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A Nationally-Representative Epidemiological and Risk Factor Assessment of Child Mental Health in Vietnam

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Abstract

As part of the global mental health movement's focus on identifying and reducing international disparities, this study conducted the first nationally representative child mental health epidemiological survey in Vietnam. We assessed as risk/protective factors several family social structure characteristics (e.g., presence of grandparents, number of siblings in the home) of particular relevance to non-Western countries. Epidemiological data using the Child Behavior Checklist and the Strengths and Difficulties Questionnaire were collected at 60 sites in 10 of Vietnam's 63 provinces selected to provide a nationally representative sample, which included 1,314 adult informants of children 6-16 years of age, and 591 children aged 12-16. Vietnamese children's mental health functioning was reported overall to be better by approximately a third standard deviation than the international average; this international difference was particularly large for externalizing (behavior) problems as compared to internalizing (emotional) problems, suggesting that a cultural *problem suppression* model may be operating in Vietnam. Significant variability in mental health problems was found across provinces, emphasizing the need for nationally representative samples when conducting child mental health epidemiological surveys. Contrary to many other studies, in Vietnam higher SES was found to be a risk factor for attention/hyperactivity problems.

Keywords

Vietnam; epidemiology; SDQ; CBCL; family social environment

Over the past two decades there has been increasing interest in global health, with the goal of reducing health disparities between high income countries (HIC), and low and middle income countries (LMIC) (Curry et al., 2010). Most recently, there has been increasing awareness of mental health, as it is recognized that mental health problems represent a significant proportion of the global health burden yet at the same have among the greatest global health disparities (Becker & Kleinman, 2013). And although almost 9 out of 10 children live in LMIC, child global mental health development lags even relative to global mental health development in general (Kieling & Rohde, 2012).

Within global health, epidemiology plays a key role, providing basic knowledge essential for reducing inequitable burdens of disease (Krieger, 2011). There have been a number of child mental health epidemiology studies in LMIC. Rescorla et al. (2012) reviewed child mental health epidemiology studies from 44 countries, half of which were LMIC. They found that effect sizes for country were larger than for age and gender; similarly, Verhulst et al. (2003) found that inter-country variability on child mental health problems was over 5 times that due to age or gender. This variability across countries highlights the necessity of assessing mental health problem within specific countries across the globe to obtain epidemiological estimates that are geographically accurate, to help reduce global mental health disparities, and to identify more fully potential protective and risk factors that may vary across the globe.

Among the 22 LMIC in Rescorla et al.'s (2012) review, only 2 studies utilized nationally representative samples. Some samples were geographically restricted, which may be problematic because if mental health problems vary within a country then non-representative samples likely will produce misleading results (Kieling & Rohde, 2012). Other studies obtained samples from schools, potentially biasing results because children experiencing more mental health difficulties tend to be less likely to remain in school (e.g., Vaughn et al., 2011) and LMIC may have relatively high rates of school dropout (e.g., in rural China, 14% of students beginning grade 7 dropout before completing grade 8; Yi et al., 2012). And although Asia is the most populous continent, neither of the nationally representative studies was conducted in Asia.

The purpose of the present study then was to conduct a nationally representative child mental health epidemiological assessment in Vietnam, the world's 13th most populous nation (Central Intelligence Agency, 2012). Similar to many LMIC, Vietnam is a young country with over 25% of its population under the age of 16, suggesting a large potential child mental health burden. As with many other LMIC, in the process of industrialization the Vietnamese government focused its limited resources on physical infrastructure directly connected to economic development (e.g., airports; roads); in contrast, education and health—in particular mental health—received relatively little investment (Stern, 1998). This focus produced annual GDP growth of 8%, although in the 2007 recession GDP growth declined to 5.5% (World Bank, 2010); social, educational, and health infrastructure, however, did not

develop comparably. The rapid economic growth coupled with the lack of social infrastructure support has resulted in increased pressure on families, threatening their traditional ability to socialize children into adaptively functioning adults (e.g., Gabriele, 2006; Ruiz-Casares & Heymann, 2009). These social changes have increased Vietnamese children's risk for mental health problems, making Vietnam an important LMIC in which to conduct a child mental health epidemiological assessment.

There have been several prior studies of child mental health epidemiology in Vietnam. Tu (1994) found that 20% to 29% of her sample of Hanoi elementary school children met criteria for a psychiatric disorder. In a survey of two Hanoi neighborhoods, McKelvey, Davies, Sang, Pickering & Tu (1999) found that 8.2% of children were at or above the borderline range ($T > 60$) for mental health problems on the Child Behavior Checklist (CBCL) Total Problems score. Using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), Anh, Minh & Phuong (2006), found that among high school students in Ho Chi Minh City 16% were experiencing significant affective problems, and 24% behavior problems. Most recently, Amstadter et al. (2011) conducted a mental health assessment of adolescents in two provinces in Vietnam using the SDQ, and reported a case rate of 9.1%.

These studies provide important preliminary information that suggests that rates of mental health problems may be relatively high among Vietnamese children, but the substantial variability across studies prevents clear conclusions. Variability across studies may be due in part to (a) none of the studies using a nationally representative sample, and geographic variability across the country; (b) a relatively restricted age range of children in many studies; and (c) use of school-based samples in some studies. In addition, most studies were based on the SDQ. Although a valid instrument useful for mental health screening, the SDQ is limited in (a) having less well-established international norms and not distinguishing (b) somatization from affective symptoms, or (c) aggressive behavior from delinquent/rule-breaking behavior, the latter two points being important distinctions within child psychopathology (Achenbach & Rescorla, 2001).

