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Exploring the relationship between quality of life and mental health problems in children: Implications for measurement and practice

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Abstract

Purpose: Quality of life is typically reduced in children with mental health problems. Understanding the relationship between quality of life and mental health problems and the factors that moderate this association is a pressing priority.

Methods: This was a cross sectional study involving 45,398 children aged 8 – 13 years from 880 schools in England. Self-reported quality of life was assessed using nine items from the KIDSCREEN-10 and mental health was assessed using the Me and My School questionnaire. Demographic information (gender, age, ethnicity, socioeconomic status) was also recorded.

Results: Quality of life was highest in children with no problems and lowest in children with both internalising and externalising problems. There was indication that quality of life may be reduced in children with internalising problems compared with externalising problems. Approximately 12% children with mental health problems reported high quality of life. The link between mental health and quality of life was moderated by gender and age but not by socioeconomic status or ethnicity.

Conclusions: This study supports previous work showing mental health and quality of life are related but not synonymous. The findings have implications for measuring quality of life in child mental health settings and the need for approaches to support children with mental health problems that are at particular risk of poor quality of life.

Keywords: quality of life, mental health, child, adolescent

Exploring the relationship between quality of life and mental health problems in children: Implications for measurement and practice

Children with mental health problems are known to be at risk for poor quality of life [13]. Those referred to mental health services, for example, report a level of quality of life that is highly correlated with the severity of their mental health difficulties [3]. However, whilst quality of life and mental health are strongly related, it is clear that the two are not synonymous [2, 6]. As such, untangling the nature of the relationship between mental health and quality of life in young people is a pressing priority.

Understanding what moderates the relationship between mental health and quality of life has important implications for understanding how to improve quality of life in the face of mental health problems. Little work has considered what characterises individuals for whom experiencing mental health problems does not go hand in hand with poor quality of life, and how we may break the cycle between the two. In one exception, Bastiaansen et al. [1] studied a sample of children referred to a clinic for mental health problems, and found that higher quality of life was associated with being male, having less severe mental health problems, not having chronic physical health problems, not experiencing stressful life events, having good social support from classmates and having strong self-esteem.

This existing research needs to be understood within the context of a number of broader challenges facing those studying the link between quality of life and mental health. First, studies relying on clinical samples may over-estimate the link between mental health problems and poor quality of life, because children for whom symptoms have the greatest impact on quality of life are arguably those most likely to be referred to services [8]. It is of importance, therefore, to also study these relationships in community samples. The simple association between quality of life and mental health in young people has been demonstrated in the general population [6, 14, 23]. For instance, in a sample of 2,703 Dutch children (aged 8-12 years), Bot et al. [6] found that parent-reported psychosocial problems (based on the Strengths and Difficulties Questionnaire) were negatively associated with quality of life. This finding suggests that associations between mental health and quality of life are present across the full range of clinical severity, and not confined to the minority of children that access specialist services. What these studies have not addressed, however, is factors that may moderate the association between mental health and quality of life.

Second, greater attention needs to be paid to child-reports of quality of life in both clinical and population groups, as many studies rely on parents' perceptions of their child's quality of life [13]. Given that quality of life is fundamentally a subjective phenomenon, relying on proxy reports from others is problematic. This constraint is underlined by findings from clinical samples that show only small-to-moderate association between quality of life ratings between parents or clinicians and child self-reports [3].

A third challenge has been untangling whether the observed associations between mental health and quality of life are simply a reflection of item overlap [13], i.e., relying on similar questions to measure common components of mental health and quality of life (e.g., feeling happy), which can result in an artificially inflated association. However, several pieces of evidence suggest that the observed associations are not artefacts of item overlap. For example, 10% of children with mental health problems report high quality of life [6] and the quality of life of children with mental health problems can improve with treatment, even if symptoms remain high [2]. Moreover, accounting for item overlap by removing the items with greatest conceptual similarity between the scales as part of sensitivity analyses has produced similar findings to studies where this correction was not applied [14]. However, item overlap has not been accounted for when exploring moderators of the relationship between mental health and quality of life in children.

This study aimed to address this research gap by exploring factors that moderated the association between quality of life and mental health in a large community sample of children, whilst taking into account item overlap. In particular, it aimed to answer three research questions (RQ) in relation to 8-13 year olds:

- RQ1: How is self-reported quality of life associated with self-reported mental health problems?
- RQ2: Is it possible to identify children with mental health problems that also have high quality of life?
- RQ3: What factors moderate the association between mental health and quality of life?

