A Profile of Social, Separation and Generalized Anxiety Disorders in a National Sample of
Children and Adolescents: Prevalence, Comorbidity, and Correlates

Susan H. Spence ^a

Stephen R Zubrick^b

David Lawrence^b

^a Australian Institute of Suicide Research and Prevention (AISRAP) and School of Applied
Psychology, Griffith University, Mount Gravatt Campus, Mount Gravatt, QLD, Australia

^bTelethon Kids Institute, The University of Western Australia, Perth, WA, Australia

Objective: Research has rarely compared the prevalence, comorbidity, demographic and socio-environmental correlates, and impact of specific forms of anxiety disorders in children and adolescents. The objectives of this paper were (i) to present the 12-month prevalence of (SOC), separation (SEP) and generalized (GAD) anxiety disorders in a large, nationally representative sample of Australian children and adolescents, (ii) to examine patterns of comorbidity between these disorders, and (iii) to examine demographic and socio-environmental correlates, impact of and service use associated with each condition.

Method: Data are from the 2013/2014 Australian national, face-to-face household Young Minds Matter survey of mental health and wellbeing. Parents or carer reports of 6310, 4 -17 year-olds completed a clinical and survey interview that provided diagnostic and service use information regarding the previous 12-months,

Results: A 12-month prevalence rate of 6.64% was found for the experience of one or more of the three anxiety disorders, with rates of 2.33% for SOC, 4.26% for SEP and 2.18% for GAD. Prevalence rates did not differ by gender, but there were significant age differences, being higher for SEP and lower for SOC and GAD in 4-11 year-olds than 12-17 year-olds. There was a high level of comorbidity between anxiety disorders, although this was lower for SEP, mainly reflecting a lower rate of comorbidity in the younger age group. All three disorders were associated with having a primary carer with a mental health problem and experiencing repeated bullying, and SEP was also associated with family dysfunction, low parental employment and family negative life events. All three anxiety disorders were associated with a moderate to high level of impairment, although this was lower for SEP. Around 70% of 12-17 year olds with an anxiety disorder had received help from school or a health service in relation to the problem, with this being less likely for the younger cohort (53%).

Conclusions: Social, separation and generalized anxiety disorders in young people are relatively common and impairing, with a high level of comorbidity. There are both

commonalities and differences in socio-environmental correlates. Although the majority of anxious youth had received some form of professional assistance over the previous 12-months, the rate was lower in the younger age group and there is still substantial under-treatment of this population.

Key words: epidemiology, children, adolescents, anxiety disorders, social, separation, generalized.

Although multiple studies have examined the prevalence and correlates of anxiety disorders in youth, the literature has typically focussed on the reporting of a single anxiety disorder or anxiety disorders in general. There is a paucity of research that examines these factors in relation to different anxiety disorders, particularly across a broad age range of young people. Also, the majority of papers have tended to ignore the issue of comorbidity between anxiety disorders, making it difficult to know whether results relate to a specific anxiety disorder or to other co-occurring disorders. Many of the studies comparing characteristics of different anxiety disorders in youth have focussed on those who have been referred for treatment and who may not necessarily be representative of those with anxiety disorders in community samples. Thus, there is a strong case for research that examines epidemiological characteristics for different anxiety disorders, across the child and adolescent age span, in a community sample.

It is now well-recognised that childhood and adolescence are key phases for the development of anxiety problems and yet we still know relatively little about variation in prevalence rates across age groups and whether different anxiety disorders vary in their age of onset, duration, and episodic presentation. Similarly, although there is a good deal of evidence of high levels of comorbidity between anxiety disorders, it is unclear how this may change with age for different anxiety disorders. There is also relatively little data to indicate whether demographic and environmental factors differ in their association with different anxiety disorders. Such information may provide some clues as to why children develop a particular type of anxiety disorder rather than another. Generally, it has been shown that the high level of comorbidity between anxiety disorders may be explained by a higher order factor of anxiety in general (Spence, 1997; Whitmore, Kim-Spoon, & Ollendick, 2014). However, such studies also support a series of second order factors, supporting the concept of individual anxiety disorders such as SOC, SEP and GAD. It is unclear, however, whether they are differentially associated with sociodemographic and environmental risk factors, and whether they have

different consequences, different levels of impairment and result in different levels of referral for professional help.

Large scale, national studies of the prevalence of mental health problems provide important information to inform the planning and provision of mental health services, and also to provide a baseline against which a nation can compare prevalence rates over time using the same methodology. A recent meta-analysis of prevalence studies from 41 studies, 27 countries, and 63,130 young people, indicated important variations in prevalence estimates for mental disorders dependent upon factors such as, geographic region, age range, informant, diagnostic tool, use and type of impairment criteria, the timeframe considered, and location of sample (home versus school) (Polanczyk et al., 2015). While noting these limitations, the meta-analysis suggested a prevalence rate for anxiety disorders of 6.5% (CI 95% 4.7–9.1) over the past 1-12 months, although the authors pointed out that studies differed in terms of the specific anxiety disorders assessed, with low prevalence disorders just as PTSD and OCD being less commonly included. When the 6.5% prevalence rate is thought of in terms of the total number of youth affected in a large national population, then clearly the implications are considerable. The meta-analysis did not report separately upon the prevalence of different types of anxiety disorders.

In 1998, Australia conducted its first national survey of mental health of children and adolescents (Sawyer et al., 2000). Although it provided valuable information, a key limitation was that it did not include assessment of the anxiety disorders. This was rectified in the 2014 survey and the present paper draws on the results the results of the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. It reports the 12-month prevalence, age of onset, duration, episodic characteristics, comorbidity, correlates and service use of children and adolescents who were identified as having clinical levels of SOC, SEP and/or GAD.