The purpose of the present study then was to conduct a nationally representative epidemiological survey in Vietnam across a broad age range (6-16). We used the two most widely used measures of child psychopathology, the CBCL and the SDQ, to obtain a comprehensive assessment of child psychopathology and to allow for the broadest comparison to other studies. We assessed the extent to which the CBCL and SDQ varied across province, to determine the degree to which national child mental health planning would need to consider the provincial level, and to evaluate Kieling and Rohde's (2012) concern that child mental health problems may vary significantly within a country. We assessed several family variables as risk or protective factors of particular relevance in LMIC, and hence important to understand within the context of global health, including (a) grandparents living in the home. In LMIC, extended families living together can be the rule rather than the exception, and grandparents could function as a protective factor (e.g., through more adult attention and supervision) or as a risk factor (e.g., through parent-grandparent disagreement regarding child discipline) (Deng, Chen, & Shi, 2003); (b) the number of siblings in the home. In LMIC family sizes may be greater than in HIC, which could function as a protective factor through more opportunities to learn to resolve conflicts,

etc., or as a risk factor resulting from less parental attention (Silverman, 2011); and (c) the time parents spend talking with the child, which may be relatively low in LMIC but serve as a protective factor through a better parent-child attachment (Elgar, Craig, & Trites, 2013).

Methods

Participants, Sampling Frame, and Recruitment

The sampling frame was structured to obtain a nationally representative sample of 6-16 year children. Ten of Vietnam's 63 provinces were selected so as to be nationally representative, based on (a) geographical character (e.g., coastal vs. inland), (b) urbanization, and (c) economic status. Provinces included: (a) Thai Nguyen (north-eastern mountain region); (b) Hanoi (northern); (c) Hoa Binh (north-western); (d) Hai Phong (Red River Delta, northern); (e) Ha Tinh (north-central); (f) Da Nang (central); (g) Phu Yen (south-central); (h) Ho Chi Minh City and (i) Binh Thuan (southern), and (j) Hau Giang (Mekong River Delta, southern). In order to help interpret potential provincial differences in mental health functioning, ratings of the ten provinces in regards to their geographical location (north, central, south) as well as their mean income, level of social services available, and degree of urbanization were obtained (e.g., General Statistics Office of Vietnam, 2014). Because the three ratings were very highly correlated across provinces (mean $r = .89$), the ratings were collapsed into a single variable, provincial level of development.

Within each province three locales were selected so that the sample would be representative of the province. One locale consisted of a relatively urban area (relative to the nature of the province). The second locale consisted of a near-urban area (in relatively urban provinces) or a semi-rural area (in relatively rural provinces), and the third a rural area. Within each locale, two neighborhoods were randomly selected, for a total of 60 data collection sites. Within each neighborhood, 22 families were selected for participation, one male and one female child across 11 ages.

Potential participants were identified from population lists. In Vietnam, all citizens must register with local authorities, and these population lists are public record. Residents are registered by household, with basic information including age and gender. A total of 1,320 families were selected for recruitment, six of whom declined to participate. Thus, the final sample consisted of 1,314 parents / guardians reporting on their child, and 591 children (3 children independently declined to participate) aged 12 or greater reporting on themselves.

The project was conducted by Vietnam National University-Hanoi (VNU), which is connected to universities across the country. For each participating region, VNU officials contacted the primary governmental educational agency at the provincial level requesting their support; all agencies agreed to participate. The provincial agency identified local staff in each locale who accompanied the project interviewer to the family's house. The staff person briefly introduced the project and interviewer to the potential participant and then left. The project interviewer described the project in detail, obtained informed consent from those interested in participating, and scheduled a time for the interview convenient to the family.

By design age was evenly distributed from 6 to 16 years old, with 50% of the sample male (see Table 1), with 93% of parents married, and 27% of households with grandparents present. Median annual family income (typically including earnings from two adults) was \$1,227, slightly above the 2010 Vietnam median per capita annual GDP of \$1,032 (World Bank, 2010). Approximately 1.4% of the children and 2.3% of the adolescents were not attending school; across provinces, dropout rates ranged from 0% (Ha Tinh and Hoa Binh) to 6.8% (Da Nang). Those who had dropped out differed significantly on 18 of 24 CBCL and SDQ subscales. In all instances, dropouts were higher than continuers, with a mean effect size of $z=.72$.

Measures

Demographics—A demographic questionnaire was completed by the adult informant. This questionnaire assessed basic information as well as potential risk and protective factors, including: (a) child age and gender; (b) family social structure variables including whether the grandparents lived with the family, the number of siblings in the family, and the amount of time the parent spent talking with the child, and (c) family income and parent education. Mother and father education were assessed separately but because they were very highly correlated ($r = .73$, $p < .0001$) were combined them into a single variable, *Parent Education*.

Strengths and Difficulties Questionnaire—The adult informant completed the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997) and adolescents (12 or older) completed the self-report SDQ, a standardized child mental health measure widely used internationally. It contains 25 items, 20 of which describe difficulties (e.g. ‘Often loses temper’), and 5 of which describe strengths. Items are rated on a 0–2 scale (Not True, Somewhat True, Certainly True). The SDQ produces five problem scales: Emotional Symptoms (somatic complaints, anxiety, sadness), Conduct Problems (aggression and anger, dishonest behavior such as lying and stealing), Hyperactivity, Peer Problems, and Total Difficulties. The SDQ has demonstrated validity around the world including Asia (Du, Kou, & Coghill, 2008). The Vietnamese version of the SDQ (e.g., Graham & Jordan, 2011) was used in the current study. To define caseness we used the cut-off scores provided by Goodman (2013) for their U.S. normative sample. To facilitate cross-study comparisons, similar to many other international SDQ studies (e.g., Amstadter et al., 2011) we used the SDQ *Borderline* caseness cutoff, which for parent-report is Total Difficulties >13 and for adolescent-report is Total Difficulties >15 . In the present sample, for the SDQ parent-report internal consistency alpha ranged from .53 (Peer Problems) to .73 (Total Problems), and for the SDQ adolescent-report, from .54 (Peer Problems) to .74 (Total Problems); see Tables 2 and 3.