It is hoped that by addressing these questions we can contribute to the wider debate about how quality of life should be considered, measured and supported in relation to interventions in mental health generally and in child mental health specifically [9, 16, 24].

Methods

Participants

The study involved 45,398 children drawn from 676 primary and 204 secondary schools from 98 local authorities across England. Details of the wider study, from which the data reported here are drawn, are reported separately [28]. Children were in year 4 (n =15,013, M_{age} = 8.71 years, SD = 0.29), year 5 (n =8,231, M_{age} = 9.72 years, SD = 0.30), year 7 (n =14,337, M_{age} = 11.71 years, SD = 0.29), and year 8 (n =7,817, M_{age} = 12.71 years, SD = 0.29). The majority were from White backgrounds (78%), 10% were Asian, 6% Black, 4% Mixed and 2% from other ethnic groups. Half of the sample (50%) were girls. The median Income Deprivation Affecting Children Index (IDACI) score [11] was 0.28, meaning that the average child in the sample was living in an area in which 28% of children were income deprived. These demographic features are largely reflective of the school-aged population in England (e.g., national average = 82% children from White backgrounds)[12], although deprivation is notably over-represented in this sample (national average = 0.20)[21].

Procedure

Parental consent was sought prior to data collection. Participants completed assessments using a secure online system at school. Teachers facilitated the completion of the survey and were given a standardised information sheet to read to participants. Children provided assent before proceeding to the questionnaire. Demographic information for participants was obtained from the National Pupil Database. The university ethics committee granted ethical permission for the wider study.

Measures

Quality of life

Quality of life was assessed using nine items from the KIDSCREEN-10 [26]. This measure provides an assessment of health-related quality of life and involves endorsing items such as "have you felt fit and well?" on a five-point scale, from "not at all" to "extremely". The item not included in this study focused on parental relations and home life ("Have your parent(s) treated you fairly?"). This item was excluded because it was deemed outside of the aim of the wider study, which focused on experiences at school [28]. As such, it was not considered appropriate to ask children about experiences with their parents. The KIDSCREEN-10 has good psychometric properties when used with European children and adolescents [26]. In this sample, the internal consistency of the nine-item measure was acceptable (alpha = 0.75) and

comparable to the established internal consistency for the 10-item measure (alpha = 0.82) [26]. In order to be able to compare the results when taking into account item overlap, scores were standardised such that they ranged between 1 and 5, with higher values representing better quality of life.

Mental health

Mental health problems were assessed using the Me and My School Questionnaire [10, 22], which consists of a 10-item emotional difficulties subscale (e.g., "I worry a lot") and a 6-item behavioural difficulties subscale (e.g., "I get very angry"). Students responded to each item by endorsing the response options "never", "sometimes" or "always". Validation studies for this measure demonstrate robust psychometric properties [10, 22], and internal consistency for the two subscales was high in the current study (internalising alpha = 0.76, externalising alpha = 0.79).

Participants were considered to be at risk of mental health problems if they scored above the 'borderline' cut-off for the subscales (score of 10 or above for the internalising subscale, score of 6 or above for the externalising subscale)[10]. This resulted in participants falling into one of four categories: 'no problems' (below cut-off for both subscales), 'internalising problems' (above cut-off for internalising subscale only), 'externalising problems' (above cut-off for externalising subscale only) or 'internalising and externalising problems (above cut-off for both subscales).

Demographic information

Demographic information available for the sample include gender, age (to the nearest month), ethnicity (White, Black, Asian, Mixed, other or not known), and socio-economic status, as measured by the IDACI score for the area in which the participant lived.

