migrants ( $M=110.83$ ,  $SE=2.01$ ; see Figure 4a). There was no main  
360 effect of trauma, or trauma by migrancy effects, on the CYRM-28.

361 For the CD-RISC resilience measure, there was a significant main effect for migrancy ( $F=21.37$ ,  $df=1$ ,  
362  $p<.0001$ ), whereby migrants demonstrated higher resilience ( $M=69.92$ ,  $SE=1.52$ ) than non-migrants  
363 ( $M=56.33$ ,  $SE=2.44$ ). When considering types of migration, a main effect was again found ( $F=13.15$ ,  $df=2$ ,  
364  $p<.0001$ ), whereby external migrants had a significantly higher resilience score ( $M=74.64$ ,  $SE=2.68$ )  
365 compared to internal migrants ( $M=66.86$ ,  $SE=1.99$ ). There was no main effect of trauma on CD-RISC scores,  
366 yet there was a trauma by migrancy effect ( $F=8.31$ ,  $df=1$ ,  $p=.005$ ). Higher resilience scores were evident in  
367 migrants exposed to trauma than non-trauma, whereas lower resilience scores were evident in non-migrants  
368 exposed to trauma vs non-trauma. Moreover, trauma-exposed migrants showed higher resilience scores than  
369 trauma-exposed non-migrants. When considering types of migration, a trauma by migrancy effect was also  
370 evident ( $F=5.61$ ,  $df=2$ ,  $p=.005$ ). External migrants showed higher resilience than internal migrants in the non-  
371 trauma group, but there were no differences between external and internal migrants in the trauma-exposed  
372 group (Figure 5a).

373 No significant main effects of migrancy or trauma were evident for wellbeing when measured using the  
374 WEMWBS. There were also no effects of migrancy when considering different types of migration. A  
375 significant interaction effect of trauma by migrancy was however evident ( $F=6.43$ ,  $df=1$ ,  $p=.012$ ). Migrants

376 and non-migrants showed similar wellbeing scores in the absence of trauma, yet in the trauma-exposed group,  
377 non-migrants ( $M=48.93$ ,  $SE=2.16$ ) showed significantly lower wellbeing than trauma-exposed migrants  
378 ( $M=56.19$ ,  $SE=1.06$ ). This interaction effect was also significant when considering types of migrants ( $F=4.29$ ,  
379  $df=2$ ,  $p=.015$ ). Again, no group differences were evident in wellbeing in the absence of trauma, yet in the  
380 trauma-exposed group, it was the non-migrants ( $M=49.23$ ,  $SE=2.17$ ) which showed lower wellbeing than the  
381 internal migrants ( $M=56.13$ ,  $SE=1.27$ ) or external migrants ( $M=55.92$ ,  $SE=1.97$ ; Figure 5b).

382 Similar to the results above, no significant main effects of migrancy or trauma were evident for total wellbeing  
383 when measured using the COMPAS-W scale. A significant interaction effect of trauma by migrancy was  
384 however evident ( $F=10.825$ ,  $df=1$ ,  $p=.001$ ). In the absence of trauma exposure, non-migrants ( $M=106.98$ ,  
385  $SE=3.29$ ) showed higher levels of wellbeing than migrants ( $M=97.41$ ,  $SE=2.45$ ); yet in the trauma-exposed  
386 group, non-migrants ( $M=94.10$ ,  $SE=3.52$ ) showed reduced levels of wellbeing than trauma-exposed migrants  
387 ( $M=102.08$ ,  $SE=1.98$ ). This interaction effect was also significant when considering types of migrants  
388 ( $F=5.22$ ,  $df=2$ ,  $p=.007$ ). In the absence of trauma exposure, non-migrants ( $M=106.83$ ,  $SE=3.28$ ) showed higher  
389 levels of wellbeing than internal migrants in particular ( $M=94.96$ ,  $SE=3.20$ ) with external migrants showing  
390 no differences between the other two groups ( $M=101.30$ ,  $SE=4.06$ ). Yet, when trauma-exposed, the wellbeing  
391 scores of the two migrant groups appeared unaffected (IM:  $M=100.55$ ,  $SE=2.37$ ; EM:  $M=105.26$ ,  $SE=3.52$ ),  
392 whereas the non-migrants showed a reduction in wellbeing when trauma-exposed ( $M=94.72$ ,  $SE=3.54$ ; Figure  
393 5c). A similar pattern of significant trauma x migrancy interaction effects were also found for the COMPAS-  
394 W subscales Composure, Mastery, Positivity, Achievement and Satisfaction (see Supplementary Materials).