Child Behavior Checklist-VN—Parents completed the *Child Behavior Checklist* (CBCL; Achenbach & Rescorla, 2001), which assesses children’s emotional and behavioral problems. It contains 118 problem items (e.g., ‘Physically attacks people’) rated on a 0–2 scale (Not True, Somewhat or Sometimes True, Very True or Often True). It produces two broadband scales (Internalizing and Externalizing Problems) and eight narrowband scales: Anxious-Depressed (anxious-depressive affect and cognitions), Withdrawn-Depressed (withdrawn behavior and sadness), Somatic Complaints, Rule-Breaking Behavior (dishonest

behavior, and status violations such as truancy), and Aggressive Behavior. Its narrowband scales thus provide a more fine-grained assessment than the SDQ, with the SDQ Emotional Symptoms scale represented by three CBCL scales (Anxious-Depressed, Withdrawn-Depressed, Somatic Complaints), and the SDQ Conduct Problems scale represented by two CBCL scales (Rule-Breaking Behavior, Aggressive Behavior). The CBCL is widely used and validated internationally (Rescorla et al., 2012). Adolescents 12 years and older completed the *Youth Self-Report* (YSR; Achenbach & Rescorla, 2001), the adolescent self-report version of the CBCL that produces the same subscales. The YSR also is widely used and validated internationally (Rescorla et al., 2012). The official Vietnamese versions (Achenbach & Rescorla, 2012) of the CBCL and YSR were used in the present study. To determine caseness, we first used the CBCL scoring software to compute age and gender adjusted t-scores (based on the U.S. normative sample) for each participant. Parallel with the SDQ, we computed caseness based on borderline cutoffs ($t\text{-score} \geq 60$ for total and broadband scales, $t\text{-score} \geq 65$ for narrowband scales; Achenbach & Rescorla, 2001). In the present sample, CBCL internal consistency alpha ranged from .64 (Social Problems) to .93 (Total Problems), and for the YSR, alpha ranged from .68 (Social Problems) to .94 (Total Problems); see Tables 4 and 5.

International Comparison Data

To help interpret our SDQ and CBCL results, we compared our results to those of other international child mental health surveys. For CBCL Total Problems, we used Rescorla et al.'s (2012) review of international CBCL prevalence studies. Because Rescorla et al. (2012) did not report means and standard deviations for the YSR, or for CBCL internalizing and externalizing problems, we also used Verhulst et al. (2003) and Rescorla et al. (2007) which did provide this information for the YSR and CBCL, respectively. Because no review of the SDQ with the necessary information was identified, we conducted a literature search using standard procedures and identified 42 datasets across 22 countries using the parent- or adolescent-report SDQ, which were used to generate international means and standard errors for the SDQ.

Procedures

The local Provincial People's Committee provided population lists, from which children were randomly selected stratified by age and gender, with only one child per family. In each province potential data collectors were identified through the provincial educational agency. Potential data collectors received two days training, focusing on: (a) discussion of the research design, (b) child mental health and psychopathology, (c) a detailed discussion of the assessment measures, (d) interview procedures (e.g., the appropriate attitude to maintain during data collection), and (e) extensive roleplaying. Data collectors were required to complete correctly two practice assessments prior to participation in the project, and received ongoing supervision from the provincial coordinators. Data collectors were assigned sites such that they did not know any participants. The parent was interviewed first in a private area of the house, then participant children 12 or older were interviewed privately. Families were paid based on the economic level of their locale and whether the adolescent was also interviewed, ranging from about \$4 to \$10.

Results

Overview of Main Statistical Analyses

We first estimated caseness rates with caseness defined as in the **Measures** portion of the **Methods** section. We also tested whether there was significant variability in mental health problems across provinces, (a) with caseness as the dependent variable and *Province* as the independent variable in a log-linear model (using SAS Proc Catmod), and (b) using a repeated measures GLM analysis (using SAS Proc GLM) with (b1) the 4 SDQ subscales and 8 CBCL narrowband factors (in separate analyses) as the dependent variables, (b2) *Domain of Psychopathology* as a repeated measures independent variable, (b3) *Province* as a between-subjects dependent variable, and (b4) their interaction. This analysis tested whether the relative levels of the different dimensions of child psychopathology varied as a function of province.

Second, risk factor analyses were conducted to determine whether overall and relative levels of the different SDQ and CBCL subscales varied as a function of our risk factors. We used similar repeated measures analyses as above, with (a) the SDQ and CBCL narrowband factors (in separate analyses) as dependent variables, (b) *Domain of Psychopathology* as a repeated measures independent variable, (c) each risk factor (e.g., parent education), in separate analyses, as a between-subjects independent variable, and (d) their interaction.

Preliminary Analyses

Prior to our main analyses we computed correlations between the SDQ and CBCL. For parent-report SDQ and CBCL, total problem scores correlated $r = .58$, SDQ conduct problems and CBCL externalizing problems correlated $r = .45$, SDQ hyperactivity and CBCL attention problems correlated $r = .53$, and SDQ emotional problems and CBCL internalizing problems correlated $r = .50$; $p < .0001$ for all correlations. For adolescent-report SDQ and YSR total problem scores correlated $r = .71$, SDQ conduct problems and CBCL externalizing problems correlated $r = .56$, SDQ hyperactivity and CBCL attention problems correlated $r = .60$, and SDQ emotional problems and CBCL internalizing problems correlated $r = .65$; $p < .0001$ for all correlations. In addition, we assessed caseness agreement for the CBCL and parent SDQ, and the YSR and adolescent SDQ. The kappa for parent caseness agreement was .42 and for adolescent agreement .41, with both $p < .0001$.

Caseness and Mean Problem Levels

Overall rates and levels—In the full sample (ages 6-16), caseness estimates were 13.2% based on parent-report SDQ Total Problems and 11.9% based on CBCL Total Problems (see Tables 2 and 4). Within the adolescent sample (ages 12-16), caseness estimates were 10.7% based on the adolescent-report SDQ Total Problems and 12.4% based on the YSR (see Tables 3 and 5).

