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Changing adolescent activity patterns and the correlation of self-esteem and externalizing mental health symptoms across time: results from the USA from 1991 through 2020

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Abstract

Background.—Common adolescent psychiatric symptoms cluster into two dominant domains: internalizing and externalizing. Both domains are linked to self-esteem, which serves as a protective factor against a wide range of internalizing and externalizing problems. This study examined trends in US adolescents' self-esteem and externalizing symptoms, and their correlation, by sex and patterns of time use.

Methods.—Using Monitoring the Future data (N = 338 896 adolescents, grades:8/10/12, years:1991–2020), we generated six patterns of time use using latent profile analysis with 17 behavior items (e.g. sports participation, parties, paid work). Groups were differentiated by high/low engagement in sports and either paid work or high/low peer socialization. Within each group, we mapped annual, sex-stratified means of (and correlation between) self-esteem and externalizing factors. We also examined past-decade rates of change for factor means using linear regression and mapped proportions with top-quartile levels of poor self-esteem, externalizing symptoms, or both.

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Conflict of interest. None.

Ethical standards. The Institutional Review Boards of University of Michigan and Columbia University approved the study protocol and analytic aims respectively in compliance with ethical standards.

Data/code availability. A public version of the data is accessible online – https://www.icpsr.umich.edu/web/NAHDAP/series/35. Code for this project is stored in a secure data enclave through Monitoring the Future.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S0033291723001150

Results.—We found consistent increases in poor self-esteem, decreases in externalizing symptoms, and a positive correlation between the two across nearly all activity groups. We also identified a relatively constant proportion of those with high levels of both in every group. Increases in poor self-esteem were most pronounced for female adolescents with low levels of socializing, among whom externalizing symptoms also increased.

Conclusions.—Rising trends in poor self-esteem are consistent across time use groups, as is the existence of a group facing poor self-esteem and externalizing symptoms. Effective interventions for adolescents' poor self-esteem/co-occurring symptoms are needed broadly, but especially among female adolescents with low peer socialization.

Keywords

Adolescent; externalizing; self-esteem; socialization; time use

Introduction

Common child and adolescent psychiatric symptoms cluster in two dominant domains: internalizing symptoms, such as social withdrawal, sadness, and fearfulness that reflect a young person's psychological state; and externalizing symptoms, such as aggression, impulsivity, and rule breaking that are manifested in a young person's outward behavior (Achenbach, Ivanova, Rescorla, Turner, & Althoff, 2016). Both internalizing and externalizing symptoms in adolescence are prevalent, and adolescents who are in distress benefit from interventions when symptoms arise (Jugovac, O'Kearney, Hawes, & Pasalich, 2022; O'Leary-Barrett et al., 2013). The stability of these two domains of mental health has been established for more than 50 years (Achenbach, 1966), and the two-domain structure has been replicated across many samples, ages, time periods, and locations (Achenbach et al., 2016). Predictors of high internalizing and externalizing symptoms include both unique correlates (e.g. internalizing symptoms being more common in females, externalizing being more common in males) (Rosenfield, 2000), as well as common risk factors (e.g. adverse childhood experiences) (Muniz et al., 2019). One important shared risk factor is poor self-esteem (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Mann, Hosman, Schaalma, & De Vries, 2004), which may become poor following psychological abuse, neglect, and exposure to certain parenting styles (e.g., authoritarian), among other reasons (Lee & Feng, 2021; Pinquart & Gerke, 2019).

In theory, poor self-esteem and externalizing symptom trends should be comparable, as these two factors are associated. In the last decade, however, time trends in the prevalence of low self-esteem and externalizing symptoms among US adolescents have diverged. Specifically, in this age group (i.e. ages 12–17), self-esteem has rapidly worsened (, Rutherford, Mauro, Kreski, & Keyes, 2022), while externalizing symptoms, such as conduct problems, theft, and violence, have declined (et al., 2022; Keyes et al., 2018; Moss, Santaella-Tenorio, Mauro, Keyes, & Martins, 2019). There has been speculation about the potential causes of increases in poor self-esteem, the potential drivers of decreases in externalizing symptoms, and whether these are the same. For example, adolescent unsupervised time with other adolescents outside the house has steadily declined for over a decade (Borodovsky et al., 2021; Keyes et al., 2018). Less social time may potentially worsen self-esteem in

some adolescents if they experience more social isolation and a lack of social support or connections, but it may also reduce externalizing symptoms if there are fewer opportunities to engage with others in theft and violence. Less unsupervised time among adolescents is part of a broader shift in how adolescents now spend their time compared to previous generations (Kreski et al., 2022). Overall, adolescent time use marked by high levels of social time with peers has declined substantially since the 1990s (Kreski et al., 2022), likely to the detriment of adolescent mental health.