Analysis

All analyses were conducted using STATA12 [25]. Given the large sample size and multiple comparisons in analyses we set alpha to 0.01 in order to control for Type I errors. First, ANOVA was used to compare quality of life between the four mental health groups (described in 'mental health', above; RQ1). Second, in order to compare those with low and high quality of life, children were divided into quintiles. The bottom quintile was deemed 'low' quality of life, quintiles 2-4 deemed 'average' quality of life, and the top quintile deemed 'high' quality of life. Chi-square tests were then used to compare the proportion of children with high, low and average quality of life across the four mental health groups

(RQ2). Finally, for RQ3, mixed effects models were used to examine factors moderating the association between mental health and quality of life. Mixed effects models were necessary because the data were hierarchically structured with participants clustered within schools. A baseline mixed effects model (including only school as a random effect) showed that there was school level variation in quality of life (intra-class correlation = 0.04). As such, random effects accounting for school level variation were included in further analyses. In order to examine moderators of the association between mental health and quality of life, interaction terms between demographic factors and mental health status were included in the mixed effects model predicting quality of life. Note that all interactions were included in the same model. The significance of particular interaction terms in the model was determined using the Wald test.

In order to account for item overlap between the mental health and quality of life measures, the main analyses were rerun with items removed from the quality of life measure that had strong conceptual overlap with mental health. These items were "Have you felt sad?" and "Have you felt lonely?". Differences in the findings between the two analyses are reported below.

Results

RQ1: How is self-reported quality of life associated with self-reported mental health problems?

There was a significant difference between the quality of life that children reported for those with and without mental health problems, $F(3, 45394) = 660.35$, $p < 0.001$. Planned comparisons between the four groups (Table 1), showed that those with internalising problems only or externalising problems only had lower quality of life than those with no problems (ps < 0.001, d = 0.39/0.43), and those with both internalising and externalising problems had lower quality of life than those with either of these problems in isolation (ps < 0.001, d = 0.25/0.22).

[Insert **Table 1** about here]

When taking into account item overlap, the same broad pattern emerged: those with no problem reported the greatest quality of life ($M = 3.97$, $SD = 0.62$) and those with both internalising and externalising problems reported the lowest quality of life ($M = 3.13$, $SD = 0.86$). One difference from the main analysis was that those with internalising problems only

now had significantly lower quality of life (M = 3.42, SD = 0.74) compared with those with externalising problems only (M = 3.61, SD = 0.73, $p < 0.001$, d = 0.26), whereas previously the two had been equivalent.

RQ2: Is it possible to identify children with mental health problems that also have high quality of life?

There was a significant difference between the proportion of children in low, average and high quality of life between the four mental health groups, $\chi^2(6) = 1900$, $p < 0.001$ (Table 2). As expected, there were greater numbers of children with mental health problems reporting low quality of life compared to those with no problems. Of particular interest here, however, is that approximately 12% of children with mental health problems (both internalising and/or externalising) reported high quality of life. This equates to 1,576 young people (of 13,098 in total) across the three mental health groups.

[Insert **Table 2** about here]

When taking into account item overlap, the results for young people with no problems and externalising problems only were similar to the main analysis (21.44% and 11.09% reporting high quality of life respectively). For children with internalising problems only, the number of children reporting high quality of life dropped to 7.40% (n = 385), and for children with both internalising and externalising problems, the number of children reporting high quality of life dropped to 5.42% (n = 139).

RQ3: What factors moderate the association between mental health and quality of life?

Results from the mixed effects models are shown in Table 3. Interaction terms in the model showed that age and gender were moderators of the relationship between mental health and quality of life.

First, the Wald test demonstrated that the overall interaction between age and mental health status for predicting quality of life was significant, $\chi^2(3) = 12.46$, $p = 0.006$. Looking more closely at the estimated marginal means showed that for all groups there was an overall negative association between age and quality of life. However, this association was less pronounced for children with externalising problems only compared with the other three groups (Figure 1). As can be seen from the estimated marginal means shown in Figure 1, the size of this effect is very small: whereas children with no problems aged 12.7 years are on

average 0.14 units on the KIDSCREEN lower than children aged 8.7 years (score ranges from 1 to 5), this difference is only 0.09 units for children with externalising problems only.

[Insert **Figure 1** about here]

Second, the interaction between gender and mental health status for predicting quality of life was significant, $\chi^2(3) = 37.81$, $p < 0.001$. Estimated marginal means, i.e. the mean response for each variable adjusting for other variables in the model, showed that there was no link between gender and quality of life for children with no problems and children with internalising problems only. In contrast, girls with externalising problems (regardless of the presence of internalising problems) showed lower quality of life compared with boys (Figure 2). Again, this effect was very small: as shown on Figure 2, the difference between girls and boys with no problems was 0.02 units on the KIDSCREEN, compared with a difference of 0.10 units between boys and girls with externalising problems.