Mean scores for the SDQ, CBCL, and YSR also are reported in Tables 2-5. Our mean parent-report SDQ Total Difficulties score was 8.41, $z = .04$ relative to our international SDQ mean of 8.31 ($SE = 2.51$). For the CBCL, our Total Problems score was 19.12, $z = -.73$ relative to Rescorla et al.'s (2012) international Total Problems mean (24.04; $SE = 6.74$). Our

CBCL Internalizing Problems and Externalizing Problem means (5.78; 4.55, respectively) were $z = -.39$ and $z = -1.30$ (respectively) relative to Rescorla et al.'s (2007) international internalizing and externalizing problem means (6.6, $SE=2.1$; 6.5, $SE=1.5$, respectively). Our mean adolescent-report SDQ Total Difficulties score was 9.56, $z = -.26$ relative to our international mean of 10.18 ($SE=2.36$). Finally, our YSR Total Problems, Internalizing Problems, and Externalizing Problems means (29.67, 9.97, 6.60) were $z = -.38$, $z = -.28$ and $z = -.55$ relative to Verhulst et al.'s (2003) international means (37.6, $SE=21.0$; 12.2, $SE=8.1$; 10.4, $SE=6.9$, respectively).

Differences in caseness and problem levels by Province—Caseness varied significantly as a function of Province when assessed by (a) parent report SDQ ($\chi^2[9]=26.69$, $p<.002$, $R^2 = .02$), (b) adolescent-report SDQ ($\chi^2[9]=21.10$, $p<.01$, $R^2 = .04$), and (c) CBCL ($\chi^2[9]=27.65$, $p<.001$, $R^2 = .02$) but not the YSR. Thus, overall rates of child mental health problems varied significantly across provinces. The repeated measures analysis assessing the interaction between Province and Domain of Psychopathology was significant for (a) parent-report SDQ ($F[27,3927]=7.19$, $p<.0001$, $R^2 = .03$), (b) CBCL ($F[63,9128]=4.54$, $p<.0001$, $R^2 = .02$), (c) adolescent-report SDQ ($F[27,1761]=1.96$, $p<.003$, $R^2 = .02$), and (d) YSR ($F[63,4067]=2.26$, $p<.0001$, $R^2 = .03$). The significant interactions indicated relative levels of different domains of child psychopathology (e.g., emotional problems vs. conduct problems) differed significantly across the provinces.

To help interpret these significant Province effects, we compared the provinces as a function of the three geographic regions (north, central, south) on the SDQ and CBCL / YSR Total Problems scores, and also correlated the province ratings for level of development with the SDQ and CBCL / YSR Total Problems scores. The southern provinces showed significantly lower parent-report SDQ and CBCL Total Problem scores than the central and northern provinces, which did not differ from each other; adolescent-report SDQ and the YSR did not differ as a function of geographic location. Level of development was significantly positively correlated with the child psychopathology measures except for the YSR, with the mean $r = .10$; i.e., the higher the level of development across the provinces, the higher the level of child problems.

Risk and Protective Factors

Grandparents—The main effect for Grandparents as well as Grandparents X Domain of Psychopathology interaction were non-significant for all four child psychopathology measures.

Number of Siblings in Family—Number of Siblings had one significant main effect, on the parent report SDQ as the dependent variable, with the greater the number of siblings the lower the SDQ score (although the effect was small, $r = -.06$; see Table 6). Two interaction effects were significant, the Number of Siblings X CBCL domain interaction and the Number of Siblings X YSR domain interaction (see Table 6). Underlying the first interaction, the effect of Number of Siblings was significant for CBCL Social Problems, Attention Problems, and Aggressive Behavior, with the greater the number of siblings in the family the lower the ratings on these scales ($r = -.08$; $r = -.07$; $r = -.06$, respectively).

Effects on other CBCL scales were non-significant. In regards to the interaction involving the YSR, the effect of Number of Siblings was significant for YSR Anxious-Depressed and Somatic Complaints, with the greater the number of siblings in the family, the higher the self-reported internalizing problems ($r = .09$; $r = .10$, respectively). Effects for the other YSR narrow-band scales were non-significant.

Time Spent Talking with Child—Time Spent Talking with the Child had three main effects, on the CBCL, the adolescent-report SDQ, and the YSR. For all three effects, the more time parents spent talking with their child the lower the level of problems reported although effects again were small ($r = -.07$; $r = -.11$; $r = -.13$, respectively). Two interactions were significant, between Time Spent Talking with Child X CBCL domain, and Time Spent Talking with Child X adolescent-report SDQ domain (see Table 6). Underlying the first interaction, the effect of Time Spent Talking with Child was significant for CBCL Withdrawn-Depressed, Somatic Complaints, Attention Problems, Rule-Breaking, and Aggressive Behavior subscales, but not for the other CBCL scales. For the significant scales, the more the parent talked with the child, the lower the level of mental health problems as reported by the CBCL ($r = -.09$; $r = -.06$; $r = -.08$; $r = -.09$; $r = -.07$, respectively). In regards to the interaction involving the adolescent-report SDQ, for Conduct Problems and Hyperactivity the more time the parent spent talking with the child, the lower the SDQ rating was ($r = -.08$; $r = -.16$, respectively).

Family income—None of the main effects for Family Income were significant; however, all four of the interactions were significant (see Table 6). The interaction with parent-report SDQ domain reflected the fact that the relation between Family Income and SDQ Hyperactivity, Emotional Symptoms, and Peer problems but not Conduct Problems were significant. Also underlying this interaction was the fact that relation between Family Income and Hyperactivity was positive whereas the relations with Emotional Symptoms and Peer Problems were negative ($r = .06$; $r = -.07$; $r = -.12$, respectively). Similarly, underlying the Family Income X CBCL domain interaction was the fact that there were significant relations between Family Income and the Anxious-Depressed, Somatic Complaints, and Attention Problems scales but not for the other CBCL narrow-band scales. And again, as with the SDQ, the relation between Family Income and Attention Problems Hyperactivity was positive but for the internalizing problems scales the relations were negative ($r = .08$; $r = -.07$; $r = -.10$, respectively).