Still, despite diverging population trends, the correlation between poor self-esteem and externalizing symptoms has remained relatively stable from 1991 to 2018 (et al., 2022). This suggests that across time, a group of adolescents with both poor self-esteem and high externalizing symptoms may persist. The size of this group is largely unaffected by population-level changes in the drivers of increases in poor self-esteem or decreases in externalizing symptoms, and the underlying causes of population-level changes in self-esteem and externalizing symptoms may not be as operative for the stable group of adolescents experiencing both. Identifying adolescents with co-occurring challenges in self-esteem and under-constrained behavior is important for prevention and intervention purposes, as they experience multiple, compounding psychiatric issues that may complicate treatment and warrant additional individual support (Herres et al., 2017; Hersh, Metz, & Weisz, 2016). As far as we are aware, the prevalence of a group with both poor self-esteem and high externalizing symptoms among adolescents across time has not been examined through 2020 in any population-based sample. It is also unclear the extent to which patterns of adolescent time use are linked to membership in this group. The extent to which patterns of adolescent supervised and unsupervised time are associated with changing population trends in self-esteem and externalizing symptoms, or with the group of adolescents who continue to have poor self-esteem and high externalizing symptoms, remains unknown. Such information would increase our understanding of whether, and to what extent, these trends are connected, thus informing prevention and intervention efforts.

Building upon our prior work (et al., 2022; Kreski et al., 2022), the present study examined trends in adolescent self-esteem and externalizing symptoms within nationally representative Monitoring the Future (MTF) data. We examined the correlation of poor self-esteem and externalizing symptoms, disaggregating by sex as well as patterns of adolescent time use. We also grouped adolescents into those reporting poor self-esteem only, high externalizing symptoms only, and both, to provide an overview of their trends and associations with adolescent time use. We hypothesized increases in poor self-esteem across years and patterns of time use, declines in externalizing symptoms, and the persistence of co-occurring poor self-esteem and high levels of externalizing symptoms.

Methods

We used yearly, cross-sectional samples of adolescents in the MTF study (years 1991–2020, N = 338 896 adolescents in grades 8, 10, and 12) (Miech et al., 2020). This analytic sample was derived from the subforms of the MTF survey with pertinent study variables. MTF was approved by University of Michigan's IRB, while data were analyzed at Columbia University. These data were collected through self-completed student surveys in schools

that were selected via multi-stage random sampling design. Schools that elected not to participate were replaced with schools that had similar size, urbanicity, and geographic location.

Measures

Time use—We operationalized the ways in which adolescents spent their time using 17 ordinal variables. These items were diverse, assessing multiple facets of adolescent time use (e.g. social, recreational, etc.). Full items are available in online Supplemental Table S1. Social media use, one of the time use items, was only available from 2009 onward. We used these items with latent profile analysis (LPA) in Mplus (Asparouhov & Muthén, 2014; Vermunt, 2010) to develop patterns of adolescent time use. Balancing interpretability, analytic metrics, and preservation of a usably large sample in each time use group, we chose a structure with six patterns of time use.

Four groups were defined through a combination of amount of time spent unsupervised or socializing with peers (e.g., parties or visiting friends) and time spent engaged in sports and other activities (groups 1–4: low social/disengaged, low social/engaged, high social/disengaged, high social/engaged). The remaining two groups were defined by a significant amount of time at a paid job (11 or more hours a week), split by time spent engaged in sports and other activities (groups 5 and 6: workers/disengaged, workers/engaged). Time use group summaries can be seen in online Supplementary Table S2, while analytic metrics used to help determine this six-group structure can be seen in online Supplementary Table S3.