This study is significant in that it reports data for a broad age range, from 4 to 17 years, in a large, representative community sample. It also examines the three anxiety disorders individually, controlling for the presence of comorbid anxiety problems, to examine the degree to which environmental correlates are associated with a particular anxiety disorder or whether they are common across the three anxiety disorders in general. Information about factors that are specifically associated with a given anxiety problem may provide clues about causal pathways, and may inform us about potential factors that could be targeted in prevention or treatment programs for that disorder. The study also enables us to examine whether patterns of comorbidity differ across the anxiety disorders, and at different age groups. Although the high level of comorbidity between anxiety is well established (Verduin & Kendall, 2003), most studies have involved clinical samples or a restricted age range. For example, Verduin and Kendall (2003) found that SEP showed a higher level of comorbidity with other anxiety disorders than SOC or GAD, but the study involved a clinical sample, aged 8-13 years. It is feasible that for older youth, GAD is likely to exhibit greater comorbidity with other forms of anxiety disorder given its greater association with the higher order factor of anxiety in general (Spence, 1997).

It is also important to identify socio-environmental factors that have been proposed to be associated with anxiety disorders in youth (Beesdo, Knappe, & Pine, 2009). For example, childhood adversity, reflected by factors such as negative/stressful life events, living apart from a biological parent, living in a dysfunctional family environment, living with a parent with a mental health problem, poverty and parent unemployment, has been proposed to be linked to the development of anxiety problems in youth. While such factors have been associated with anxiety disorders in general, and typically with depression also (Beesdo et al., 2009; Beesdo-Baum et al., 2012; Merikangas et al., 2010) it is unclear whether they have an equivalent effect across SOC, SEP and GAD. The present study also examined the association between peer

victimization and the three anxiety disorders. Recent models of social anxiety disorder in youth have noted the elevated level of victimization experience by those with SOC (Gren-Landell et al., 2011; Spence & Rapee, 2016; Tillfors et al., 2012). However, it is unclear whether peer victimization is also associated with other anxiety disorders such as SEP and GAD. Most research in this area to date has focussed on younger children, and the present study provides an opportunity to examine the association between bullying and anxiety disorders in adolescents. This is important given a recent study showing increases in anxiety symptoms in a large community sample of adolescents who experienced peer victimization (Stapinski et al., 2015). The present study provides an opportunity to examine this issue, although we note that the cross-sectional nature of the data precludes us from drawing conclusions about causality.

Epidemiological studies have also highlighted the under-treatment of youth with anxiety disorders (Merikangas et al., 2011), but it is unclear whether this is consistent across the anxiety disorders and age groups. Similarly, although anxiety disorders in youth are generally associated with impairments in functioning at home and school, and in relationships with peers (Muroff & Ross, 2011; Strauss, Frame, & Forehand, 1987), it is unclear whether these are equivalent for SOC, SEP and GAD. Although a criterion for a diagnosis of an anxiety disorder requires demonstration of at least mild impairment in functioning, it is unclear whether the anxiety disorders differ in terms of severity of impairment.

The goals of the current study were to examine (i) the weighted 12-month prevalence of SOC, SEP and GAD in a large, nationally representative community sample of children and adolescents, (ii) age of onset, duration, episodic nature and patterns of comorbidity between these disorders, and other key clinical diagnoses, (iii) socio-environmental correlates, (iv) level of impairment associated with each condition, and (iv) potential age and gender differences. The paper also discusses the findings in relation to comparable studies internationally.

The paper presents data based on parent-report of child and adolescent anxiety disorders, for both the child and adolescent age ranges. This methodology was selected to enable a consistent methodology in the comparison of results across age groups. Some prior epidemiological studies have used parent report for the child age group, and combined parent and youth report in assessing diagnoses and correlates for the adolescents (Canino et al., 2004; Ford, Goodman, & Meltzer, 2003). The authors of these studies argue that adolescents are in a strong position to report on their mental health, whereas children are not. However, in order to avoid the confound of differential informants, we restricted data to parent report. The paper also did not include data relating to obsessive compulsive disorder (OCD), although this was examined in the original survey. This was based in the recent arguments presented in the DSM-5 (American Psychiatric Association, 2013) that resulted in the exclusion of OCD from the anxiety disorders.

Method

The Young Minds Matter survey was conducted during 2013–2014. The design, sampling and survey interview methods have been described in detail elsewhere (Hafekost et al., 2016; Lawrence et al., 2015). In brief, the survey used area-based random sampling with voluntary recruitment and informed consent of eligible households where there was at least one child aged 4–17 years. Where there were multiple eligible children in the household, one was selected at random. Participants in the present study were 6310 parents and carers reporting on one eligible young person, reflecting a 55% response rate. Face-to-face interviews were conducted with the primary carer of the selected child in each household. Youth report data were also collected for the 11–17 year olds, but these data are not used in the present paper (see above for rationale). Comparison with 2011 Australian Census data showed that the sample was broadly representative of the Australian population in terms of major demographic characteristics, with no differences with respect to area-level socio-economic indicators (i.e.

Socio-Economic Indexes for Areas [SEIFA]), population distribution, age, sex and country of birth of the total population of 4- to 17-year-olds in Australia and demographic characteristics including household income, family type, household tenure, parent/carer education and labour force status of families with children aged 4–17 years. There was, however, a slightly higher proportion of children aged 4–7 years and a lower proportion of families with only one eligible child than would be expected based on random sampling. Table 1 outlines the socio-

demographic characteristics of the sample. STEVE OR DAVID – DO YOU ALREADY

HAVE A SUMMARY TABLE THAT COULD GO IN AT BOTTOM OF PAPER- TABLE 1?

The research protocol was approved by the Australian Government Department of Health Human Research Ethics Committee and The University of Western Australia Human Research Ethics Committee.

Measures

Clinical Diagnoses - were assessed using the Diagnostic Interview Schedule for Children—Version IV (DISC-IV) (Fisher et al., 1993). The DISC-IV implements the criteria for mental disorders set out in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychiatric Association, 2000). Seven DISC-IV modules were completed by parents and carers in relation to their children's symptoms and the impact of these over the previous 12 months: anxiety disorders (social phobia, separation anxiety disorder, generalised anxiety disorder, obsessive-compulsive disorder); major depressive disorder; attention-deficit/hyperactivity disorder (ADHD); and conduct disorder. The DSM-IV specifies that to meet criteria for a mental disorder there must be clear evidence of clinically significant impairment in social, academic, or occupational functioning (i.e. functional domains). In line with other national surveys that have used the DISC-IV, the criteria for impairment required

either severe impairment in one or more functional domains or at least moderate impairment in two or more domains.

