Ecological Model of Depression in Adolescents

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Ecological Model of Depression in Adolescents

A study of the Australian population in 2015 found that mental health disorders accounted for 23% of the non-fatal burden of illness, with depressive orders among the highest burden (Australian Institute of Health and Welfare, 2019). The onset of mental health disorders usually occurs in adolescence, with earlier onset associated with a longer delay in treatment of those disorders (de Girolamo et al., 2012). A national survey of Australian children and adolescents found that 13.9% of those surveyed had experienced a mental health disorder in the previous 12 months (Australian Institute of Health and Welfare, 2021). Depression is known to be related to individual and social factors, and has been researched using several theories (Bernaras et al., 2019). The present study used an ecological systems approach to determine which interrelated factors are most related to depression in adolescents. It used a large representative sample of Australian adolescents called Growing Up in Australia: The Longitudinal Study of Australian Children (LSAC), which is a population-based study of Australian children (Department of Social Services et al., 2021). The current study used Wave 7 of the K cohort, which comprised adolescents aged 16-17 years of age.

## Bronfenbrenner's Ecological Systems Theory

This study used the initial version of Bronfenbrenner's (1977) ecological theory of human development as a theoretical framework. The theory is a way of understanding human development in terms of mutual interactions between the individual and a series of nested systems (Bronfenbrenner, 1977). It had three distinct phases of development, but Eriksson et al. (2018) found that the first phase is useful for population level research because it emphasises interrelations between ecological systems, rather than later phases which focussed on the individual and their immediate environment. In the first phase of the

theory the nested ecological systems, in order from most immediate to most distant, are the microsystem, the mesosystem, the exosystem and the macrosystem (Bronfenbrenner, 1977).

In Bronfenbrenner's ecological theory (1977) the microsystem refers to the individual's immediate environment which includes interactions at home and at school. The mesosystem comprises of the relations between microsystems, and the way that actions at each affects the others. For example, experiences at home will affect the way the individual interacts socially at school. The exosystem refers to systems beyond the individual's immediate environment. The individual does not directly interact with factors at the exosystem level, but these factors influence the microsystem and the mesosystem. Neighbourhood status and socioeconomic status are examples of exosystem level factors. The macrosystem is the broadest system of influence and includes cultural values or ideologies. The current research explores factors at the microsystem and exosystem level.

The nested systems of the ecological model interact with each other and the individual. The ecological approach is an established method of exploring depression in adolescents (Beam et al., 2002; Prelow et al., 2006). The LSAC used the ecological model of development as its theoretical framework to track developmental trajectories (Sanson et al., 2002). Bronfenbrenner (1977) described ecological transitions as points of particular interest. The transition from adolescence to adulthood is one such transition, and the LSAC at Wave 7 captured the individual prior to this transition. The current study explored correlates of depression using the ecological perspective, to consider both proximal and distal factors.

Individual Correlates of Depression

Individual personality traits are consistent characteristics that affect, and are affected by, interactions with the environment. The Big Five model describes personality traits in

terms of five factors: openness, conscientiousness, extraversion, agreeableness and neuroticism (Goldberg, 1993). These broad factors are a way to describe individual differences in behaviour, based on the expectation that each individual behaves consistently in similar situations (McCrae & Costa Jr, 1999). Kotov et al. (2010) conducted a meta-analysis on the associations between personality and mental health disorders. The researchers found that high neuroticism and low conscientiousness were related to depression, while extraversion, agreeableness and openness were not. The finding that high neuroticism was related to depression was expected, as neuroticism is characterised by self-criticism (Clara et al., 2003).

The current study examined gender as an individual factor that relates to depression. The gender differences of depression have been well-studied, with the prevalence of depression for females estimated to be twice that of men (Bebbington, 1996). In 2019 the global prevalence of depressive disorders for individuals aged 15-19 was 2.82% overall, 2.17% for males and 3.47% for females, while for all ages the global prevalence was 3.76%, 2.96% for males and 4.54% for females (Institute of Health Metrics and Evaluation, 2019). A meta-analysis of the gender differences in depression found that being female was associated with 1.95 greater likelihood of being diagnosed with depression, and an effect size $d = 0.27$ of greater symptoms (Salk et al., 2017). The researchers also found that the difference was emphasised in adolescence, but then declined and remained stable through adulthood. The reasons for this gender difference in depression are not well understood, but Bebbington (1996) suggested that social, rather than biological, reasons are related.