For the Family Income X adolescent-report SDQ domain interaction, there were significant positive relations between Family Income, and SDQ Hyperactivity and Conduct Problems ($r = .12$; $r = .09$, respectively) but non-significant relations with Emotional Symptoms and Peer Problems. Finally, for the Family Income X YSR domain interaction there were significant positive relations between Family Income and the Attention Problems ($r = .10$), Rule-Breaking Behavior ($r = .08$), and Aggressive Behavior ($r = .10$) scales; effects for the other YSR narrow-band subscales were non-significant.

Parent education—Similar to the results for Family Income, for Parent Education none of the main effects were significant but all four of the interactions were significant (see Table 6). The Parent Education X parent-report SDQ domain reflected the fact that there

was a significant positive relation between Parent Education and SDQ Hyperactivity ($r = .11$), and a significant negative relation to Peer Problems ($r = -.11$) but non-significant relations with Emotional Symptoms and Conduct Problems. For Parent Education X CBCL domain interaction, the relation between Parent Education and Attention Problems was significant and positive ($r = .10$) but all other relations scales were non-significant.

The Parent Education X SDQ domain reflected the fact that there was a significant positive relation between Parent Education and SDQ Hyperactivity ($r = .11$) and a negative relation with Emotional Symptoms ($r = -.10$) and non-significant relations with Peer Problems and Conduct Problems. Finally, the Parent Education X YSR domain interaction reflected the fact that the relation between Parent Education and Withdrawn-Depressed was significant ($r = -.10$) but relations with the other YSR scales were non-significant.

Child gender—For the CBCL the main effect of *Child Gender* was significant, with the males reported to have slightly higher overall scores (see Table 6). However, all four interaction effects also were significant. These interactions reflected the fact that for emotional problems (e.g., the SDQ Emotional Symptoms scale) females tended to be higher than males, and for behavior problems (e.g., the CBCL/YSR Rule Breaking Behavior scale) males tended to be higher than females (see Table 6).

Child age—Child Age showed one significant main effect, on the YSR, with older children reporting higher problem levels ($r = .09$). The interactions between Child Age, and parent-report SDQ domain, CBCL domain, and YSR domain also were significant. For the parent-report measures (parent-report SDQ, and CBCL) this interaction reflected the fact that behavior problems (e.g., SDQ Hyperactivity, CBCL Aggressive Behavior) decreased slightly with age whereas emotional problems (CBCL Withdrawn-Depressed, Somatic Complaints) increased slightly with age.

Discussion

In our nationally representative Vietnamese sample, overall levels of child mental health problems were about one third standard deviation below the international average (i.e., the children were reported to have fewer problems than the international average), but above rates reported by Amstadter et al. (2011) and McKelvey et al. (1999) in their Vietnamese samples. Although levels of mental health problems may be below international averages, our caseness rates still suggest a significant need for services, with perhaps 12% of the non-adult population in need of mental health services. Given the current Vietnamese population of over 90 million people more than one quarter of whom are 16 years of age or younger (Central Intelligence Agency, 2012), this translates into over three million children and adolescents potentially in need of services. Unfortunately, as with many other LMIC, in Vietnam current child mental treatment resources appear far from adequate to address this challenge (Weiss et al., 2012).

This need is not consistent, however, across domains of child psychopathology. For instance, based on the parent-report CBCL our Vietnamese sample was approximately 1.30 SD below the international average for externalizing problems but only .39 SD below the

average for internalizing problems, suggesting a greater need in the area of internalizing problems such as anxiety and depression. Information such as this will be critical when developing treatment resources, as these forms of mental health problems require different intervention resources (Weisz & Kazdin, 2010).

One possible explanation why relative to international norms externalizing problems were lower than internalizing problems is that a cultural *problem suppression-facilitation* process may be operating. It has been suggested (e.g., Lansford et al., 2010; Weisz et al., 1993) that cultures differentially suppress (via punishment and extinction) certain child behaviors (e.g., aggression), and encourage (via modeling and reinforcement) others (e.g., in Asian cultures such as Vietnam, for instance, somatic complaints), resulting in relative levels of different types of child psychopathology varying across cultures, similar to what we found in our Vietnamese sample. Vietnamese culture has been heavily influenced by Confucian tradition which strongly emphasizes affective control (in particular group-disruptive emotions such as anger), and harmony and self-restraint in interpersonal relationships (Tran, 2001). In our sample these cultural values may have helped to reduce externalizing behavior problems but had relatively little effect on internalizing problems which may be less externally observable and less disruptive to group harmony.

Although our caseness rates were higher than those reported by Amstadter et al. (2011) and McKelvey et al. (1999) for their Vietnamese samples, our rates were lower than those reported by Anh et al. (2006) and Tu (1994) for their Vietnamese samples. This heterogeneity of results could reflect a number of different factors, including geographical limitations and variability across sites of previous studies, the use of different assessment measures, the relatively restricted age range of most prior studies, and the use of school-based samples for several of the prior studies.

Using both the SDQ and CBCL, child mental health problems varied significantly across provinces. In regards to the parent-report SDQ, for instance, province explained 9% in total score variance and 3% variance in the relative levels of SDQ subscales. We found that in southern provinces lower levels of child and adolescent problems tended to be reported compared to the central and northern provinces, perhaps because culturally, southern Vietnam is seen as more socially supportive, and less stressful (Ngoc, 2012). We also found that provinces that were higher in their level of development tended to report more child mental health problems, which may be another factor underlying variability in child mental health problems across provinces.