Age of onset, duration, and continuity of disorder- parents and carers of young people who had at least a sub-threshold level of symptoms of a disorder responded to a series of questions about the age of onset, duration of the current episode and continuity of the disorder since onset.

Socio-environmental data - the socio-environmental factors included:-

- (i) family structure (living with both biological parents –Yes/No);
- (ii) household income (lowest 30% of equivalised annual household income – Yes/No);
- (iii) level of parent/carer education (neither parent exceeded high school education Yes/No);
- (iv) labour force status (neither carer in fulltime employment Yes/No), derived from the Australian Bureau of Statistics standard formats
- (v) primary carer mental health (self report as to whether the primary carer ever diagnosed with a mental health disorder by a doctor or other health professional);
- (vi) negative life events (primary carer report as to whether or not they or their partner had experienced each of 12 family stressor events over the past 12-months, with the experience of 3 or more negative family events being defined as elevated);
- (vii) experience of repeated bullying – assessed from primary carer report of the young persons repeated experience of bullying over the previous 12-months specifically whether, to the best of their knowledge the child had been bullied, teased or picked on to the point of distress, including in person, or via mobile phone, text message, internet or email, and how often this had occurred in the past 12-months. The experience of bullying was defined as a positive response to the first question, with a frequency ranging from every few weeks to all the time;

(viii) family environment – assessed using the 6-item version of the General Functioning Scale of the McMaster Family Assessment Device (Byles et al., 1988). The 6-item version has been shown to have strong psychometric properties equivalent to the original 12-item version (Boterhoven de Haan et al., 2015),

Service Use - parents and carers responded to an extensive set of questions about service use received at school (or another educational institution) or from a qualified health practitioner in the previous 12 months in relation to their presenting for emotional or behavioural problems.

Impact on functioning - severity of the impact of mental disorders on functioning was assessed using a measure specifically developed for the study (Hafekost et al., 2016) . It included 17 items that assessed the impact of symptoms across four domains: the child or adolescent’s educational or workplace participation, their social development, family activities and other family members, and on the child or adolescent themselves, particularly distress. A final Graded Response Model was fitted to the item data to construct a composite score measuring severity of impact on function. The score was standardised and categorised into mild, moderate and severe impact. Psychometric and scoring details are outlined in detail in Zubrick et al. (2015).

Data Analysis

Survey data were weighted to represent the full Australian population of 4- to 17-year-olds and to adjust for patterns in non-response **DAVID/STEVE – PLEASE COULD YOU CHECK**

THIS NEXT SECTION AND EDIT/ADD – NOT MY AREA OF EXPERTISE. THANKS

Additionally 16- to 17-year-olds were specifically oversampled. The weighting accounts for these factors. Survey estimates and associated confidence intervals (CIs) were determined using STATA to account for the clustered nature of the sample design **(AGAIN.. PLEASE**

COULD YOU ADD A PHRASE THAT EXPLAINS THE CLUSTERING – THANKS) and

the use of survey weights. Associations between categorical variables were examined using Wald adjusted Chi-square tests, and binary logistic regression analyses to determine odds ratios.

Results

12-month prevalence rates

The weighted 12-month prevalence rates for parent-reported SOC, SEP, GAD and one or more of these anxiety disorders are shown in Table 2. This shows an overall prevalence of 6.64% for the experience of at least one of the three disorders, with the highest prevalence rate being for SEP (4.26%) followed by SOC (2.33%) and GAD (2.18%). Although there was no significant age effect for the experience of one or more of the 3 anxiety disorders collectively, there were significant age effects for the disorders individually, albeit in different directions. Prevalence rates were significantly higher for the 12-17 year olds compared to 4-11 year olds for SOC (Wald adjusted Chi Sq (1,565)=21.67, $p < .001$), and for GAD (Wald adjusted Chi Sq (1,565)=9.76, $p = .002$). In contrast, rates for SEP were significantly higher for the 4-11 year olds compared to 12-17 year olds (Wald adjusted Chi Sq (1,565)=7.88, $p = .02$). These age effects were evident for both boys and girls and there was a no significant difference between genders for the 4-11 year olds or 12-17 year olds for the experience of the anxiety disorders collectively or for any individual anxiety disorder.

Age of first onset, duration and recurrence of disorders

The distribution of age of onset for each disorder is shown in Figure 1 (**DO WE NEED THESE FIGURES?**). The distributions indicate a greater tendency for SEP to develop at a younger age, than SOC or GAD. To illustrate, 84.3% (95% CI = 80.08, 87.98) of young people with a diagnosis of SEP had age of first onset at or prior to age 10, compared to 79.0% (95% CI =

73.45, 84.08) with SOC and 65.6% (95% CI = 58.27, 72.88) with GAD. In terms of parent report of duration since first onset, the longest average duration was shown for SOC ($M = 6.13$, $SE = .33$, 95% CI = 5.46, 6.80), followed by GAD ($M = 4.96$, $SE = .36$, 95% CI = 4.24, 5.67) and then SEP ($M = 3.72$, $SE = .27$, 95% CI = 3.18, 4.25). Given that SOC tends to emerge slightly earlier than GAD and yet tends to show a longer duration, this suggests a greater persistence for SOC.

Parents also reported whether the current episode of the disorder had been continuous since onset or whether there had been at least one period of 2 months or longer without symptoms. The findings showed that youth with a diagnosis of SEP (33.93%, 95% CI = 27.66, 40.20) or SOC (27.64%, 95% CI = 19.86, 35.41) were more likely to show discontinuity of the disorder than those with GAD (19.70%, 95% CI = 12.79, 26.61).