[Insert Figure **2** about here]

In contrast, there was no moderating effect of socio-economic status, $\chi^2(3) = 6.68$, $p = 0.08$, or ethnicity, $\chi^2(3) = 0.90$, $p = 0.82$, on the association between mental health status and quality of life. Given the significant age and gender interactions, we ran an exploratory model including a three-way interaction (mental health x age x gender), but this interaction was not significant, $\chi^2(4) = 7.07$, $p = 0.13$, and so for parsimony only the models involving the two-way interactions are reported here. When accounting for item overlap in the measures, the results examining potential moderators of the association between quality of life and mental health remained unchanged.

Discussion

In line with earlier studies, self-reported mental health problems were found to be strongly related to self-reported quality of life in this large community sample of young people aged between 8 and 13 years old in England. Experiencing both internalising and externalising problems was associated with worse quality of life than experiencing either of these difficulties in isolation. The effect sizes for these differences were small-medium. These current findings align well with existing literature showing that the existence of co-morbidities predicts worse quality of life in children with mental health problems [4, 18].

When taking into account item overlap, there was an indication that internalising problems on their own were associated with lower quality of life to a greater extent than externalising problems on their own. Previous research has also found that internalising problems are more strongly related to quality of life than externalising problems [18], adding some weight to this finding. One explanation is that externalising problems may have a greater impact on family members than on the young person themselves [8, 17]. However, when comparing quality of life between children with depressive disorder and those with conduct disorder or ADHD, Sawyer et al. [23] reported a differential impact of quality of life from the different conditions: whereas depressive disorders had greater impact on distress in the child and peer activities, conduct disorder and ADHD had greater impact on the relationship with their caregiver. As such, it may be that the broad measure of health-related quality of life used in this study is masking more subtle differences between the impact of internalising and externalising problems.

Despite the strong link between mental health and quality of life, approximately 12% of children with mental health problems reported high quality of life (that is, quality of life in the top quintile for the sample). This demonstrates that poor quality of life and mental health difficulties need not necessarily go hand in hand. Taking into account item overlap resulted in fewer children with internalising problems reporting high quality of life. This mirrors the findings above that internalising problems may have a greater impact on quality of life than externalising problems.

Given that poor quality of life and mental health problems did not always co-occur, understanding the factors that moderate the link between the two seems a valuable contribution. Current findings exploring the role of demographic factors showed that age and gender moderated this relationship. For all children in the sample, quality of life tended to reduce with age, but this effect was less marked for children with externalising problems. That is, there was a greater difference between the quality of life of children with no problems and children with externalising problems at age 8-9 years compared with age 12-13 years. The reduction of quality of life from late childhood to early adolescence is well documented [5, 15] and so the general downward trend observed in this sample aligns with this broader work. Note that the size of this effect was very small, which was to be expected because the data were drawn from the community rather than a clinical population. The extent to which these small differences are clinically meaningful is worthy of future

investigation, but it is worth highlighting that even a small difference that affects a large number of people in the population may still have important implications for public health.

Bastiaansen et al. [1] also found an interaction between age and mental health status in predicting quality of life, but their results were somewhat different to those found here. In their clinical sample, the strength of the association between psychopathology and quality of life *increased* with age. However, it is notable that the age range in this clinical study was greater than in the current study (8-18 years compared with 8-13 years respectively). The fact that our finding was specific to externalising problems also sets it apart. One explanation could be that the greater impact of externalising problems on quality of life in the younger children may reflect a cohort more dominated by externalising behaviours that begin in childhood [19, 20]. In contrast to the younger group, externalising problems in the older children may be more likely to include adolescent-limited antisocial behaviour, which, being more normative [19, 20], may have less of an impact on quality of life. Further research to explore this finding is clearly needed.

Regarding gender, we found evidence that the link between mental health problems and reduced quality of life was stronger for girls compared with boys. Specifically, for young people with no problems or with internalising problems only, there was no link between gender and quality of life. In contrast, girls with externalising problems (whether with additional internalising problems or not) reported lower quality of life than boys with the same problems. Again, the effect size was very small. Several studies have also demonstrated that the impact of psychopathology on quality of life is greater for girls compared with boys. For example, Lack et al. (2009) reported that quality of life was more greatly reduced in girls with obsessive-compulsive disorder (OCD) compared to boys. Similarly, Bastiaansen et al. [1] found an interaction between severity of psychopathology and gender, such that the impact of psychopathology on quality of life was larger for girls than boys.