395 In respect to depression, anxiety, and stress as measured by the DASS-21, there were no significant main or  
396 interaction effects of trauma or migrancy in terms of total general distress or depression, anxiety and stress  
397 subscores. There were also no significant main or interaction effects of trauma or migrancy for self-reported  
398 substance-related risks and problems as measured by CRAFFT.

399 When considering behavioral problems measured by the SDQ, several main and interaction effects were  
400 evident. First, we identified two main effects of migrancy for peer problems ( $F=10.30$ ,  $df=1$ ,  $p=.002$ ) and  
401 prosocial behavior ( $F=7.44$ ,  $df=1$ ,  $p=.007$ ), for which migrants showed higher peer problems ( $M=2.70$ ,  
402  $SE=0.15$ ) and lower prosocial behavior ( $M=7.4$ ,  $SE=0.16$ ) than non-migrants (peer problems:  $M=1.66$ ,  
403  $SE=0.28$ ; prosocial:  $M=8.34$ ,  $SE=0.29$ ). When considering types of migrancy, these main effects were again  
404 significant for peer problems ( $F=5.16$ ,  $df=2$ ,  $p=.007$ ) and prosocial behavior ( $F=12.40$ ,  $df=2$ ,  $p<.0001$ ). In this  
405 case, both internal ( $M=2.67$ ,  $SE=0.19$ ) and external migrants ( $M=2.76$ ,  $SE=0.31$ ) showed higher peer problems  
406 than non-migrants ( $M=1.67$ ,  $SE=0.28$ ; Figure 4b). In addition, external migrants showed the lowest prosocial  
407 behavior ( $M=6.33$ ,  $SE=0.30$ ), followed by internal migrants ( $M=7.89$ ,  $SE=0.20$ ), with non-migrants showing  
408 the highest level of prosocial behavior ( $M=8.16$ ,  $SE=0.28$ ; Figure 4c). Second, we identified a main effect of  
409 trauma for conduct problems ( $F=6.98$ ,  $df=1$ ,  $p=.022$ ), whereby trauma exposed participants showed higher  
410 conduct problems ( $M=1.96$ ,  $SE=0.18$ ) than non-trauma exposed participants ( $M=1.35$ ,  $SE=0.19$ ). There was  
411 also a trauma by migrancy effect for conduct problems ( $F=6.98$ ,  $df=1$ ,  $p=.009$ ), whereby in the absence of  
412 trauma exposure, non-migrants showed fewer conduct problems ( $M=0.92$ ,  $SE=0.30$ ) than migrants ( $M=1.78$ ,  
413  $SE=0.20$ ). Yet, in the presence of trauma exposure, migrants showed no difference in conduct problems  
414 ( $M=1.74$ ,  $SE=0.16$ ), whereas non-migrants showed an increase in conduct problems ( $M=2.18$ ,  $SE=0.33$ ). This  
415 interaction effect for conduct problems was also significant when considering types of migrancy ( $F=3.59$ ,  
416  $df=2$ ,  $p=.030$ ), whereby non-migrants showed fewer conduct problems in the absence of trauma exposure  
417 ( $M=0.94$ ,  $SE=0.31$ ) than both internal migrants ( $M=1.73$ ,  $SE=0.24$ ) and external migrants ( $M=1.89$ ,  $SE=0.40$ ),  
418 but in the presence of trauma exposure, non-migrants showed similar levels of conduct problems ( $M=2.22$ ,  
419  $SE=0.33$ ) to internal migrants ( $M=1.65$ ,  $SE=0.19$ ) and external migrants ( $M=1.99$ ,  $SE=0.31$ ; Figure 5d).

420 INSERT FIGURE 4 AND 5 ABOUT HERE

## 421 DISCUSSION

422 This aim of this study was to use our pilot data to explore the impact of site, migrancy and trauma exposure  
423 on resilience, wellbeing and mental health among migrant and non-migrant adolescents aged 10-17 in multiple  
424 countries where there are high rates of internal and external migration. Our key research questions aimed to  
425 clarify (1) whether the measures of resilience, wellbeing, mental health, and behavior were reliable across  
426 country sites, (2) whether differences were apparent between migrant and non-migrant adolescents and  
427 between sites in trauma exposure, (3) whether there were differences between migrant and non-migrants in  
428 behavioral and mental health outcomes, and (4) how trauma and migration was related to resilience, behavior  
429 and wellbeing.