Comorbidity between anxiety disorders

There was a high degree of comorbidity between the three anxiety disorders as shown in Table 3. For young people with SOC comorbidity was GAD (37.18%), SEP (33.29%) and both GAD and DEP (16%). Of those with SEP comorbidity was SOC (18.21%), GAD (21.62%), and SOC and GAD (9.65%). Among those with GAD comorbidity was SOC (39.74%), SEP (38.00%) and SOC and SEP (17.48%). These data suggest a lower level of comorbidity for SEP than for SOC and GAD. All three anxiety disorders showed a relatively high level of comorbidity with depression, although again this was somewhat lower for SEP and was particularly high (41.43%) for GAD. Youth with SOC, GAD or SEP also showed a surprisingly high degree of comorbidity with Oppositional defiant disorder and ADHD.

We then examined whether the lower rate of comorbidity for SEP with the other anxiety disorders could be attributed to the lower age of SEP youth, in general. In keeping with this proposition, the results showed that only the young 4-11 year olds with SEP showed

low levels of comorbidity. Table 4 shows that, whereas only 10.97% of 4-11 year olds with SEP also experienced SOC (OR=11.32, 95% CI=6.01,21.31) and 13.57% experienced comorbid GAD (OR= 14.78, 95% CI=8.14,26.86), the comorbidity rates were much higher for 12-17 year olds with SEP consistent with those for other disorders. These age effects were statistically significant, with the 4-11 year group being significantly less likely than older youth to experience comorbid SOC (Wald adjusted Chi Sq = 14.80, F(1,200), $p < .001$) or GAD (Wald adjusted Chi Sq = 8.84, F(1,200), $p = .002$). There were no significant age differences for SOC or GAD in terms comorbidity with other anxiety disorders.

Demographic and environmental correlates of anxiety disorders

Table 5 shows the outcomes for bivariate logistic regression analyses, examining the association between the socio-environmental factors and the presence of each anxiety disorder. For all three anxiety disorders there were significant bivariate associations for not living with both biological parents, having a parent with a mental health problem, experiencing elevated negative life events, low carer employment, low family income, and the experience of repeated bullying. There were no significant associations between any of the anxiety disorders in terms of level of parent/carers education.

When the multivariate analyses were considered, controlling for age group, gender, the inter-relationship between variables, and the presence of the other two anxiety disorders, some of the environmental factors were no longer significantly associated with the specific anxiety disorder concerned. As shown in Table 5, after controlling for the presence of the other two anxiety disorders, all three anxiety disorders (SOC, SEP or GAD) were associated with having a parent with a mental health problem and to have experienced repeated bullying over the previous 12-months. For SEP, there were also significant multivariate associations with

family dysfunction, experiencing elevated negative life events, and low parent/carer workforce participation.

Impact upon Functioning and School Absence

The impact of each anxiety disorder was examined across domains of family, school, friendships and personal functioning. Table 6 shows the proportion of youth with each disorder for whom their parent or caregiver reported moderate or severe impairment of functioning that could be attributed to their anxiety disorder. Youth with SEP in their profile tended to show lower levels of impairment across all domains of functioning than those with SOC or GAD.

Receipt of Professional Help

Table 7 show the proportion of young people with an anxiety disorder who received help from either a school or health professional service over the previous 12 months in relation to an emotional or behavioural problem. In total 72.78 of those with a diagnosis of SOC, 60.74% of those with SEP, and 70.92% of those with a diagnosis of GAD received assistance from a professional at school or a health service.

The apparent lower rate of receipt of help for those with SEP may be confounded by the younger average age of those with this disorder. Of youth with at least one anxiety disorder, the older age group (72.4%) were significantly more likely than the younger cohort (52.9%) to have received some form of professional service over the previous 12-months in relation to their anxiety problem, (Wald adjusted Chi Sq = 15.18, F(1,279), $p < .001$).

Discussion

The present study found a 12-month prevalence rate of 6.64% for the experience of at least one anxiety disorder (SOC, SEP and/or GAD), consistent with a recent meta-analysis (Polanczyk et

al., 2015) that estimated a prevalence rate of 6.5% (CI 95% 4.7–9.1) over the past 1 to 12 months in 4-18 year olds. The finding is also consistent with the 12-month prevalence rate of 6.9% reported in a large-scale study using the DISC-IV, reported by Roberts, Roberts, and Xing (2007) with adolescents, although that study did not examine separation anxiety and it included agoraphobia. Interestingly, Canino et al. (2004) also found a 12-month prevalence rate of 6.9% for anxiety disorders among a large sample of 4-17 year olds in Puerto Rico using the DISC-IV. Although estimates for the prevalence of anxiety disorders have varied widely according to the methodology used (Costello, 2015), the figure reported in the current study appears to be consistent with other large-scale epidemiological studies using the DISC-IV, and the balance of the evidence revealed from the recent meta-analysis noted above.

In terms of the individual anxiety disorders examined in the present study, the prevalence rates were SOC (2.33%), SEP (4.26%) and GAD (2.18%). A significant difference in prevalence rates across the age groups was noted for the three anxiety disorders, being higher for SOC and GAD in the 12-17 year olds, but higher for SEP in the 4-11 year olds. Although the Polanczyk et al (2015) meta-analysis did not report on the prevalence of individual anxiety disorders there is a small number of studies that have done so, and that included a large sample size, a large age range, and that used a reliable and valid clinical diagnostic interview in keeping with the present study. For example, the US National Comorbidity Survey Replication-Adolescent (NCS-A) study indicated 12-month prevalence rates of 8.2% for SOC, 1.6% for SEP, and 1.1% for GAD (Kessler et al., 2012) but this was limited to 13-17 year olds and used the World Health Organization (WHO) Composite International Diagnostic Interview (Merikangas et al., 2010) rather than the DISC, and adolescents rather than parents as informants. Such procedural differences could explain the high prevalence estimate for SOC in that study, as other studies have found lower 12-month prevalence estimates for SOC adolescents more in keeping with the present study. For

example, Ranta et al. (2009) reported 12-month prevalence of 3.2% for SOC with a large sample of Swedish 12-17 year olds. Similarly, Gren-Landell et al. (2009) noted a point prevalence rate of 4.4% for youth-reported social phobia among 12-14 year olds, also in Sweden. Canino et al. (2004) reported a 12-month prevalence rate of 2.5 for SOC, 3.1 for SEP and 2.2 for GAD among Puerto Rican 4-17 year olds using similar impairment criteria to those in the present study. These findings were highly consistent with the results reported here.