## Microsystem Level Correlates of Depression

Increased depression symptomology scores have been associated with increased, self-reported, sedentary behaviour (Hoare et al., 2016; Stiglic & Viner, 2019), but this

association was not found for objectively measured sedentary behaviour (Hoare et al., 2016). Internet usage has also been associated with increased symptoms of depression (Hoare et al., 2016; Huang, 2010). In previous research employing the LSAC data set, screen time was found to have had a weak negative effect on socio-emotional outcomes of children aged 10-15 (Sanders et al., 2019). The researchers found the results to be consistent across all types of screen time except for educational screen time, which did not have significant effects on socio-emotional outcomes.

Hoare et al. (2016) emphasised the need to investigate physical activity as another potential correlate of depression in relation to screen time. Biddle et al. (2019), in a systematic review of physical activity and mental health in children and adolescents, found that associations between reduced physical activity and depression were low to none, but variable. Graupensperger et al. (2021) used the LSAC data set to investigate the association between sports participation and depression in children aged 12-17. They found that team sport participation was associated with reduced symptoms of depression, while individual sport participation was not associated with a reduction in symptom. This suggests that, for adolescents, the physical aspect of the activity may not be as important as the social aspects of physical activity. In the broader literature, there is evidence that the social support related to physical activity explains the relationship between physical activity and depression (Harvey et al., 2010). Ahn and Fedewa (2011) conducted a meta-analysis and found that in randomised controlled trials, increased physical activity had a moderate effect on a reduction in depressive symptoms. The relationship between physical activity and depression is likely explained by both biological and social factors.

Increased social support has been associated with a lack of depression (Gariepy et al., 2016) and with a reduction in depressive symptoms (Foody et al., 2019; Rueger et al.,

2016). Rueger et al. (2016) did not find gender differences in the effect of social support on depression. It has also been found that family support is more important than peer support in relation to depressive symptoms, although both types of support are related to depression (Gariepy et al., 2016; Rueger et al., 2016). Foody et al. (2019) recommended that future research investigated how level of online interaction impacted on adolescents mental health, as there are both positive and negative aspects of using the internet.

Exosystem Level Correlates of Depression

In the ecological systems model, the exosystem influences the development of the individual at the community level, but not directly. At this level, studies using the ecological approach have typically identified neighbourhood factors and socioeconomic status (Behnke et al., 2010; Romano et al., 2015). A longitudinal study of adolescents in the United States found lower socioeconomic status and increased presence of depression were associated (Goodman, 1999). In surveys of Australia, the Netherlands, Germany and the United States, the presence of depression was associated with 'having a low social status' (Baumeister & Harter, 2007, p. 542). The current study considers parental socioeconomic status as a potential correlate of depression.

The Present Study

The current research used Bronfenbrenner's ecological approach (1977) to understand the correlates of depressions. The approach allows an understanding of who is at risk, and at what ecological level interventions will be most effective. This research considered each level of the ecological model cumulatively, with the hypothesis that each successive level of the model, including the microsystem and the exosystem, will explain correlates of depression beyond individual characteristics. The research used Wave 7 of the

LSAC, when participants were aged 16-17 years of age as a period of adolescence which precedes the ecological transition to adulthood.

*Hypotheses*

At the individual characteristic level, it was expected that, higher neuroticism, lower conscientiousness and being female would be associated with increased depressive symptoms.

At the microsystem, it was expected that higher screen time, lower levels of physical activity and lower social support would be associated with increased depressive symptoms. It was also expected that parental support would have a greater association with depression than peer support would. Furthermore, the level of online social interaction was included as an exploratory variable.

At the exosystem level, reduced socioeconomic position was hypothesised to relate to an increase in depressive symptoms.

Method

This study used data from Wave 7 of the LSAC dataset, which was collected in 2016 when participants in the K cohort were aged 16-17 years of age. The first period of collection was in 2004, when the B cohort were infants, and the K cohort were 4-5 years of age. The sample was nationally representative of Australian children in each cohort. Of the children who responded at wave 1, 62% responded at Wave 7. The LSAC methodology has been described extensively elsewhere (Soloff et al., 2005).