Self-esteem/externalizing factor scores—To generate overall factors of self-esteem and externalizing symptoms, we used seven externalizing items and eight self-esteem items. The externalizing items covered a variety of domains, assessed with the prompt: ‘During last 12 months, how often have you…’ followed by one of these behaviors: ‘damaged school property on purpose,’ ‘gone into some house or building when you weren’t supposed to be there,’ ‘gotten into a serious fight in school or at work,’ ‘hurt someone badly enough to need bandages or a doctor,’ ‘taken part in a fight where a group of your friends were against another group,’ ‘taken something not belonging to you worth under $50,’ or ‘taken something not belonging to you worth over $50.’ Response options ranged from 1 (not at all) to 5 (five or more times). Cronbach’s α for this scale ranged from 0.79 (2018) to 0.83 (1996). These items covered externalizing behaviors (i.e. theft, vandalism, rule breaking, and violence) reflected in other assessments of adolescent externalizing symptoms (such as the Child Behavior Checklist) (Achenbach & Ruffle, 2000).

Self-esteem items covered self-esteem and self-derogation, assessed with the prompt, ‘How much do you agree or disagree with each of the following statements’ followed by these items: ‘On the whole, I’m satisfied with myself,’ ‘I take a positive attitude toward myself,’ ‘I am able to do things as well as most other people,’ ‘I feel I am a person of worth, on an equal plane with others,’ ‘I feel that I can’t do anything right,’ ‘I feel I do not have much to be proud of,’ ‘Sometimes I think that I am no good at all,’ and ‘I feel that my life is not very useful.’ The first four items (which captured positive self-esteem rather than self-derogation) were reverse coded to enhance interpretability by reflecting poor self-esteem. Response

options ranged from 1 (disagree) to 5 (agree). Cronbach's α for this scale ranged from 0.84 (1992) to 0.89 (2018). Adolescents missing data on an item in the overall externalizing scale, the self-esteem subscale, or the self-derogation subscale were imputed with the mean of the other items in that scale or subscale (1.3% of adolescents for the externalizing scale, 1.8% for self-esteem, and 1.7% for self-derogation). Adolescents missing two or more items in a given scale or subscale were excluded (a total of 17.1% of available respondents). This resulted in a sample of 338 896 adolescents for analysis.

We replicated the two factors of previous work (Askari et al., 2022), creating a self-esteem factor with a normal distribution (mean = 0, S.D. = 1) and an externalizing factor, also with a normal distribution (mean = 0, S.D. = 1). We additionally created binary versions of poor self-esteem and externalizing symptoms, split at the top quartile (a score of 0.70 for poor self-esteem, 0.11 for externalizing symptoms), to capture poor self-esteem, high externalizing symptoms, or both. We combined these dichotomized versions to create a four-group outcome (adequate self-esteem/low externalizing, poor self-esteem/low externalizing, adequate self-esteem/high externalizing, and poor self-esteem/high externalizing).

Statistical analyses

We examined means in poor self-esteem and externalizing factor scores and their correlations from 1991 to 2020 for the six time use groups defined using LPA as described above, and then stratified by sex (male/female). Then, we used sex-stratified linear regressions to estimate rates of change in poor self-esteem and externalizing factor scores for each time use group from 2010 onward, the year that preliminary analyses showed as a consistent point of inflection. Specifically, we predicted each factor mean score using year, time use group, and their interaction among male and female respondents separately. We then examined additional models adjusting for demographic factors as potential confounders, namely race/ethnicity (White, Black, Hispanic/Latino, multiracial, Asian/Pacific Islander, American Indian/Alaskan Native, other), grade (8/10/12), and highest level of parental education (less than high school, high school/some college, college or more). Lastly, we mapped proportions of adolescents in four groups based on low or high self-esteem and externalizing symptoms overall, again by time use group and then stratified by sex. All statistical analyses account for the complex survey design used in the MTF.

Results

Sample distribution of time use groups and sex can be seen in Table 1. Time use group prevalence ranged from the workers/disengaged group (4.1%) to the high social/engaged group (35.1%). Of the analytic sample, 47.9% reported their sex as male.