Both of these studies interpreted these findings on the grounds that girls tend to present with internalising problems more frequently, and that this is likely to have greater impact on perceived quality of life than externalising problems (which are more common in boys) [1, 18]. However, the current study may provide a rather different explanation. Given that we considered internalising and externalising problems separately, it is clear from these data that it is actually those girls with externalising problems that experience the greatest reduction in quality of life compared with their male peers. Here, then, it seems that experiencing

problems that are less typical for your gender (in this case externalising for girls) is more problematic in terms of associations with quality of life. It may be, for example, that there are greater impacts on friendships for girls with externalising problems. Future research on the mechanisms underpinning this finding would be valuable.

Strengths and limitations of this study

This study has a number of notable strengths. First, the large community sample involving over 45,000 children in England meant that it was both well powered to detect small effects and largely representative of the English population. This was the first study to consider moderating factors of the link between quality of life and mental health in a community sample. As noted above, relying solely on clinical samples in previous research has been problematic, as those children for whom mental health problems have greatest impact on their quality of life are most likely to be referred into services. Considering this question in a large community sample is, therefore, of considerable merit.

Second, as noted by Dey, Landolt et al. [13] there is a need for research on quality of life and mental health to take into account the fact that there is considerable conceptual and measurement overlap between these constructs. A strength of this study is that we have conducted sensitivity analyses to help to untangle whether the role of item overlap on the findings. The differences that emerged between the analyses suggest that this was a valuable approach to take, as failing to take into account item overlap appeared to over-estimate the quality of life of children with internalising problems.

Finally, this study included child self-reports on their own quality of life. Given that quality of life is a subjective phenomenon, reliance on proxy reports from carers or clinicians may not be optimal. Indeed, previous research has demonstrated that there may be systematic differences between the ways in which parents and children perceive the child's quality of life [13, 17].

Despite these strengths, there are also some considerable limitations that are important to acknowledge. First, having multiple informants of both mental health and quality of life would have allowed us to explore a more nuanced picture of the link between these two factors. Second, our measure of quality of life was limited in that we were missing one item from the KIDSCREEN-10. As such, despite good internal consistency for the 9-item measure employed in the current study, the measure will not have fully captured the broad construct of quality of life. Further research is clearly needed using the full 10 items of the KIDSCREEN-

10 and other measures of quality of life to corroborate the findings of the current study. Given that previous research shows age and gender differences in response to the different aspects of quality of life [5], having a more detailed measure of quality of life would be useful in untangling whether the moderating factors vary across the different facets of quality of life, including, for example, distinguishing between physical and psychological well-being.

Third, given the very large scale of the study, we were limited in the quantity of data that were available for each child. This meant that we were restricted to examining demographic features as potential moderators of the link between quality of life and mental health. Previous research has shown that aspects of the child, their parents, family and wider social network all contribute to quality of life [1]. Therefore, although the present study makes a valuable contribution to this field, it necessarily had limited scope. Finally, the cross-sectional nature of the study precludes us from forming causal conclusions based on these findings. It may be, for example, that both externalising problems in girls and relatively poorer quality of life are driven by some third factor rather than externalising problems driving poor quality of life, or the two being mutually reinforcing. Examining this in longitudinal data would enhance our understanding of these associations.

Implications

These findings have a number of implications for those working with young people at risk of mental health problems. Most straightforwardly, they highlight the known link between mental health problems and impaired quality of life, underlining the relevance of measuring quality of life as a key outcome of mental health interventions [9, 16, 24]. This is especially significant given the acknowledgment that, alongside decreasing symptoms, a key goal of intervention may be to ensure that mental health difficulties have minimal impact on functioning and quality of life [7, 24]. This may be particularly relevant for those children with mental health problems that show little change over time.

In terms of measurement, these findings also confirm that mental health and quality of life are not synonymous, suggesting that the measurement of mental health symptoms cannot stand as a proxy for poor quality of life or vice versa. Nonetheless, the conceptual overlap between these phenomena cannot be ignored, and so those measuring both need to take steps to account for this (such as the sensitivity analyses adopted here).