The significant variability across provinces has several implications. First, in order for the child mental health functioning of Vietnam to be accurately described, a nationally representative sample is necessary. This issue likely is not unique to Vietnam, and thus these findings highlight a broader concern: As Kieling and Rohde (2012) have noted, within-country variability in child mental health problems sometimes may be greater than between country variability, suggesting more generally that child mental health epidemiological studies based on non-representative samples, although valuable, also should be interpreted cautiously. In addition, our finding of significant variability across provinces suggests that when considering national planning, province level assessments will be important as we not

only found variability in overall levels but also in the relative levels of different mental health problem areas that require different interventions.

Our most unexpected finding was that family income and parent education served as risk factors for attention/hyperactivity problems. In general, other studies have found either no relation between SES indices and attention/hyperactivity problems (e.g., Graves, Blake, & Kim, 2012), or that higher SES is a protective factor (e.g., Martel, 2013). In contrast, we found that the higher the SES index, the higher the rating for attention/hyperactivity problems. This was true for both informants and both measures, and for both income and parent education, suggesting that this finding is not simply a measure or informant effect. One possible explanation is that although in general higher SES is associated with higher levels of physical activity (e.g., Macera et al., 2005), in Vietnam the inverse may be true. Vietnamese children and adolescents of higher SES may spend more time studying, being driven to school rather than riding a bicycle, playing video-games rather than engaging in physical play, etc., decreasing their physical activity (Trang, Hong, Dibley, & Sibbritt, 2009). There is some evidence that physical exercise has a modest but significant negative relation to ADHD symptoms (Rommel, Halperin, Mill, Asherson, & Kuntsi, 2013), which could explain in part the link between higher SES and higher attention / hyperactivity symptoms in our sample. A related possibility is that this finding is due to the fact that levels of ADHD behaviors may be positively correlated with increased parental academic pressure placed on the child (Rogers, Wiener, Marton, & Tannock, 2009). At least in some cases, Vietnamese parents of higher SES place greater pressure on their children to succeed academically (Trang et al., 2009), which in turn may increase their child's attention/hyperactivity problems.

In contrast, we found no significant results for the presence of the grandparents in the home. It is possible that where it has been traditionally the norm, the structure of the family has adapted to the presence of grandparents. It also is possible that relations between grandparents and mental health functioning may involve more complex effects than the simple presence of grandparents, that the quality or other specifics of the relationship between the grandparents and the rest of the family may influence the children rather than the presence itself.

We also found that the CBCL Attention Problems, Aggressive Behavior, and Social Problems subscales were negatively correlated with number of siblings in the home. In contrast, for the adolescent-report YSR the number of siblings was positively correlated with the Anxious-Depressed and Somatic Complaints subscales. Children and parents tend to some extent to be differentially aware of internalizing versus externalizing problems (Rescorla et al., 2012), and it is possible that our results represents a similar sensitivity in regards to the effects of siblings. That is, adolescents may be more sensitive to the effects on their emotional functioning of less parental attention (due to a greater number of siblings) whereas parents may be more sensitive to the behavioral learning effects on social problems, aggressive behavior, etc. of increased need to share, exposure to more role models, etc. associated with a greater number of siblings.

Limitations should be considered when interpreting our results. Because we used standard child mental health measures, we may have missed mental health symptoms culturally-specific to Vietnamese or Southeast Asian populations (Hinton, Kredlow, Pich, Bui, & Hofmann, 2013). Second, our international comparisons were limited in that the SDQ and CBCL comparisons did not necessarily involve the same countries, and the CBCL has a more extensive international comparison database; nonetheless the comparisons provide an important metric for gauging Vietnamese children's mental health functioning. And third, with the exception of province results, most effects would be considered 'small' using Cohen's (1992) definition. However, even relatively small effects (e.g., our finding that SES indices explain about 1% of the variance in attention/hyperactivity symptoms) can be of practical and theoretical significance, in particular if unexpected based on prior research (Prentice & Miller, 2003).

In conclusion, the results of this first nationally representative epidemiological assessment of child mental health in Vietnam produced several key findings. First, our results suggest that approximately 12% of Vietnamese children are experiencing significant mental health problems (i.e., were considered cases), which translates into over three million children and adolescents potentially in need of services. Second, however, overall Vietnamese children appear to be functioning better than the international average, particularly in regards to externalizing behavior problems but less so for internalizing emotional problems. Third, there was significant variability across provinces in rates and levels of mental health problems, both overall and relative across different domains of psychopathology. And finally, higher SES was associated with greater risk for attention / hyperactivity problems, contrary to most findings in higher income countries.

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Table 1

Demographic Characteristics of Sample

Characteristic	Level	
Child		
Mean (SD) age	11.2 (3.1)	
Percent male	50%	
Percent drop out of school	1.8%	
Family		
Median annual income	\$1,227	
Mean (SD) number children in household	3.17 (.93)	
Grandparents live in home	27%	
Parental marital status		
Married	93%	
Widowed	3%	
Divorced	2%	
Parents	Father	Mother
Informant	24%	74%
High school graduate	38%	36%
Mean (SD) age	42.3 (6.3)	38.8 (6.0)
Occupation		
Farmer	27%	25%
Fisherman	2%	0%
Vendor	12%	22%
Factory worker	13%	10%
Office worker	18%	18%
Homemaker	0%	9%
Retired	2%	1%

Table 2

Total sample means and 'caseness' rates for parent-report SDQ

SDQ	Alpha	Mean	SD	Case
Total Difficulties (scale range: 0-40)	.73	8.41	4.73	13.2%
Emotional Symptoms (scale range: 0-10)	.65	2.43	2.02	27.9%
Conduct Problems (scale range: 0-10)	.63	0.92	1.19	9.2%
Hyperactivity (scale range: 0-10)	.61	2.78	1.83	6.7%
Peer Problems (scale range: 0-10)	.53	2.27	1.58	40.3%

Table 3

Adolescent sample means and 'caseness' rates for adolescent- and parent-report SDQ