430 First, we have shown that the structured questionnaire administered in the current study was feasible and  
431 acceptable in this age group, and had good validity when used in different settings with youth of the same age.  
432 All questionnaires showed high internal reliability across the total sample, with some small variability in  
433 estimates for specific sites likely due to smaller sample sizes and variability in health behaviors for specific  
434 subsamples (particularly for the UK sample with N=10).

435 With regard to the second question, a number of key differences in trauma exposure were found for migrants  
436 and non-migrants, and by site. Generally speaking, migrants reported a higher mean number of traumatic  
437 events in the past year than non-migrants, with internal migrants reporting the most events. The types of events  
438 that varied the most between migrant groups were exposure to life-threatening accidents, combat/war  
439 experience and death of a family member or close friend. When we considered variation by site, South African  
440 youth reported a higher mean number of events relative to all other country sites. Importantly, the effects of  
441 migrancy were significant despite including site as a covariate, so the effects were not specific to any country  
442 of origin in particular but rather by virtue of migrancy status specifically.

443 Thirdly, we identified a number of differences between the migrant groups in terms of mental health and  
444 behavioral outcomes. Migrant youth reported higher CD-RISC resilience scores than non-migrants, yet they

445 also reported more behavioral problems in terms of higher SDQ peer problems and lower prosocial behaviors.  
446 However, when we considered type of migrancy, the external migrants showed the higher resilience scores  
447 yet lower SDQ prosocial behaviour scores than the internal migrants and non-migrants. External and internal  
448 migrant groups showed no difference in the SDQ peer problems (both higher than non-migrants). Together,  
449 this suggests that perhaps the external migrants showed higher resilience than internal migrants because they  
450 were able to move away from the trauma (by moving countries), whereas internal migrants may not have been  
451 able to move 'away' from the adversity. This argument is strengthened by the fact that the internal migrants  
452 showed the highest percentage of past year traumatic events due to combat/war, life threatening accidents and  
453 death of a family member/friend in particular, suggesting the adversity may still be present or having an  
454 impact. In contrast to these findings for resilience, migrants did however report more behavioral problems and  
455 less prosocial behaviors towards peers. This effect is likely a reflection of challenges that youth would  
456 experience when entering and assimilating into a new school system; in particular, the larger challenge of  
457 creating new peer networks within a new cultural environment, and often in another primary language for  
458 many external migrants.

459 Finally, we found that the presence of trauma modulated the mental health and behavioral outcomes of non-  
460 migrants in particular, rather than migrants who showed no differences in scores when comparing trauma and  
461 non-trauma exposed groups. For instance, in terms of CD-RISC resilience scores, migrants had higher  
462 resilience than non-migrants in the presence of trauma. This effect was apparent in both internal and external  
463 migrant groups, although in the absence of trauma, external migrants still showed higher resilience scores.  
464 Together, this suggests that migrant youth, particularly external migrants, show a resilient response to  
465 adversity, especially in the presence of trauma or hardship. As this is cross-sectional data, it is difficult to  
466 delineate whether this effect is due to these migrant groups being able to move 'away' from the trauma and  
467 hence they then feel they have more resilience resources, or because they had an inherent disposition of  
468 stronger adaptation or sense of agency which underscored the motivation for them (and their family) to change

469 their living environment and move away. For wellbeing (measured using the WEMWBS and COMPAS-W  
470 scales), the migrant youth (both internal and external) showed higher levels of wellbeing than non-migrants in  
471 the presence of trauma. This effect may again reflect the increased positive mental health state of migrant  
472 youth compared to non-migrant youth given they were able to move away from the most recent trauma.  
473 Finally, in terms of SDQ conduct problems, the presence or absence of trauma did not appear to impact migrant  
474 conduct behaviour for both internal and external migrants. Yet non-migrants showed lower conduct problems  
475 in the absence of trauma, but an increase in conduct problems in the presence of trauma. Overall, these effects  
476 suggest that the mental health behaviors of migrants appeared to be unaffected by the presence or absence of  
477 trauma, whereas non-migrants show significant detriments in resilience, wellbeing and conduct problems in  
478 the presence of trauma. Migrant youth do however appear to demonstrate more peer problems than non-  
479 migrant youth and less prosocial behaviors for external migrants in particular.