The findings suggest the potential importance of intervention to support those young people at particular risk of low quality of life. In addition, the link between quality of life and mental

health implies that enhancing quality of life may be a means of preventing mental health problems. There is clearly a need for further research to identify those factors that most foster resilience in young people with mental health problems to gain or maintain high quality of life in the face of their difficulties [27]. Further exploring the potential explanations for why quality of life is particularly impacted for certain young people with mental health problems would help to guide those interventions.

Based on our interpretations discussed above, it may be that a central feature of being at increased risk for low quality of life is being 'unusual' for your peer group (i.e., being a child compared to an early adolescent with externalising, or a girl compared to a boy with externalising problems). It could be, therefore, that fostering positive peer relations and social support in young people with mental health problems may buffer the extent to which they experience reduced quality of life. Empirical work exploring this possibility of breaking the cycle between mental health problems and poor quality of life would clearly be very valuable.

Conclusions

In summary, whilst mental health problems were strongly related to poorer quality of life in this community sample of young people, the two constructs were not synonymous. Quality of life was particularly reduced in younger children with externalising problems and in girls with externalising problems. The results highlight the potential relevance of quality of life measures to help understand the impact of mental health problems on the lives of young people and to help us to identify children with mental health problems that may require particular interventions. Finding ways to promote quality of life in those with mental health problems is an important next step from this research.

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Conflict of interest

The authors declare that they have no conflict of interest.

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Table 1: Quality of life by mental health status

	n	Quality of life – full measure Mean (SD)
No problems	32,300	3.49 (0.47)
Internalising problems only	5,204	3.30 (0.56)
Externalising problems only	5,330	3.28 (0.57)
Internalising and externalising problems	2,564	3.15 (0.65)

Table 2: Percentage of children with low, average and high quality of life by mental health status.

	No problems % (*n*)	Internalising problems only % (*n*)	Externalising problems only % (*n*)	Internalising and externalising problems % (*n*)
Low quality of life	17.40 (5,619)	32.67 (1,700)	32.83 (1,750)	44.81 (1,149)
Average quality of life	66.11 (21,355)	54.82 (2,853)	55.38 (2,952)	43.60 (1,118)
High quality of life	16.49 (5,326)	12.51 (651)	11.78 (628)	11.58 (297)

Table 3: Coefficients from mixed effects model testing interaction of demographic factors and mental health status for predicting quality of life

		b	SE	*p*
Mental health[a]	Internalising	-0.20	0.01	<0.001
	Externalising	-0.19	0.01	<0.001
	Internalising & externalising	-0.32	0.01	<0.001
Age		-0.03	0.002	<0.001
Gender[b]		-0.02	0.006	0.005
SES		0.002	0.002	0.18
Ethnicity[c]		0.02	0.007	0.04
Mental health[a] x age	Internalising x age	-0.01	0.005	0.04
	Externalising x age	0.01	0.005	0.01
	Internalising & externalising x age	-0.002	0.007	0.75
Mental health[a] x gender[b]	Internalising x gender	-0.01	0.02	0.34
	Externalising x gender	-0.08	0.02	<0.001
	Internalising & externalising x gender	-0.09	0.02	<0.001
Mental health[a] x SES	Internalising x SES	0.008	0.004	0.05
	Externalising x SES	0.003	0.004	0.43
	Internalising & externalising x SES	0.01	0.005	0.07
Mental health[a] x ethnicity[c]	Internalising x ethnicity	-0.003	0.02	0.89
	Externalising x ethnicity	0.009	0.02	0.59
	Internalising & externalising x ethnicity	0.02	0.03	0.44
Constant		3.50	0.005	<0.001

SES = socio-economic status. a: reference category = no problems, b: reference category = male, c: reference category = White.