The results relating to retrospective report of age of onset and persistence generally reflected those from prior research with SEP tending to develop an earlier age than SOC, which in turn tended to develop earlier than GAD, consistent with findings reported by (Beesdo-Baum & Knappe, 2012) from the NCS-A study. Despite having an earlier age of onset, SEP also tended to be of shorter duration than SOC and GAD. In contrast, SOC while having an earlier age of onset than GAD was the disorder with the longest duration, suggesting a high level of persistence over time. This is consistent with longitudinal research showing high stability of SOC from childhood through adolescence (Bittner et al., 2007). Consistent with the NCS-A study (Beesdo-Baum et al., 2012), GAD tended to develop at a later age particularly during later teens, but tended to be less episodic than SOC and SEP. Thus, the data suggested different trajectories for the three disorders, although it must be noted that the data are not prospective and are based on retrospective report.

In terms of gender, there were no significant differences in prevalence of anxiety disorders in the younger age group. In contrast, the NCS-A study reported significantly higher prevalence rates in teenage girls than boys for SOC, SEP and GAD (Kessler et al., 2012), as did Canino et al. (2004). However, no difference between genders was found for anxiety disorders in a large epidemiological study in the UK with 5-15 year olds (Ford et al., 2003). A possible explanation for the variation in gender effects across studies could lie in the informant or differences in age groups. We can only speculate but it is possible that studies using youth

rather than parent report may be more likely to show a gender effect than those such as the present paper that was limited to parent report of anxiety symptoms. Young males may be more reluctant than their female peers to admit to the experience of anxiety problems, leading to an underestimation of prevalence in males when using youth report. Parents in contrast may be more willing to report on anxiety issues in their male offspring. This possibility warrants examination in future studies.

In terms of comorbidity, there was a high level of co-occurrence of the experience of SOC, SEP and GAD during the previous 12 months, but also high comorbidity between these anxiety disorders and depression, ODD, and ADHD. There were, however, differences in comorbidity patterns for the three anxiety disorders. Contrary to the findings of Verduin and Kendall (2003) who found SEP to show the highest level of comorbidity with other anxiety disorders, the present study found that SEP tended to show less comorbidity with other disorders, including other anxiety disorders. The difference in findings could potentially reflect the different age range in the Verduin and Kendall sample (8-15 years) or that their sample involved clinical referrals to a treatment centre, or differences in diagnostic instrument used.

The finding of the lower rate of comorbidity in the present study could potentially reflect an age effect as SEP tended to be more prevalent in the young age group and, generally, comorbidity tended to be lower in 4-11 year olds than in the older age group. For the older youth with SEP, comorbidity rates were similarly to those for other anxiety disorders. Possibly, anxiety problems are more specific during childhood, with symptoms becoming more generalized with increasing age and thus greater comorbidity with other disorders. Indeed, Beesdo et al. (2009) in an empirical review concluded that the number of “pure” disorder anxiety cases decreases with age in favour of patterns with multiple anxiety disorders by late adolescence or early adulthood. This could reflect a reciprocal effect of anxiety, both in leading to and being a result of other mental health problems, thereby increasing comorbidity over

time. Indeed, longitudinal studies have demonstrated that anxiety disorders increase the risk of the future development of other anxiety disorders and other mental health problems such as depression (Bittner et al., 2007).

When environmental factors were examined, there were both consistencies and differences in their association with the three anxiety disorders. In terms of bivariate associations, young people with SOC, SEP, or GAD were more likely than youth without these conditions to live apart from a biological parent, have a parent with a mental health problem, to experience elevated negative life events, to live in a family with low family income and low parent-carer workforce participation, and to experience repeated bullying. However, when multivariate analyses were conducted, examining the environmental variables simultaneously, controlling for age, gender and the other two anxiety disorders, only the experience of repeated bullying and having a parent with a mental health problem still had significant associations with all three anxiety disorders. A diagnosis of SEP had the strongest associations with socio-environmental factors, also being significantly associated with family dysfunction, the experience of high negative life events, and low carer workforce participation. We can only speculate why SEP may be more strongly associated than SOC and GAD with these family factors, and the effect cannot simply be attribute to the younger age distribution as age was controlled for in the analyses. It appears that high levels of family stress and dysfunction may place young people at particular risk for the development of separation fears. Potentially, the high stress family environment may also encourage parenting practices that maintain and enhance the child's separation anxious emotions and behaviours. This proposition warrants testing in longitudinal research.

A striking finding was the strong association between the experience of repeated bullying and all three anxiety disorders. We anticipated that peer victimisation would be most highly associated with SOC, as it has been attributed a strong role in the causal and

maintaining models of the development of SOC (Spence & Rapee, 2016). However, contrary to our expectations this was not found to be the case, and the experience of bullying was also linked to SEP and GAD even when the effects of comorbidity with SOC had been controlled for. Although the data were cross-sectional and thus we cannot infer causal relationships, it is clear that studies need to examine the degree to which peer victimization is potentially a consequence of and a causal factor for a range of anxiety problems and depression in young people, rather than being specific to SOC.

Although the study has many strengths, it is important to recognise the limitations. For example, the interviews did not address all anxiety disorders, such as panic/agoraphobia and specific phobias, thus it is unclear how comorbidity with these conditions may impact upon the findings. Furthermore, the interviews did not examine lifetime occurrence of disorders, thus direct comparison is restricted those studies that also used a 12-month timeframe. Costello (2015) noted that there are marked variation in prevalence estimates in the literature reflecting methodological differences such as the measure used, the level of impairment used to ascertain a diagnosis, timeframe, and informant (child report tended to give higher prevalence estimates than parent report). The present study also has not considered subthreshold anxiety and yet the main report from this national survey indicated significant distress and interference in daily living for young people with anxiety symptoms but who fell short of diagnostic criteria (Lawrence et al., 2015), consistent with findings elsewhere in the literature (Balázs et al., 2013; Burstein et al., 2014). It is important that this neglected group of young people are not forgotten as they may benefit from targeted prevention to prevent development to a full-blown disorder.