480 Previous studies focusing on the mental health of migrant youth have either focused on refugee youth in  
481 particular, with limited direct comparisons of mental health outcomes to immigrant and non-migrant  
482 comparative groups, and/or broadly defined immigrant groups with limited consideration of time since  
483 migrancy, generational effects and/or cross-cultural differences (Beiser & Hou, 2016; Chau et al., 2012; Fazel  
484 et al., 2012; Sirin et al., 2013; Tummala-Narra, 2015). Nonetheless, these studies have identified a number of  
485 protective factors for mental health including psychological wellbeing of the parents/guardians, peer and social  
486 support, religious beliefs and integration into the host community, whereas risk factors of poorer mental health  
487 outcomes included trauma exposure, parental exposure to violence, loss of parent(s), limited family support,  
488 violence and discrimination in host country, and feeling disconnected to school and neighbourhood (Beiser &  
489 Hou, 2016; Fazel et al., 2012; Sirin et al., 2013). In contrast to some of these effects, our findings suggest that  
490 trauma-exposed migrant youth are more resilient and demonstrate higher levels of wellbeing in comparison to  
491 their non-migrant trauma-exposed peers. The presence of trauma had no impact on the conduct behaviours of  
492 migrant youth relative to non-migrants who *were* more significantly impacted by trauma exposure. Migrant

493 youth did however demonstrate more peer problems and less prosocial behaviors than their non-migrant  
494 trauma-exposed peers, which is consistent with previous reports of increased behavioral problems in refugee  
495 youth (Beiser & Hou, 2016). Given the current sample included both immigrants and refugee migrant youth,  
496 it is possible that the role of trauma in the current study showed a differential impact to previous studies  
497 focusing on refugee youth alone. Indeed, in the recent study comparing mental health outcomes of refugee  
498 versus immigrant youth aged 11 – 13 years in Canada, it was the refugee youth that demonstrated significantly  
499 higher emotional problems, aggressive behaviour, and pre-post migration trauma than immigrant youth (Beiser  
500 & Hou, 2016). However, as participants needed to be living in Canada for 10 years or less, it is unclear whether  
501 any differences varied with the recency of migration. It is therefore worthwhile to compare these migrant  
502 subgroups over time. Examining these associations longitudinally will help determine whether these higher  
503 levels of resilience and wellbeing in migrant youth are sustained over time, or whether they are a short-term  
504 outcome from possibly moving away from the trauma. Recent studies in fact suggest that factors such as  
505 postarrival discrimination or acculturative stress can cause additional harm on mental health outcomes,  
506 whereas feeling welcomed at school can mitigate against mental and behavioral problems (Beiser & Hou,  
507 2016; Sirin et al., 2013). Thus, it would be important to confirm whether the behavioral problems linked to  
508 peers and prosocial behaviors is alleviated with time as the young people become more acquainted with their  
509 new school environment and peer networks, or whether this worsens and has a subsequent detrimental impact  
510 on their psychological and cognitive development.

511 The current study was an international pilot study conducted across a range of contexts in high and middle  
512 income countries, including both external and internal migrant adolescents and non-migrant adolescents. The  
513 migrants included refugees and economic migrants. To our knowledge this is the first reported study of its  
514 kind. The study also included wellbeing and resilience findings in addition to risk/vulnerability outcomes. As  
515 the study was cross-sectional and limited by sample size in each country, this restricted some statistical  
516 analyses and comparisons that could be made (e.g., refugee vs economic migrant adolescents). The limited

517 sample sizes of some specific sites may have also impacted the reliability of some measures, as reported earlier.  
518 Thus, it would be worthwhile to replicate these outcomes in a larger sample, controlling for multiple  
519 comparisons to minimise potential false positive reporting. Some questions were also not culturally acceptable  
520 in some sites, including for instance those asking about the use of drugs and alcohol in China, so had to be  
521 omitted. This limited the inclusion of some sites in the analyses, but is an issue that needs to be acknowledged  
522 in future international trials. Another limitation of this study is that recruitment was based on voluntary  
523 participation, so self-selecting participants (particularly some migrant adolescents) may have been more  
524 resilient to begin with. It would therefore be important to confirm the current findings in a larger and even  
525 more diverse sample of adolescents.