Figures

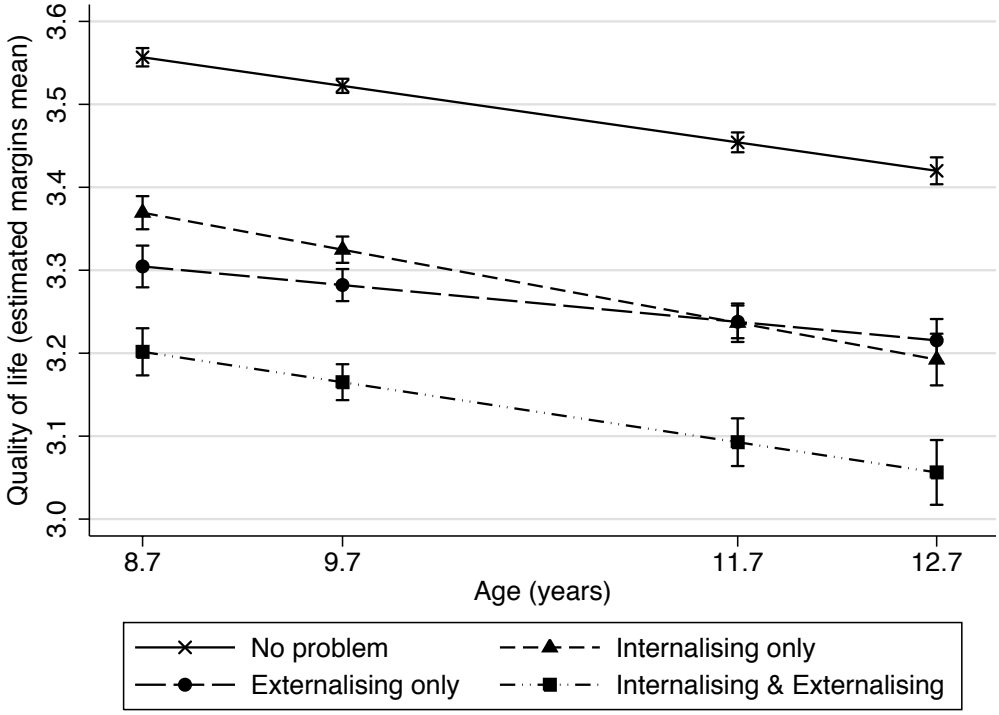

Figure 1: Interactions between age and mental health status for predicting quality of life

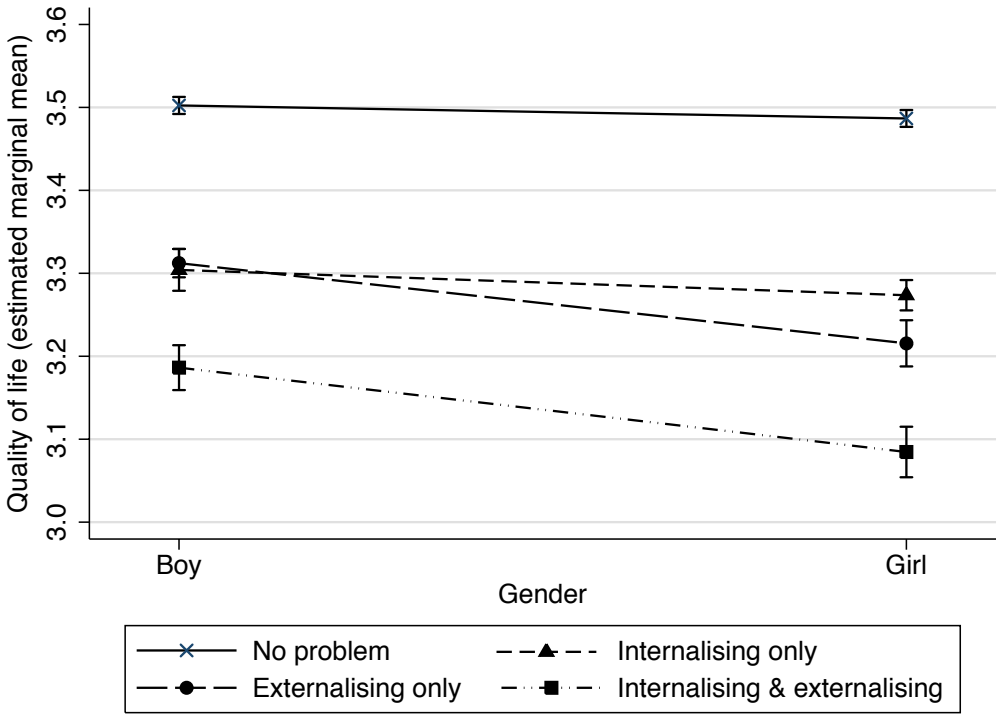

Figure 2: Interactions between gender and mental health status for predicting quality of life