Patterns in poor self-esteem and externalizing symptoms by time use

Figures 1 and 2 depict the trends in poor self-esteem and externalizing factor means by time use group, stratified by sex (males: Figure 1; females: Figure 2) and time use group. Poor self-esteem among both male and female respondents was elevated for the groups with lower levels of engagement in sports and other activities, and highest overall for the group with this disengagement and low levels of social behavior (low social/disengaged). Additionally,

there was worse baseline self-esteem among female adolescents. Within each sex, trends reflected similar patterns of worsening self-esteem, particularly from 2010 onward, though the magnitude of these trends varied by time use group. For externalizing symptoms, baseline levels were elevated for those with high levels of socialization or paid employment (high social/disengaged, high social/engaged, workers/disengaged, workers/engaged) (see Figs 1 and 2) compared with those with low socialization, with higher baseline levels among male adolescents. The correlation between poor self-esteem and externalizing factors remained relatively consistent across time, time use groups, and sex, typically hovering around a mean of 0.25 with the exception of an anomalous drop in the correlation to −0.29 among the 32 male adolescents in the workers/disengaged group in 2020.

To examine the shifts in poor self-esteem and externalizing factor means from 2010 onward, we conducted a sex-stratified survey-weighted linear regression with outcomes predicted by year, time use group, and their interaction (Table 2). Annual increases in the poor self-esteem scores were highest for the low social/disengaged group, with an annual increase of 0.046 (95% CI 0.035–0.058) units among male respondents and 0.076 (0.064–0.088) units among female respondents. There was strong evidence of annual rate differences between time use groups among female respondents (interaction p value: 0.0007), though evidence was weaker for male respondents (interaction p value: 0.0543). We similarly examined declines in externalizing symptoms from 2010 onward with linear regressions, finding that among both male and female respondents, declines were largest among the group with high levels of social time and low levels of engagement in sports and other activities (high social/disengaged) with an annual decline of −0.031 (95% CI −0.047 to −0.014) units among male respondents, and −0.013 (−0.023 to −0.003) units per year among female respondents. There was evidence of significantly different declines in externalizing symptoms across time use groups for male ($p < 0.0001$) and female (p value: 0.0070) respondents.

Overall, the low social groups typically had higher increases in poor self-esteem and smaller declines in externalizing compared to the other groups, regardless of sex. Both low social groups are notable for female students not only for their high increases in poor self-esteem, but also for being the only time use group/sex combinations with increasing externalizing symptoms (e.g. yearly change for low social/disengaged female adolescents = 0.003, 95% CI −0.003 to 0.008), albeit building on relatively low baseline levels. The patterns and magnitude of yearly effects by time use group were nearly identical in models adjusting for race/ethnicity, grade, and parental education (Table 3).

Proportions with high levels of poor self-esteem, externalizing, or both

While the above trends in factor means broadly characterize poor self-esteem and externalizing symptoms in this sample, we were particularly interested in adolescents who exhibited especially high levels of poor self-esteem, externalizing symptoms, or both. Figures 3 and 4 show the trends in these outcomes by time use group and sex, although censoring due to limited cell sizes limited conclusions that we could draw for some groups. Available data suggest relatively consistent patterns across sex, with rapid increases in those with poor self-esteem from 2010 onward [e.g. an increase of 30.9 percentage points from 2010 (27.9% prevalence) to 2020 (58.8%) among low social/disengaged female

adolescents], slower declines in the proportion with high externalizing symptoms [e.g. a drop of 12.3 percentage points among male adolescents in the workers/engaged group from 2010 (27.4%) to 2019 (15.1%)], and a relatively stable proportion with both across the entire study period (e.g. an increase of only 3.4 percentage points from 1991 (9.4%) to 2020 (12.8%) among male respondents in the high social/engaged group). Particular attention should be given to female adolescents in the low social/disengaged and workers/engaged groups, as they were more likely than not to have poor self-esteem in 2020.

Discussion

This study examined trends and patterns in adolescents' poor self-esteem and externalizing symptoms, as well as the correlation between these outcomes, by sex and patterns of time use between 1991 and 2020. We identified sharp increases in poor self-esteem, declines in externalizing symptoms, and a consistent positive correlation between the two for all time use groups. Groups with the highest increases in poor self-esteem, including female adolescents with low levels of socializing time, typically had smaller declines in externalizing symptoms. Importantly, despite significant changes in self-esteem and externalizing symptom means, the proportion with both high levels of poor self-esteem and high externalizing symptoms remained relatively stable over time. Taken together, we identified that a group of adolescents at particularly high risk for mental health problems associated with both poor self-esteem and externalizing problems remained relatively invariant in size.