SDQ Scale	Alpha	Mean	SD	Case
A-report Total Difficulties (scale range: 0-40)	.74	9.56	4.84	10.7%
P-report Total Difficulties (scale range: 0-40)	.75	8.28	4.86	11.9%
A-report Emotional Symptoms (scale range: 0-10)	.65	3.12	2.14	12.4%
P-report Emotional Symptoms (scale range: 0-10)	.67	2.51	2.09	28.4%
A-report Conduct Problems (scale range: 0-10)	.66	1.16	1.27	6.2%
P-report Conduct Problems (scale range: 0-10)	.61	0.89	1.25	8.7%
A-report Hyperactivity (scale range: 0-10)	.61	2.97	1.85	8.5%
P-report Hyperactivity (scale range: 0-10)	.64	2.54	1.83	5.2%
A-report Peer Problems (scale range: 0-10)	.54	2.30	1.56	20.3%
P-report Peer Problems (scale range: 0-10)	.56	2.35	1.59	42.7%

Note: A-report = Adolescent-Report, P-report = Parent-Report

Table 4

Total sample means and 'caseness' rates for CBCL

CBCL Scale	Alpha	Mean	SD	Case
Total (scale range 0-238)	.93	19.12	16.43	11.9%
Int (scale range 0-64)	.86	5.78	5.57	18.3%
Ext (scale range 0-70)	.84	4.55	5.00	6.6%
AnxDep (scale range 0-26)	.72	2.81	2.77	7.3%
WithDep (scale range 0-16)	.68	1.45	1.81	5.9%
SomC (scale range 0-22)	.77	1.52	2.10	9.6%
SocProb (scale range 0-22)	.64	2.54	2.30	6.4%
TP (scale range 0-30)	.70	1.04	1.82	4.4%
AttPrb (scale range 0-20)	.75	3.28	2.80	4.0%
RB (scale range 0-34)	.64	1.29	1.91	2.5%
Agg (scale range 0-36)	.81	3.26	3.56	2.9%

Note: Total = CBCL Total Score; Int=CBCL Internalizing Problems; Ext=CBCL Externalizing Problems; AnxDep=CBCL Anxious Depressed Scale; WithDep=CBCL Withdrawn Depressed Scale; SomC=CBCL Somatic Complaints Scale; SocProb=CBCL Social Problems Scale; TP=CBCL Thought Problems Scale; AttPrb=CBCL Attention Problems Scale; RB=CBCL Rule Breaking Behavior Scale; Agg=CBCL Aggressive Behavior Scale.

Table 5

Adolescent sample means and 'caseness' rates for YSR and CBCL

CBCL Scale	Alpha	Mean	SD	Case
YSR-Total (scale range 0-210)	.94	29.67	20.31	12.4%
CBCL-Total (scale range 0-238)	.93	18.89	17.71	11.3%
YSR-Int (scale range 0-62)	.88	9.97	7.60	20.0%
CBCL-Int (scale range 0-64)	.88	6.26	6.08	18.5%
YSR-Ext (scale range 0-64)	.85	6.60	5.71	6.1%
CBCL-Ext (scale range 0-70)	.86	4.49	5.43	5.4%
YSR-AnxDep (scale range 0-26)	.78	4.54	3.67	8.6%
CBCL-AnxDep (scale range 0-26)	.74	2.81	2.86	7.3%
YSR-WithDep (scale range 0-16)	.69	2.56	2.35	6.3%
CBCL-WithDep (scale range 0-16)	.72	1.72	2.06	5.1%
YSR-SomC (scale range 0-20)	.77	2.86	2.83	10.2%
CBCL-SomC (scale range 0-22)	.78	1.73	2.24	11.3%
YSR-SocProb (scale range 0-22)	.68	3.77	2.84	10.3%
CBCL-SocProb (scale range 0-22)	.63	2.33	2.27	7.3%
YSR-TP (scale range 0-24)	.68	2.21	2.60	2.2%
CBCL-TP (scale range 0-30)	.77	1.02	2.03	4.6%
YSR-AttPrb (scale range 0-18)	.74	4.56	3.07	7.3%
CBCL-AttPrb (scale range 0-20)	.76	3.21	2.88	4.7%
YSR-RB (scale range 0-30)	.71	1.91	2.24	1.2%
CBCL-RB (scale range 0-34)	.69	1.37	2.26	1.7%
YSR-Agg (scale range 0-34)	.80	4.69	4.04	3.7%
CBCL-Agg (scale range 0-36)	.83	3.13	3.65	2.2%

Note: Total = Total Score; Int = Internalizing Problems; Ext = Externalizing Problems; AnxDep = Anxious Depressed Scale; WithDep = Withdrawn Depressed Scale; SomC = Somatic Complaints Scale; SocProb = Social Problems Scale; TP = Thought Problems Scale; AttPrb = Attention Problems Scale; RB = Rule Breaking Behavior Scale; Agg = Aggressive Behavior Scale.