526 In conclusion, we found that, with some adjustment for cultural sensitivity, the current questionnaire included  
527 a reliable set of measures to use in an international study of migrant and non-migrant adolescent populations.  
528 Some interesting group differences in mental health outcomes were observed between migrants and non-  
529 migrants in the presence/absence of trauma exposure, which may open up avenues for future research. Our  
530 findings indicate that promoting mental health and wellbeing is an important strategy to implement for all  
531 young people, particularly those recovering from adversity, migrant or not. There is a need for further research  
532 with larger prospective sample sizes to investigate levels of resilience and mental health behaviors in migrant  
533 adolescents over time, and ways of promoting increased peer support networks in schools, as well as resilience  
534 in trauma-exposed young people, regardless of migrancy status.

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546

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548 JMG was a stockholder in MAP Corp. Pte Ltd.

549 **Table 1: Age, sex, and migrant status by site**

| Site                   | N          | Age<br>(Mean±SD)   | Age range          | Sex<br>(N, %)                       | Migrant Status  | Country of Birth (Majority)  |
|------------------------|------------|--------------------|--------------------|-------------------------------------|---|--|
| Australia              | 25         | 13.3 (0.61)        | 12 – 14 yrs        | M: 17 (68%)<br>F: 8 (32%)           | Migrant: 0<br>Non-Migrant: 25                                       | n=0<br>Australia (n=24)*   |
| Canada                 | 21         | 14.1 (0.97)        | 13 – 15 yrs        | M: 8 (38%)<br>F: 13 (62%)           | Migrant <sup>E</sup> : 21<br>Non-Migrant: 0                         | Iraq (n=9)**<br>n=0  |
| China                  | 77         | 13.2 (0.96)        | 12 – 17 yrs        | M: 44 (57%)<br>F: 29 (38%)          | Migrant <sup>I</sup> : 77<br>Non-Migrant: 0                         | Guangzhou, China (n=25)***<br>n=0                                  |
| New Zealand<br>(NZ)    | 33         | 15.3 (1.11)        | 12 – 16 yrs        | M: 9 (27%)<br>F: 24 (73%)           | Migrant <sup>E</sup> : 19<br>Non-Migrant: 14                        | Philippines (n=10)****<br>New Zealand (n=19)                       |
| South Africa<br>(SA)   | 28         | 13.8 (1.58)        | 10 – 16 yrs        | M: 19 (68%)<br>F: 9 (32%)           | Migrant <sup>I</sup> : 28<br>Non-Migrant: 0                         | South Africa (n=20)*****<br>n=0                                    |
| United Kingdom<br>(UK) | 10         | 15.7 (1.25)        | 13 – 17 yrs        | M: 4 (40%)<br>F: 6 (60%)            | Migrant <sup>E</sup> : 4<br>Non-Migrant: 6                          | Europe (n=3)*****<br>England (UK) (n=6)                            |
| <b>TOTAL</b>           | <b>194</b> | <b>13.9 (1.36)</b> | <b>10 – 17 yrs</b> | <b>M: 101 (52%)<br/>F: 89 (46%)</b> | <b>Migrant: 105<sup>I</sup>, 89<sup>E</sup><br/>Non-Migrant: 45</b> | <b>Guangzhou (n=25), SA (n=20)<br/>Australia (n=24), NZ (n=14)</b> |

550 *Note.* M: Male, F: Female, Migrant<sup>E</sup>: External Migrant (cross-country), Migrant<sup>I</sup>: Internal Migrant (within-country). Country of birth  
551 origin: \*Australia Non-Migrants: 24 Australia, 1 USA; \*\* Canada External Migrants: 9 Iraq, 2 Australia/China/Uganda, 1  
552 Syria/Yemen/Nepal/Congo/Qatar/Pakistan; \*\*\* China Internal Migrants: 25 Guangzhou, China, 43 ‘Other’; \*\*\*\* New Zealand  
553 External Migrants: 10 Philippines, 4 England (UK), 2 China, 1 Oman/Malaysia/India; \*\*\*\*\* South Africa Internal Migrants: 20 South  
554 Africa, 3 Congo, 2 Zimbabwe, 1 Burundi/Mozambique; \*\*\*\*\* UK External Migrants: 1 The Netherlands, 1 France, 1 Poland, 1 USA.