The increases in poor self-esteem were particularly notable for female adolescents with low levels of socializing time and low engagement in sports and other structured activities. While overall lower self-esteem among female adolescents is a well-documented gender difference (Askari et al., 2022; Kearney-Cooke, 1999), this distinct pattern of time use adds further nuance and specificity that can aid in targeting selected interventions. Not only was this group's pace of increase in poor self-esteem from 2010 onward more than double the rate seen in many other groups, but by 2020 they had the highest prevalence of poor self-esteem of any group. While reverse-causality is possible, with poor self-esteem leading to lower social time and activity engagement, our findings provide an avenue for further inquiry into the mental health determinants of this vulnerable group. The positive correlation between poor self-esteem and externalizing symptoms may explain why other groups evidenced declines in externalizing symptoms but this group saw minor increases from 2010 onward. This correlation may also explain why the groups with the smallest increases in poor self-esteem (i.e. male adolescents who work or have high levels of social time) had the largest decreases in externalizing symptoms. Shifts in one category of symptoms seem to pull the other category of symptoms in a similar direction, even as the overall trends in poor self-esteem and externalizing symptoms have diverged over the past decade. Further work should continue to identify the underlying causes of these divergent trends, such as shifting social and political factors, that are strong enough to overcome the consistent positive correlation between these outcomes.

There was an increase in those with top quartile levels of poor self-esteem over time, and a decrease in those with top quartile externalizing symptoms. However, the proportion of

those with high levels of both remained relatively stable in each time use group. This group seems unaffected by the factors leading to shifting proportions of adolescents with primarily poor self-esteem or externalizing symptoms. Adolescents with co-occurring poor self-esteem and externalizing symptoms may have common genetic and environmental factors contributing to their risk of both, and further research should examine the causal pathways linking these outcomes and other factors. The stability of this comorbid group over time is concerning. By 2019–2020, in many time use groups, adolescents with high externalizing symptoms were more likely than not to also have poor self-esteem symptoms. Thus, further research is urgently needed to identify risk factors for comorbid externalizing symptoms and poor self-esteem in US adolescents.

Ultimately, the rise in poor self-esteem and the consistent prevalence of adolescents with both poor self-esteem and externalizing symptoms warrant interventions and support for adolescent mental health. Effective interventions for self-esteem among adolescents are diverse, ranging from family therapy (Bos, Muris, Mulkens, & Schaalma, 2006) to cognitive or social skills training (Barrett, Webster, & Wallis, 1999; Seema & Kumar, 2018). Interventions focused on social engagement and skills should be tailored for adolescent girls with low socialization, as this study observed substantial increases in poor self-esteem symptoms among this group. For externalizing symptoms, intervention options are just as diverse, ranging from emotional regulation treatment (te Brinke et al., 2021) to programs that foster parents' ability to attend to adolescents' emotional and attachment needs (Jugovac et al., 2022) and systemic therapy (von Sydow, Retzlaff, Beher, Haun, & Schweitzer, 2013), which focuses on symptoms within their existing social context and emphasizes addressing interpersonal relations and interactions. For adolescents who are working or engaged in sports or other activities, implementing resources and support in these settings may be beneficial, leveraging these spaces in addition to schools and other community settings. Additionally, ensuring safe and accessible mental healthcare for adolescents is a major priority, as existing access is often limited across the USA and making these services more accessible may reduce the historically stable prevalence of adolescents combatting poor self-esteem and externalizing symptoms. Further research is needed to identify the most effective strategies for addressing co-occurring poor self-esteem and externalizing symptoms.