Conclusions

The present study has confirmed, among a large Australian community sample, the relatively high prevalence of anxiety disorders during childhood and adolescence for both males and females, accompanied by significant distress and impairment in functioning across multiple domains. The three anxiety disorders examined, namely SOC, SEP and GAD, showed different prevalence rates by age group, being more common in older youth for SOC and GAD and for younger children for SEP. All disorders showed a high level of comorbidity, although this was lower for SEP and this could be partly attributed to an overall increase in comorbidity with age. All three disorders showed significant associations with socio-environmental factors, particularly for having a primary caregiver with a mental health problem, and experiencing repeated bullying . A diagnosis of SEP showed particularly strong associations with other socio-environmental factors such as negative life events, a dysfunctional family environment, and low carer workforce participation.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC : American Psychiatric Association.
- Balázs, J., Miklósi, M., Keresztény, Á., Hoven, C. W., Carli, V., Wasserman, C., . . . Wasserman, D. (2013). Adolescent subthreshold - depression and anxiety: psychopathology, functional impairment and increased suicide risk. *Journal of Child Psychology and Psychiatry*, 54(6), 670-677.
- Beesdo, K., Knappe, S., & Pine, D. S. (2009). Anxiety and Anxiety Disorders in Children and Adolescents: Developmental Issues and Implications for DSM-V. *The Psychiatric clinics of North America*, 32(3), 483-524.
- Beesdo-Baum, K., & Knappe, S. (2012). Developmental epidemiology of anxiety disorders. *Child and Adolescent Psychiatric Clinics of North America*, 21(3), 457-478.
- Beesdo-Baum, K., Knappe, S., Fehm, L., Hofler, M., Lieb, R., Hofmann, S., & Wittchen, H. (2012). The natural course of social anxiety disorder among adolescents and young adults. *Acta Psychiatrica Scandinavica*, 126(6), 411-425.
- Bittner, A., Egger, H. L., Erkanli, A., Costello, E. J., Foley, D. L., & Angold, A. (2007). What do childhood anxiety disorders predict? *Journal of Child Psychology and Psychiatry*, 48(12), 1174-1183.

- Botelho de Haan, K. L., Hafekost, J., Lawrence, D., Sawyer, M. G., & Zubrick, S. R. (2015). Reliability and Validity of a Short Version of the General Functioning Subscale of the McMaster Family Assessment Device. *Family Process*, 54(1), 116-123.
- Burstein, M., Beesdo-Baum, K., He, J., & Merikangas, K. (2014). Threshold and subthreshold generalized anxiety disorder among US adolescents: prevalence, sociodemographic, and clinical characteristics. *Psychological Medicine*, 44(11), 2351-2362.
- Byles, J., Byrne, C., Boyle, M. H., & Offord, D. R. (1988). Ontario Child Health Study: reliability and validity of the general functioning subscale of the McMaster Family Assessment Device. *Family Process*, 27(1), 97-104.
- Canino, G., Shrout, P. E., Rubio-Stipec, M., Bird, H. R., Bravo, M., Ramirez, R., . . . Martinez-Taboas, A. (2004). The DSM-IV rates of child and adolescent disorders in Puerto Rico: prevalence, correlates, service use, and the effects of impairment. *Archives of General Psychiatry*, 61(1), 85-93.
- Costello, E. J. (2015). Commentary: 'Diseases of the world': from epidemiology to etiology of child and adolescent psychopathology – a commentary on Polanczyk et al. (). *Journal of Child Psychology and Psychiatry*, 56(3), 366-369.
- Ford, T., Goodman, R., & Meltzer, H. (2003). The British Child and Adolescent Mental Health Survey 1999: The Prevalence of DSM-IV Disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42(10), 1203-1211.
- Gren-Landell, M., Aho, N., Andersson, G., & Svedin, C. G. (2011). Social anxiety disorder and victimization in a community sample of adolescents. *Journal of Adolescence*, 34(3), 569-577.
- Gren-Landell, M., Tillfors, M., Furmark, T., Bohlin, G., Andersson, G., & Svedin, C. G. (2009). Social phobia in Swedish adolescents: Prevalence and gender differences. *Social Psychiatry and Psychiatric Epidemiology*, 44(1), 1-7.
- Hafekost, J., Lawrence, D., Botelho de Haan, K., Johnson, S. E., Saw, S., Buckingham, W. J., . . . Zubrick, S. R. (2016). Methodology of Young Minds Matter: The second Australian Child and Adolescent Survey of Mental Health and Wellbeing. *The Australian and New Zealand journal of psychiatry*, 50(9), 866-875.
- Kessler, R. C., Avenevoli, S., Costello, E., Georgiades, K., Green, J. G., Gruber, M. J., . . . Merikangas, K. R. (2012). Prevalence, persistence, and sociodemographic correlates of DSM-IV disorders in the National Comorbidity Survey Replication Adolescent Supplement. *Archives of General Psychiatry*, 69(4), 372-380.
- Lawrence, D., Johnson, S., Hafekost, J., Botelho De Haan, K., Sawyer, M., Ainley, J., & Zubrick, S. R. (2015). *The Mental Health of Children and Adolescents. Report on the second Australian Child and Adolescent Survey of Mental Health and Wellbeing.* . Canberra. : Department of Health.
- Merikangas, K. R., He, J.-p., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., . . . Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: Results from the National Comorbidity Survey Replication-Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(10), 980-989.