Measures

Participants reported their sociodemographic answers in Wave 1 of the LSAC, and relevant answers were changed in each subsequent wave. A standardised score representing socioeconomic position was calculated for the LSAC. The score uses parental income, education, and employment (Baker et al., 2017)

*Depression*

The Short Mood and Feelings Questionnaire (Angold et al., 1995) is a 13-item self-report questionnaire that measures childhood and adolescent depressive symptomology. Participants were asked to rate how true statements (e.g., "I thought I could never be as good as other people") were about themselves in the past two weeks on a scale of 1 (*True*), 2 (*Sometimes*), or 3 (*Not True*). The answers were reverse coded and then summed to produce a depression score (0 –26). In this research it will be used as a measure of depression. The score has been validated in a community sample of participants aged 17-18 (Turner et al., 2014).

*Personality*

Personality factors were measured using a 10-item self-report assessment of the Big Five Personality Inventory (Rammstedt & John, 2007). This study used conscientiousness and

neuroticism, as they were most relevant to the aims. The measure has been shown to have a

test-retest reliability coefficient of .75, and a correlation to the full 44-item Big Five

assessment of .83 (Rammstedt & John, 2007).

*Screen Time*

Screen time was calculated as a sum of the self-reported weekly hours spent

watching TV or movies, hours spent playing electronic games, and hours spent accessing the

internet. Participants were asked about their average time spent on each activity for both

weekdays and weekend days (e.g., "About how many hours on a typical weekday do you

watch TV programs or movies at home?"). Weekly time for each activity was calculated by

multiplying the weekday value by 5, multiplying the weekend value by 2, and then summing

the result. Total weekly screen time was calculated for this study by summing each of the

totals.

*Physical Activity*

Participants were asked about how many days per week they exercised for 30

minutes or more (e.g., "About how many days each week do you do at least 30 minutes of

moderate or vigorous physical activity?").

*Level of Online Interaction*

Participants were asked to what degree they interacted with their close friends

online (e.g., "Thinking about your close friends, how much of the time do you interact with

them face-to-face or via electronic devices?"). Responses were on a scale of 1 (*All or almost*

*all face-to-face)* to 5 (*All or almost all via electronic devices*).

*Peer and Parental support*

The LSAC used an adapted, reverse-scored, version of the peer attachment scale

from the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987).

Participants responded to statements (e.g., "My friends sense when I'm upset about something") on a scale of 1 (*Almost always true*) to 5 (*Almost never true)*. The overall scale is composed of a trust subscale, and a communication subscale. This research will use a sum of the two scales which represents overall peer attachment. Higher scores on the scale reflect poorer peer attachment, so it will be reverse scored, such that higher scores correspond to better social support.

The parents of the participants were asked six questions about the social support they provide to their child. The questions were general (e.g., "How often do you and the study child talk about what is going on in his/her life") or related to specific domains (e.g., "How often do you and the study child talk about future jobs he/she might have"). Parents responded on a scale of 1 (*Never/Almost never)* to 5 (*Always/Almost always)*, and the mean score of the six questions was used to represent level of parental support provided to the child.

Results

All analyses were conducted using R (Version 4.1.1) with an alpha level of .05.

Participants with missing answers in any variable were removed. See Table 1 for descriptive

statistics, and group comparisons by gender using the Mann-Whitney U test (all variables

violated the assumption of normality required for standard t-tests). There were 2277

participants, 1316 males and 961 females, after removing participants with missing data.

The mean score for depression overall was 7.47 (*SD* = 7.64), 6.46 (*SD* = 7.51) for males and

8.84 (*SD* = 7.59) for females. See Table 1 for all group comparisons by gender. As predicted,

females had significantly higher scores of depression than males. Females and males did not

differ significantly in weekly screen time. Females had significantly higher levels of peer and

parental support.

Hierarchical Regression Results

The main hypotheses were tested using hierarchical multiple regression, where each

step in the model represented a broader ecological system. The sample size (N = 2277) was

appropriate for the number of predictors (9) in the final model, and the variables were

independent measures that were not highly intercorrelated (see Table 2 for correlations

between variables). A 3-step hierarchical regression was conducted. At step 1,

conscientiousness and neuroticism were entered as individual characteristics. At step 2,

microsystem level variables were entered. They were screen time, physical activity, online

friends, peer support and parental support. Finally at step 3, socioeconomic position was

entered as an exosystem level variable. Intercorrelations are reported in Table 2, and the

regression statistics are in Table 3.

At step 1 individual characteristics contributed significantly to the regression model,

*F* (3,2273) = 78.64, *p* < .001, and accounted for 9.1% of the variation in depression.  Adding

microsystem level variables accounted for a significant additional 1.6% of the variation in depression, $F (5,2268) = 9.06$, $p < .001$. Adding socioeconomic position did not explain any additional variance in the model and was not significant, $F (1, 2267) = 0.25$, $p = .62$.