Table 6

Summary of Significant Risk and Protective Factor Effects

Independent variable	Dependent variable(s)	Interaction component effect	F	Effect size
Num sibs	P-SDQ (Main eff)	----	4.82 [*]	$r = -.06$
	CBCL (Inter eff)		3.35 ^{**}	$R^2 < .01$
		CBCL-SP	8.92 ^{**}	$r = -.08$
		CBCL-AT	6.43 [*]	$r = -.07$
		CBCL-Ag	4.86 [*]	$r = -.06$
	YSR (Inter eff)		2.33 [*]	$R^2 < .01$
		YSR-AD	4.81 [*]	$r = .09$
		YSR -SC	6.22 [*]	$r = .10$
Talking	CBCL (Main eff)	----	6.33 [*]	$r = -.07$
	CBCL (Inter eff)		2.93 [*]	$R^2 < .01$
		CBCL-WD	9.49 ^{**}	$r = -.09$
		CBCL-SC	4.03 [*]	$r = -.06$
		CBCL-At	7.87 ^{**}	$r = -.08$
		CBCL-RB	11.09 ^{***}	$r = -.09$
		CBCL-Ag	5.54 [*]	$r = -.07$
	A-SDQ (Main eff)	----	6.57 [*]	$r = -.11$
	A-SDQ (Inter eff)		3.30 [*]	$R^2 < .01$
		A-SDQ-CP	4.16 [*]	$r = -.08$
		A-SDQ-H	14.52 ^{***}	$r = -.16$
	YSR (Main eff)	----	10.52 ^{**}	$r = -.13$
Family income	P-SDQ (Inter eff)		12.82 ^{****}	$R^2 < .01$
		P-SDQ-H	4.36 [*]	$r = .06$
		P-SDQ-ES	6.39 [*]	$r = -.07$
		P-SDQ-SP	17.82 ^{****}	$r = -.12$
	CBCL (Inter eff)		8.82 ^{****}	$R^2 < .01$
		CBCL-AD	6.99 ^{**}	$r = -.07$
		CBCL-SC	13.86 ^{***}	$r = -.10$
		CBCL-At	8.27 ^{**}	$r = .08$
	A-SDQ (Inter eff)		4.48 ^{**}	$R^2 < .01$
		A-SDQ-H	8.14 ^{**}	$r = .12$
		A-SDQ-CP	5.06 [*]	$r = .09$
	YSR (Inter eff)		5.50 ^{****}	$R^2 < .01$

Independent variable	Dependent variable(s)	Interaction component effect	F	Effect size
		YSR-At	5.59 [*]	r = .10
		YSR-RB	3.87 [*]	r = .08
		YSR-Ag	5.69 [*]	r = .10
Parent education	P-SDQ (Inter eff)		18.24 ^{****}	R ² = .01
		P-SDQ-H	16.60 ^{****}	r = .11
		P-SDQ-SP	14.80 ^{****}	r = -.11
	CBCL (Inter eff)		6.12 ^{****}	R ² < .01
		CBCL-At	12.51 ^{***}	r = .10
	A-SDQ (Inter eff)		8.76 ^{****}	R ² = .01
		A-SDQ-H	6.59 [*]	r = .11
		A-SDQ-ES	6.12 [*]	r = -.10
	YSR (Inter eff)		4.18 ^{***}	R ² < .01
		YSR-WD	5.41 [*]	r = -.10
Child gender	P-SDQ (Inter eff)		23.57 ^{****}	R ² = .01
		P-SDQ-CP	4.53 [*]	M > F, R ² < .01
		P-SDQ-H	23.36 ^{****}	M > F, R ² = .02
		P-SDQ-ES	13.55 ^{***}	F > M, R ² = .01
	CBCL (Main eff)	----	4.99 [*]	M > F, R ² < .01
	CBCL (Inter eff)		19.07 ^{****}	R ² = .01
		CBCL-AD	5.44 [*]	F > M, R ² < .01
		CBCL-At	27.95 ^{****}	M > F, R ² = .02
		CBCL-RB	33.29 ^{****}	M > F, R ² = .02
	A-SDQ (Inter eff)		11.11 ^{***}	M > F, R ² = .01
			8.85 ^{****}	R ² = .01
		A-SDQ-ES	7.47 ^{**}	F > M, R ² = .01
	YSR (Inter eff)		6.51 ^{****}	R ² < .01
		YSR-RB	25.50 ^{****}	M > F, R ² = .04
Child age	P-SDQ (Inter eff)		11.78 ^{****}	R ² < .01
		P-SDQ-H	18.82 ^{****}	r = -.12
	CBCL (Inter eff)		13.83 ^{****}	R ² = .01

Independent variable	Dependent variable(s)	Interaction component effect	F	Effect size
		CBCL-WD	27.75 ^{****}	r = .14
		CBCL-SC	9.19 ^{**}	r = .08
		CBCL-SP	13.95 ^{***}	r = -.10
		CBCL-Ag	5.05 [*]	r = -.06
	YSR (Main eff)	----	5.37 [*]	r = .09
	YSR (Inter eff)		4.45 ^{****}	R ² < .01
		YSR-WD	5.66 [*]	r = .10
		YSR-At	5.13 [*]	r = .09
		YSR-RB	11.70 ^{***}	r = .14
		YSR-Ag	12.16 ^{***}	r = .14

Note: P-SDQ (Main eff) = Main effect for Parent-report SDQ across 4 sub-domains; P-SDQ (Inter eff) = Interaction effect with Independent Variable and Parent-report SDQ Domain; A-SDQ (Main eff) = Main effect for Adolescent-report SDQ across 4 sub-domains; A-SDQ (Inter eff) = Interaction effect with Independent Variable and Adolescent-report SDQ Domain; CBCL (Main eff) = Main effect for CBCL across 8 narrowband domains; CBCL (Inter eff) = Interaction effect with Independent Variable and CBCL narrowband Domain; YSR (Main eff) = Main effect for YSR across 8 narrowband domains; YSR (Inter eff) = Interaction effect with Independent Variable and YSR narrowband Domain. CBCL-AD = CBCL Anxious-Depressed narrowband factor; CBCL-WD = CBCL Withdrawn-Depressed narrowband factor; CBCL-SC = CBCL Somatic Complaints; CBCL-SP = CBCL Social Problems; CBCL-AB = CBCL Aggressive Behavior narrowband factor; CBCL-AT = CBCL Attention Problems narrowband factor; CBCL-SP = CBCL Social Problems narrowband factor. YSR-AD = YSR Anxious-Depressed narrowband factor; YSR-WD = YSR Withdrawn-Depressed narrowband factor; YSR-SC = YSR Somatic Complaints; YSR-SP = YSR Social Problems; YSR-AB = YSR Aggressive Behavior narrowband factor; YSR-AT = YSR Attention Problems narrowband factor; YSR-SP = YSR Social Problems narrowband factor. Num Sibs = *Number of Siblings in the Home*; Talking = *Time Spent Talking with Child*.

* = $p < .05$,

** = $p < .01$,

*** = $p < .001$,

**** = $p < .0001$.