- Merikangas, K. R., He, J.-p., Burstein, M., Swendsen, J., Avenevoli, S., Case, B., . . . Olfson, M. (2011). Service utilization for lifetime mental disorders in U.S. Adolescents: Results of the National Comorbidity Survey-Adolescent Supplement (NCSA). *Journal of the American Academy of Child and Adolescent Psychiatry*, 50(1), 32-45.
- Muroff, J., & Ross, A. (2011). Social disability and impairment in childhood anxiety. McKay, Dean [Ed]; Storch, Eric A [Ed] (2011) *Handbook of child and adolescent anxiety disorders* (pp 457-478) xix, 532 pp New York, NY, US: Springer Science + Business Media; US, 457-478.
- Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015). A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*, 56(3), 345.
- Ranta, K., Kaltiala-Heino, R., Rantanen, P., & Marttunen, M. (2009). Social phobia in Finnish general adolescent population: Prevalence, comorbidity, individual and family correlates and service use. *Depression and Anxiety*, 26(6), 528-536.
- Roberts, R. E., Roberts, C. R., & Xing, Y. (2007). Rates of DSM-IV psychiatric disorders among adolescents in a large metropolitan area. *Journal of Psychiatric Research*, 41(11), 959-967.
- Sawyer, M. G., Arney, F. M., Baghurst, P. A., Clark, J. J., Graetz, B. W., Kosky, R. J., . . . Zubrick, S. R. (2000). *The Mental Health of Young People in Australia*. Canberra: Commonwealth Department of Health and Aged Care.
- Spence, S. H. (1997). Structure of anxiety symptoms among children: A confirmatory factor-analytic study. *Journal of Abnormal Psychology*, 106(2), 280-297.
- Spence, S. H., & Rapee, R. M. (2016). The etiology of social anxiety disorder: An evidence-based model. *Behaviour Research and Therapy*, No Pagination Specified.
- Stapinski, L. A., Araya, R., Heron, J., Montgomery, A. A., & Stallard, P. (2015). Peer victimization during adolescence: Concurrent and prospective impact on symptoms of depression and anxiety. *Anxiety, Stress & Coping: An International Journal*, 28(1), 105-120.
- Strauss, C. C., Frame, C. L., & Forehand, R. (1987). Psychosocial impairment associated with anxiety in children. *Journal of Clinical Child Psychology*, 16(3), 235-239.
- Tillfors, M., Persson, S., Willén, M., & Burk, W. J. (2012). Prospective links between social anxiety and adolescent peer relations. *Journal of Adolescence*, 35(5), 1255-1263.
- Verduin, T. L., & Kendall, P. C. (2003). Differential Occurrence of Comorbidity Within Childhood Anxiety Disorders. *Journal of Clinical Child and Adolescent Psychology*, 32(2), 290-295.
- Whitmore, M. J., Kim-Spoon, J., & Ollendick, T. H. (2014). Generalized Anxiety Disorder and Social Anxiety Disorder in Youth: Are They Distinguishable? *Child Psychiatry and Human Development*, 45(4), 456-463.
- Zubrick, S. R., Lawrence, D., Johnson, S., & Hafekost, J. (2015). *Measuring Severity of Mental Disorders with the Young Minds Matter Parent/Carer-Reported Impact Items: Technical Report*.

NEED TABLE 1. MAIN DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE. IS THERE ONE FROM A PREVIOUS PAPER?

Table 2.

Weighted 12-month prevalence of parent-reported social, separation and generalized anxiety disorders by age group and gender

Gender	Total N =6310	SOC			SEP			GAD			SOC/SEP/or GAD		
	Age	N	%	(95% CI)	N	%	(95% CI)	N	%	(95% CI)	N	%	(95% CI)
Males	4-11yrs	32	1.82	[1.26,2.62]	85	4.95	[3.98,6.12]	29	1.79	[1.24,2.59]	118	7.00	[5.83,8.38]
	12-17yrs	48	3.29	[2.43,4.46]	48	3.78	[2.75,5.16]	36	2.34	[1.62,3.39]	89	6.16	[4.92,7.70]
	4-17yrs	80	2.45	[1.92,3.12]	133	4.45	[3.70,5.34]	65	2.03	[1.57,2.62]	207	6.64	[5.75,7.67]
Females	4-11yrs	20	1.29	[0.82,2.01]	78	4.79	[3.80,6.03]	23	1.52	[1.00,2.31]	96	6.03	[4.90,7.42]
	12-17yrs	56	3.45	[2.64,4.49]	48	3.05	[2.21,4.20]	55	3.44	[2.59,4.56]	114	7.44	[6.09,9.05]
	4-17yrs	76	2.20	[1.73,2.80]	126	4.05	[3.36,4.89]	78	2.34	[1.85,2.94]	210	6.63	[5.73,7.66]
Persons	4-11yrs	52	1.56	[1.18,2.06]	163	4.87	[4.16,5.69]	52	1.66	[1.27,2.17]	214	6.53	[5.72,7.44]
	12-17yrs	104	3.37	[2.73,4.15]	96	3.43	[2.69,4.36]	91	2.88	[2.28,3.62]	203	6.78	[5.80,7.92]
	4-17yrs	156	2.33	[1.95,2.78]	259	4.26	[3.72,4.86]	143	2.18	[1.82,2.60]	417	6.64	[5.98,7.36]

Table 3. Comorbidity between anxiety and other disorders for the previous 12 months among 4 to 17 year olds

Another Disorder in Past 12-Months																	
		SOC		SEP		GAD		OCD		MDD		CD		ODD		ADHD	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Anxiety Disorder in Past 12-months	SOC (N=156)	-	-	52	(33.29)	58	(37.18)	11	(7.53)	53	(31.29)	15	(11.24)	41	(26.00)	46	(36.57)
	SEP (N=259)	52	(18.21)	-	-	56	(21.62)	24	(10.44)	69	(23.63)	22	(9.95)	64	(24.66)	68	(28.93)
	GAD (N=143)	58	(39.74)	56	(38.00)	-	-	11	(8.38)	65	(41.43)	12	(11.37)	49	(32.71)	49	(36.94)

Note 1: SOC = Social Anxiety Disorder, SEP = Separation Anxiety Disorder; GAD = Generalized Anxiety Disorder, MDD = Major Depressive Disorder; CD= Conduct Disorder; OCD = Obsessive Compulsive Disorder; ODD = Oppositional Defiant Disorder; ADHD = Attention Deficit Hyperactivity Disorder