At the individual characteristic level, it was expected that, higher neuroticism, lower conscientiousness and being female would be associated with increased depressive symptoms. As hypothesised, neuroticism was significantly positively associated with depression, $F (1,2268) = 110.56$, $p < .001$, such that a 1 unit increase in neuroticism was associated with increase in depression score by 1.54. Conscientiousness was negatively associated with depression, where a 1 unit increase in conscientiousness was associated with a decrease in depression score of 1.03. This association was significant, $F (1,2268) = 64.81$, $p < .001$, and was hypothesised. Being female, as hypothesised, was associated with significantly higher depression scores, $F (1,2268) = 60.63$, $p < .001$, and an increased depression score of 1.79.

At the microsystem level, it was expected that higher screen time, lower levels of physical activity and lower social support would be associated with increased depressive symptoms. Screen time was significantly associated with depression, $F (1,2268) = 5.95$, $p = .01$, but an increase of an hour of screen time did not result in a change in depression score. Physical activity was not significantly associated with depression, $F (1,2268) = 2.29$, $p = .13$, which was not hypothesised. Peer support, $F (1,2268) = 29.60$, $p < .001$, and parental support, $F (1,2268) = 4.20$, $p = .04$, were both significantly negatively associated with depression, such that increased support led to increased lower depression scores. This was hypothesised. It was not hypothesised that peer support ($\beta = -.11$) would have a greater effect when compared to parental support ($\beta = -.04$). At the exosystem level, reduced

socioeconomic position was hypothesised to relate to an increase in depressive symptoms,

but it was not found to be significantly associated with depression, $F (1,2267) = 0.25$, $p = .62$.

Discussion

The results did not support the broad hypothesis that the ecological microsystem and exosystem would explain correlates of depression beyond individual characteristics. The individual level results were as predicted; that higher neuroticism, lower conscientiousness, and being female would be associated with higher depressive symptoms. At the microsystem, the hypotheses that physical activity and screen time would be associated with depressive symptoms were not as predicted. These factors were not shown to be related to depression. However, as hypothesised, increased peer and parental support were both associated with lower levels of depressive symptoms. The relationship between online interaction and depression symptoms were not known previously, and the results of the present study do not suggest that level of online interaction is related to depression. At the exosystem, socioeconomic position was not shown to be related to depression, which was not hypothesised. The overall results suggest individual level factors are more related to depression than the social factors examined in this study. The broad implications of these results are that interventions are likely better focussed on identifying individuals at risk, rather than on broader interventions.

### Individual Level Correlates

While social factors have been implicated in depression (Bernaras et al., 2019), genetic factors are likely a more important factor in predicting the development of depression. Genetic factors have been found to account for 31% to 42% of the variation in depression (Sullivan et al., 2000). Furthermore, 40% of variance in personality is also related to genetic factors (Vukasovic & Bratko, 2015). In this study personality factors were the strongest correlates of depression, even when controlling for microsystem level factors. This

study was limited by not accounting for a family history of depression or other related mental illnesses.

The relationships between personality and depression found in this study replicate past results (Kotov et al., 2010). The positive relationship between neuroticism and depression is likely explained by self-criticism, which is a characteristic of neuroticism (Clara et al., 2003). Neuroticism is also characterised by in part by low mood (Thompson, 2008). Low mood and self-criticism match symptoms of depression listed in the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013). Kotov et al. (2010) describe two theories that attempt to explain the relationship between low conscientiousness and increased depression scores. The first is that the low self-perception present in depression leads to a decrease in goal-related behaviour, which is characteristic of conscientiousness. Alternatively, Kotov et al. (2010) explain that individuals with low conscientiousness may be less likely to cope with stressors, making them more vulnerable to depression.

The higher levels of depression for females found in this study also replicate past research (Bebbington, 1996; Salk et al., 2017). In this study gender was a correlate of depression comparable to conscientiousness and peer support. Females had higher neuroticism scores than males, which is consistent with past results (Costa et al., 2001). The gender differences in peer and parental support may help to explain Bebbington's (1996) theory that females rely on social support more than males do. Increased social support should mean that females have a lower likelihood of experiencing depression, however there may be more complex interactions with other factors that this study did not consider. It is also possible that the social support measures used in this study did not fully capture their intended constructs. The implications of the gender differences in depression add to

the body of literature which suggest that females are at a higher risk of experiencing depression. This may mean that females need more support in relation to mental health, but further research is necessary to determine what that support could be.