This study has a number of strengths. By leveraging three decades of nationally representative data from students in grades 8, 10, and 12, the results generalize to a broad range of US adolescents. Additionally, externalizing symptoms covered a broad range of pertinent behaviors. However, this study is not without limitations. The set of items in MTF does not fully capture all behaviors that fall into 'time use' for adolescents. Time use group stratification required sorting adolescents into groups based on most likely class membership, though high entropy (0.848) suggests a strong separation of classes. Still, it is uncertain whether these groups constitute a complete description of adolescent time use throughout recent decades. Additionally, this study could not capture gender identity apart from sex, nor could it accurately capture intersex individuals. Results also do not necessarily reflect the experiences of adolescents outside the USA, outside the grades analyzed, or outside the school systems sampled (although the sample design aims to produce a nationally representative sample of students). While MTF is representative of US school-attending, certain important sociodemographic factors that can influence mental health,

including sexual orientation and disability, are not examined in the adolescent surveys. For both poor self-esteem and externalizing symptoms, top quartile cut-points were used in lieu of validated thresholds for what constitutes 'high' levels of each outcome. The groups based on these thresholds may differ from groups constructed with different thresholds. Finally, these cross-sectional data are also subject to reverse-causality of proposed links between time use group membership and self-esteem/externalizing symptomology, as well as residual confounding not otherwise controlled by our models.

In this nationally representative study of US adolescents in schools from 1991 to 2020, we found consistent increases in poor self-esteem, decreases in externalizing symptoms, and a positive correlation between the two across sex and patterns of time use. These patterns were reflected in an increase in adolescents with high levels of poor self-esteem, a decrease in those with high externalizing symptoms, and a relatively constant proportion of those with high levels of both in each group. Interventions are needed to curtail rising rates of poor self-esteem and better support vulnerable groups, such as female adolescents with low levels of social time. Efforts should also aim to reduce the historically consistent proportion of adolescents with both poor self-esteem and high externalizing symptoms.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data availability statement.

Monitoring the Future is a publicly accessible dataset.

References

Achenbach TM (1966). The classification of children's psychiatric symptoms: A factor-analytic study. Psychological Monographs: General and Applied, 80(7), 1.

Achenbach TM, Ivanova MY, Rescorla LA, Turner LV, & Althoff RR (2016). Internalizing/externalizing problems: Review and recommendations for clinical and research applications. Journal of the American Academy of Child & Adolescent Psychiatry, 55(8), 647–656. [PubMed: 27453078]

Achenbach TM, & Ruffle TM (2000). The child behavior checklist and related forms for assessing behavioral/emotional problems and competencies. Pediatrics in Review, 21(8), 265–271. [PubMed: 10922023]

Askari MS, Rutherford CG, Mauro PM, Kreski NT, & Keyes KM (2022). Structure and trends of externalizing and internalizing psychiatric symptoms and gender differences among adolescents in the US from 1991 to 2018. Social Psychiatry and Psychiatric Epidemiology, 57, 737–748. 10.1007/s00127-021-02189-4 [PubMed: 34773140]

Asparouhov T, & Muthén B (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. Structural Equation Modeling: A Multidisciplinary Journal, 21(3), 329–341. 10.1080/10705511.2014.915181

Barrett PM, Webster HM, & Wallis JR (1999). Adolescent self-esteem and cognitive skills training: A school-based intervention. Journal of Child and Family Studies, 8, 217–227.

Borodovsky JT, Krueger RF, Agrawal A, Elbanna B, de Looze M, & Grucza RA (2021). US trends in adolescent substance use and conduct problems and their relation to trends in unstructured in-person socializing with peers. Journal of Adolescent Health, 69(3), 432–439. 10.1016/j.jadohealth.2020.12.144

Bos AER, Muris P, Mulkens S, & Schaalma HP (2006). Changing self-esteem in children and adolescents: A roadmap for future interventions. Netherlands Journal of Psychology, 62(1), 26–33. 10.1007/BF03061048

Donnellan MB, Trzesniewski KH, Robins RW, Moffitt TE, & Caspi A (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. Psychological Science, 16(4), 328–335. [PubMed: 15828981]

Herres J, Williamson AA, Kobak R, Layne CM, Kaplow JB, Saltzman WR, & Pynoos RS (2017). Internalizing and externalizing symptoms moderate treatment response to school-based trauma and grief component therapy for adolescents. School Mental Health, 9, 184–193.

Hersh J, Metz KL, & Weisz JR (2016). New frontiers in transdiagnostic treatment: Youth psychotherapy for internalizing and externalizing problems and disorders. International Journal of Cognitive Therapy, 9(2), 140–155.