Table 4 Comorbidity (%) with other anxiety disorders by age group

			Another Anxiety Disorder in Past 12-months					
			SOC		SEP		GAD	
			N	(%)	N	(%)	N	(%)
Anxiety Disorder in Past 12-months	SOC	4-11yrs N= 52	-	-	19	(34.27)	18	(35.21)
		12-17yrs N=104	-	-	33	(32.67)	40	(38.42)
	SEP	4-11yrs N=163	19	(10.97)	-	-	23	(13.57)
		12-17yrs N=96	33	(32.14)	-	-	33	(30.74)
	GAD	4-11yrs N=52	18	(33.05)	23	(39.79)	-	-
		12-17yrs N=91	40	(44.98)	33	(36.60)	-	-

Note 1: SOC = Social Anxiety Disorder, SEP = Separation Anxiety Disorder; GAD = Generalized Anxiety Disorder

Table 5. Bivariate and multivariate (controlling for the other anxiety disorders) logistic regression analysis for demographic and life experiences in relation to social, separation and generalized anxiety disorders

Type of Anxiety Disorder		SOC								SEP								GAD							
		Bivariate				Multivariate#				Bivariate				Multivariate#				Bivariate				Multivariate#			
		OR	95%	Cis	p	OR	95%	Cis	p	OR	95%	Cis	p	OR	95%	Cis	p	OR	95%	Cis					
Sex	Male (Ref)	1.00				1.00				1.00				1.00				1.00							
	Female	0.90	[0.64,	1.26]		0.84	[0.55,	1.27]		0.91	[0.69,	1.19]		0.92	[0.69,	1.22]		1.16	[0.83,1.62]		1.28	[0.85,	1.94]		
Age Group	4-11 (Ref)	1.00				1.00				1.00				1.00				1.00							
	12-17	2.20	[1.58,	3.07]	***	2.30	[1.52,	3.47]	***	0.69	[0.51,	0.93]	*	0.50	[0.36,	0.70]	***	1.75	[1.72,2.50]	***	1.47	[0.93,	2.34]		
Living with both biological parents	Yes (Ref)	1.00				1.00				1.00				1.00				1.00							
	No	2.06	[1.46,	2.89]	***	1.22	[0.78,	1.93]		1.79	[1.33,	2.40]	***	1.07	[0.76,	1.50]		0.43	[0.29,0.63]	***	1.53	[0.92,	2.55]		
Family dysfunction	Yes (Ref)	1.00				1.00				1.00				1.00				1.00							
	No	1.29	[0.92,	1.83]		0.74	[0.48,	1.14]		1.79	[1.43,	2.24]	***	1.33	[1.03,	1.73]	*	2.35	[1.59,3.46]		1.30	[0.92,	1.85]		
Primary carer mental health problem	No (Ref)	1.00				1.00				1.00				1.00				1.00							
	Yes	1.88	[1.56,	2.27]	***	1.45	[1.18,	1.79]	***	2.07	[1.78,	2.41]	***	1.68	[1.44,	1.97]	***	1.81	[1.50,2.20]	***	1.29	[1.01,	1.64]	*	
High negative life events	No (Ref)	1.00				1.00				1.00				1.00				1.00							
	Yes	2.74	[1.79,	4.19]	***	1.04	[0.60,	1.82]		4.49	[3.39,	5.95]	***	2.45	[1.74,	3.45]	***	3.34	[2.21,5.07]	***	1.30	[0.68,	2.48]		
Low carer employment	No	1.00				1.00				1.00				1.00				1.00							
	Yes	2.20	[0.02,	0.03]	***	1.12	[0.62,	2.05]		3.33	[2.45,	4.53]	***	2.18	[1.48,	3.21]	***	2.26	[1.41,3..62]	***	0.96	[0.45,	2.08]		
Low family income	No (Ref)	1.00				1.00				1.00				1.00				1.00							
	Yes	1.69	[1.22,	2.34]	**	1.10	[0.69,	1.76]		1.84	[1.37,	2.46]	***	0.92	[0.64,	1.32]		1.72	[1.17,2.51]	**	1.01	[0.60,	1.70]		
Repeatedly bullied	No (Ref)	1.00				1.00				1.00				1.00				1.00							
	Yes	5.49	[3.82,	7.89]	***	2.87	[1.76,	4.68]	***	4.31	[3.16,	5.88]	***	2.07	[1.41,	3.03]	***	4.90	[3.31,7.24]	***	1.94	[1.08,	3.48]	*	

Note 1: *** = p<.001; **=p<.01; * = p <.05

Note 2: SOC = Social Anxiety Disorder, SEP = Separation Anxiety Disorder; GAD = Generalized Anxiety Disorder

Note 3: # = controlling for the other two anxiety disorders

Table 6
Proportion of youth showing moderate to severe impairment of functioning attributed to anxiety disorder(s) over the previous 12-months

Type of Disorder	Area of Functioning											
	Family			School			Friends			Self		
	N	%	(95% CI)	N	%	(95% CI)	N	%	(95% CI)	N	%	(95% CI)
SOC	86	59.67	[52.00,66.89]	90	58.06	[49.06,66.55]	97	60.62	[52.11,68.54]	103	66.97	[58.38,74.57]
SEP	109	42.81	[36.05,49.86]	109	42.25	[35.68,49.10]	119	44.69	[37.61,51.98]	145	56.59	[49.77,63.17]
GAD	90	63.68	[54.64,71.85]	82	57.89	[48.99,66.31]	93	64.60	[55.73,72.56]	101	68.18	[59.21,75.98]

Table 7
Receipt of professional assistance from school or health professional over previous 12-months in relation to emotional or behavioural problems

Type of Disorder	Any School Service			Any Health Service			Any Service		
	N	% of Disorder	(95% CI)	N	% of Disorder	(95% CI)	N	% of Disorder	(95% CI)
SOC	85	53.00	[44.04,61.77]	108	69.26	[60.94,76.48]	114	72.78	[64.6,79.66]
SEP	108	43.43	[37.14,49.95]	153	59.05	[52.47,65.32]	157	60.74	[54.24,66.88]
GAD	72	50.12	[41.12,59.10]	101	68.74	[59.77,76.50]	103	70.92	[62.13,78.37]

Note : SOC = Social Anxiety Disorder, SEP = Separation Anxiety Disorder; GAD = Generalized Anxiety Disorder

Figure 1. Cumulative proportion for age of onset for those with a parent-reported social, separation or generalized anxiety disorder