Microsystem and Exosystem Correlates

Screen time and physical activity did not relate to depression, which was unexpected. Past research had found weak associations between increased screen time and depression (Hoare et al., 2016; Stiglic & Viner, 2019). The associations between screen time and depression have been robust and shown in meta-analyses, so the results of the present study are likely due to error. Hoare et al. (2016) note that screen time is likely to have interactions with health-related behaviour like physical activity and body mass index. The present study did not account for the latter of these factors. It was hypothesised that increased physical activity would relate to lower levels of depression, but the current study did not find a significant association between depression and physical activity. Research has shown varying relationships between mental health and physical activity in adolescents (Biddle et al., 2019). It is possible that physical activity is not a predictor of depression in children and adolescents, but that it becomes more important in adult life. The self-report nature of physical activity and screen time may have limited their validity. Objectively measured physical activity and screen time would be the gold-standard for this type of research in future. It is also possible that the social elements of physical activity are more related to depression in adolescents.

Regarding social support, the result that lower social support was associated with increased depressive symptoms was as hypothesised. It was unexpected, however, that peer support had a stronger effect on depressive symptoms than parental support. It is possible that the results of previous studies were found in younger adolescents and children. The

participants of this study were in late adolescence, at a time when friendships are stable

(Branje et al., 2007). In late adolescence it also possible that individuals are seeking more

independence, and therefore rely on their parents for less emotional support. The measure

of parental support in this study was reported by parents. It is possible that a report from

adolescents would produce different results. Perceived parental support from the

adolescent may be more useful than the parental perception of support, but more research

would be needed to determine this. Level of online interaction was included as an

exploratory variable but was not found to be related to depression. It is likely that level of

online interaction has a role in the relationship between depression and cyberbullying

(Foody et al., 2019), which was not considered in the current research. Further research into

cyberbullying and depression could explore this factor. Lower socioeconomic position was

hypothesised to relate to an increase in depressive symptoms but was not found to be

related to depression. It is possible that for this age group, socioeconomic position is less

relevant to depression than it is for other age groups. Longitudinal or cross-cohort

comparison research may be able to determine the role of socioeconomic position in

depression.

Conclusion

Depression has a high burden, and it usually first occurs in adolescence, so it is

important to intervene at this stage. The factors that relate to depression must be

understood to design effective interventions. This study used an ecological approach to

determine at what level correlates of depression are most important. The overall results

were not as hypothesised, with individual factors explaining the largest amount of variance

in depression. Social factors at the microsystem level of the ecological model did explain a

small amount of variance in depression beyond individual factors. Further research could

address other social factors, like cyberbullying, which may be more relevant to depression. The practical implications of this study are that depression interventions should focus on individuals who are at risk due to individual characteristics, rather than social reasons. Further research could explore what these interventions could be. An important limitation of this study is that the cross-sectional approach did not allow for prediction of any causal relationships, which further research could also address. This study emphasises the need to support individuals who are already at risk of depression.

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Tables

Table 1

*Descriptive Statistics and Differences by Gender*

| Variable | Overall[a] | | Males[b] | | Females[c] | | *U* | *p* |
|---|---|---|---|---|---|---|---|---|
| | *Mdn* | IQR | *Mdn* | IQR | *Mdn* | IQR | | |
| Depression | 5.0 | 1.0-13.0 | 4.0 | 0.0-10.0 | 7.0 | 2.0-14.0 | 495829 | < .001 |
| Conscientiousness | 3.0 | 2.5-3.5 | 3.0 | 2.5-3.5 | 3.0 | 2.5-3.5 | 645270 | .39 |
| Neuroticism | 3.0 | 2.0-3.5 | 2.5 | 2.0-3.5 | 3.5 | 2.5-4.0 | 400007 | < .001 |
| Screen time | 3300 | 2340-4650 | 3360 | 2340-4800 | 3240 | 2340-4530 | 655630 | .13 |
| Physical activity | 3 | 2-5 | 4 | 2-5 | 3 | 1-4 | 781841 | < .001 |
| Peer support | 32.0 | 27.0-37.0 | 31.0 | 26.0-35.0 | 33.0 | 28.0-37.0 | 530292 | < .001 |
| Parental support | 4.0 | 3.5-4.3 | 3.8 | 3.3-4.2 | 4.0 | 3.7-4.5 | 506533 | < .001 |
| Online friends | 2 | 2-3 | 2 | 2-3 | 2 | 2-3 | 625658 | .64 |
| SEP[a] | -0.05 | -0.7-0.7 | -0.01 | -0.6-0.7 | -0.1 | -0.72-0.70 | 657992 | .10 |

*Note.* Gender differences were conducted using the Mann-Whitney U Test as the measures were not normally distributed. IQR = Interquartile range; SEP = Socioeconomic position.