555 **Table 2: Internal reliability (Cronbach Alpha) of each questionnaire by site**

| <b>Measure</b>        | <b>Australia</b> | <b>Canada</b> | <b>China</b>  | <b>New Zealand</b> | <b>South Africa</b> | <b>United Kingdom</b> | <b>TOTAL</b>   |
|-----------------------|------------------|---------------|---------------|--------------------|---------------------|-----------------------|----------------|
| <b>(No. of items)</b> | <b>(N=25)</b>    | <b>(N=21)</b> | <b>(N=77)</b> | <b>(N=33)</b>      | <b>(N=28)</b>       | <b>(N=10)</b>         | <b>(N=194)</b> |
| CYRM-28 (28)          | 0.831            | 0.869         | 0.926         | 0.929              | 0.874               | 0.333                 | <b>0.904</b>   |
| CD-RISC (25)          | 0.811            | 0.896         | 0.932         | 0.925              | 0.916               | 0.792                 | <b>0.929</b>   |
| WEMWBS (14)           | 0.829            | 0.877         | 0.922         | 0.896              | 0.840               | 0.537                 | <b>0.898</b>   |
| COMPAS-W (26)         | 0.824            | 0.850         | 0.900         | 0.861              | --                  | --                    | <b>0.883</b>   |
| DASS-21 (21)          | 0.769            | 0.921         | 0.948         | 0.912              | 0.905               | 0.854                 | <b>0.931</b>   |
| SDQ (20)              | 0.843            | 0.861         | 0.812         | 0.862              | 0.811               | 0.846                 | <b>0.823</b>   |
| CRAFFT (6)            | 0.480            | 0.310         | --            | 0.782              | 0.727               | 0.107                 | <b>0.721</b>   |

556 *Note.* CYRM-28: Child and Youth Resilience Measure; CD-RISC: Connor-Davidson Resilience  
557 Scale; WEMWBS: Warwick-Edinburgh Mental Well-being Scale; COMPAS-W: COMPAS-W  
558 Wellbeing Scale; DASS-21: Depression, Anxiety, Stress Scale; SDQ: Strengths and Difficulties  
559 Questionnaire; and CRAFFT: CRAFFT Screening Tool for Adolescent Substance Abuse. "--"  
560 reflects missing data due to China not administering the CRAFFT, and South Africa/United  
561 Kingdom not administering the COMPAS-W.

562

563 **FIGURE LEGENDS**

564 **Figure 1:** Frequency (%) of childhood trauma exposure reported across the sample for the past  
565 year and lifetime ( $N=194$ ). The corresponding question items for each of the trauma categories are  
566 as follows: i. Combat/war (“Have you ever had direct combat experience in a war?”); ii. Accident  
567 (“Have you ever been involved in a life-threatening accident?”); iii. Disaster (“Have you ever been  
568 involved in a fire, flood or other natural disaster?”); iv. Witness injury/murder (“Have you ever  
569 witnessed someone being badly injured or killed?”); v. Assault/abuse (“Have you ever been  
570 seriously attacked or assaulted?”); vi. Weapon/captive/kidnapped (“Have you ever been threatened  
571 with a weapon, held captive, or kidnapped?”); vii. Terrorist victim (“Have you ever been the victim  
572 of terrorists?”); viii. Shocking event to others (“Have you suffered a great shock because one of  
573 the events on the list happened to someone close to you?”); and ix. Death: Family/friend (“Have  
574 you experienced the death of a close family member or close friend?”).

575 **Figure 2:** Percentage exposure (% of ‘yes’ responses) for significant differences by migrancy  
576 groups for total traumatic events reported during (a) the lifetime and (b) the past year.

577 **Figure 3:** Percentage exposure (% of ‘yes’ responses) for significant site differences by total  
578 traumatic events reported during (a) the lifetime and (b) the past year. For (b), site differences were  
579 also found for ‘life-threatening accidents’ (China: 5%, South Africa: 20% percentage exposure),  
580 and ‘threatened by a weapon/held captive/kidnapped’ (Australia: 100%, China: 3.4%, South  
581 Africa: 15% percentage exposure) (not presented here).

582 **Figure 4:** Means and SE bars for significant main effects of migrancy for (a) CYRM resilience  
583 resources, (b) SDQ peer problems, and (c) SDQ prosocial behavior.

584 **Figure 5:** Means and SE bars for significant interaction effects of trauma by migrancy for (a) CD-  
585 RISC resilience scores, (b) WEMWBS wellbeing scores, (c) COMPAS-W wellbeing scores, and  
586 (d) SDQ conduct problems.

587

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