[a]N=2277. [b]N=1316. [c]N=961.

Table 2

*Spearman's Rank-order Correlations between Variables in the Hierarchical Regression Model*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Depression | — | | | | | | | | |
| 2. Conscientiousness | -.20** | — | | | | | | | |
| 3. Neuroticism | .34** | -.14** | — | | | | | | |
| 4. Screen time | .08** | -.22** | .04* | — | | | | | |
| 5. Physical activity | -.08** | .18** | -.16** | -.18** | — | | | | |
| 6. Peer support | -.15** | .11** | -.10** | -.07** | .04 | — | | | |
| 7. Parental support | -.03 | .07** | .04 | -.01 | -.03 | .07** | — | | |
| 8. Online friends | .10** | -.12** | .11** | .18** | -.09** | -.04 | -.01 | — | |
| 9. SEP | -.03 | .03 | -.07** | -.15** | .04 | .03 | -.07** | -.03 | — |

*Note.* SEP = Socioeconomic position.

*p < 0.05. **p < 0.01.

Table 3

*Summary of Hierarchical Regression Analysis for Ecological Factors Related to Depression*

| Variable | B | 95% CI for B | | SE B | β | R2 | ΔR2 |
|---|---|---|---|---|---|---|---|
| | | LL | UL | | | | |
| Step 1 | | | | | | .09 | .09*** |
| Constant | 5.89*** | 4.26 | 7.52 | 0.83 | | | |
| Gender | 1.26*** | 0.62 | 1.90 | 0.33 | .08*** | | |
| Conscientiousness | -1.22*** | -1.60 | -0.83 | 0.19 | -.13*** | | |
| Neuroticism | 1.64*** | 1.33 | 1.95 | 0.16 | .22*** | | |
| Step 2 | | | | | | .11 | .02*** |
| Constant | 9.03** | 6.10 | 11.96 | 1.50 | | | |
| Gender | 1.79*** | 1.13 | 2.45 | 0.34 | .12*** | | |
| Conscientiousness | -1.03*** | -1.42 | -0.64 | 0.20 | -.11*** | | |
| Neuroticism | 1.54*** | 1.23 | 1.85 | 0.16 | .21*** | | |
| Screen Time | 0.00* | 0.00 | 0.00 | 0.00 | .04* | | |
| Physical Activity | 0.12 | -0.02 | 0.26 | 0.07 | .04 | | |
| Online Friends | 0.34 | -0.01 | 0.70 | 0.18 | .04 | | |
| Peer Support | -0.12*** | -0.16 | -0.07 | 0.02 | -.11*** | | |
| Parental Support | -0.48* | -0.94 | -0.02 | 0.23 | -.04* | | |
| Step 3 | | | | | | .11 | .00 |
| Constant | 9.09*** | 6.14 | 12.03 | 1.50 | | | |
| Gender | 1.79*** | 1.12 | 2.44 | 0.33 | .12*** | | |
| Conscientiousness | -1.03*** | -1.4 | -0.64 | 0.20 | -.11*** | | |
| Neuroticism | 1.53*** | 1.2 | 1.84 | 0.16 | .21*** | | |
| Screen Time | 0.00 | 0.00 | 0.00 | 0.00 | .04 | | |
| Physical Activity | 0.12 | -0.02 | 0.26 | 0.07 | .04 | | |
| Online Friends | 0.34 | -0.01 | 0.70 | 0.18 | .04 | | |
| Peer Support | -0.12*** | -0.16 | -0.07 | 0.02 | -.11*** | | |
| Parental Support | -0.49* | -0.95 | -0.03 | 0.23 | -.04* | | |
| SEP | -0.08 | -0.39 | 0.23 | 0.16 | -.01 | | |

*Note.* N = 2277. CI = confidence interval; LL = lower limit; UL = upper limit. SEP = Socioeconomic

Position.

*p < 0.05. **p < 0.01. *** p < 0.001.