Jugovac S, O'Kearney R, Hawes DJ, & Pasalich DS (2022). Attachment-and emotion-focused parenting interventions for child and adolescent externalizing and internalizing behaviors: A meta-analysis. Clinical Child and Family Psychology Review, 25, 754–773. 10.1007/s10567-022-00401-8 [PubMed: 35680711]

Kearney-Cooke A (1999). Gender differences and self-esteem. The Journal of Gender-Specific Medicine: JGSM, 2(3), 46–52.

Keyes KM, Gary DS, Beardslee J, Prins SJ, O'Malley PM, Rutherford C, & Schulenberg J (2018). Joint effects of age, period, and cohort on conduct problems among American adolescents from 1991 through 2015. American Journal of Epidemiology, 187(3), 548–557. 10.1093/aje/kwx268 [PubMed: 28679165]

Kreski NT, Chen Q, Olfson M, Cerdá M, Hasin DS, Martins SS, … Keyes KM (2022). Time use and associations with internalizing symptoms from 1991 to 2019 among US adolescents. SSM – Population Health, 19, 101181. 10.1016/j.ssmph.2022.101181 [PubMed: 35968043]

Lee C, & Feng J (2021). From childhood victimization to internalizing and externalizing behavior problems through self-esteem in adolescence. Research in Nursing & Health, 44(6), 931–944. [PubMed: 34618937]

Mann M, Hosman CMH, Schaalma HP, & De Vries NK (2004). Self-esteem in a broad-spectrum approach for mental health promotion. Health Education Research, 19(4), 357–372. [PubMed: 15199011]

Miech R, Johnston L, O'Malley P, Bachman J, Schulenberg J, & Patrick M (2020). Monitoring the future national survey results on drug use, 1975–2019: Volume I, secondary school students. Ann Arbor: Institute for Social Research, The University of Michigan. Available at http://monitoringthefuture.org/pubs.html#monographs

Moss SL, Santaella-Tenorio J, Mauro PM, Keyes KM, & Martins SS (2019). Changes over time in marijuana use, deviant behavior and preference for risky behavior among US adolescents from 2002 to 2014: Testing the moderating effect of gender and age. Addiction, 114(4), 674–686. [PubMed: 30461115]

Muniz CN, Fox B, Miley LN, Delisi M, Cigarran GP, & Birnbaum A (2019). The effects of adverse childhood experiences on internalizing versus externalizing outcomes. Criminal Justice and Behavior, 46(4), 568–589.

O'Leary-Barrett M, Topper L, Al-Khudhairy N, Pihl RO, Castellanos-Ryan N, Mackie CJ, & Conrod PJ (2013). Two-year impact of personality-targeted, teacher-delivered interventions on youth internalizing and externalizing problems: A cluster-randomized trial. Journal of the American Academy of Child & Adolescent Psychiatry, 52(9), 911–920. 10.1016/j.jaac.2013.05.020 [PubMed: 23972693]

Pinquart M, & Gerke D-C (2019). Associations of parenting styles with self-esteem in children and adolescents: A meta-analysis. Journal of Child and Family Studies, 28(8), 2017–2035. 10.1007/s10826-019-01417-5

Rosenfield S (2000). Gender and dimensions of the self: Implications for internalizing and externalizing behavior. In Frank E (Ed.), Gender and its effects on psychopathology (pp. 23–36). American Psychiatric Publishing, Inc.

Seema GB, & Kumar GV (2018). Impact of social skills training on self-esteem among male and female adolescent students. Indian Journal of Positive Psychology, 9(1), 147–151.

te Brinke LW, Menting ATA, Schuiringa HD, Deković M, Weisz JR, & de Castro BO (2021). Emotion regulation training as a treatment element for externalizing problems in adolescence: A randomized controlled micro-trial. Behaviour Research and Therapy, 143, 103889. 10.1016/j.brat.2021.103889 [PubMed: 34111699]

Vermunt JK (2010). Latent class modeling with covariates: Two improved three-step approaches. Political Analysis, 18(4), 450–469. 10.1093/pan/mpq025

von Sydow K, Retzlaff R, Beher S, Haun MW, & Schweitzer J (2013). The efficacy of systemic therapy for childhood and adolescent externalizing disorders: A systematic review of 47 RCT. Family Process, 52(4), 576–618. [PubMed: 24102196]

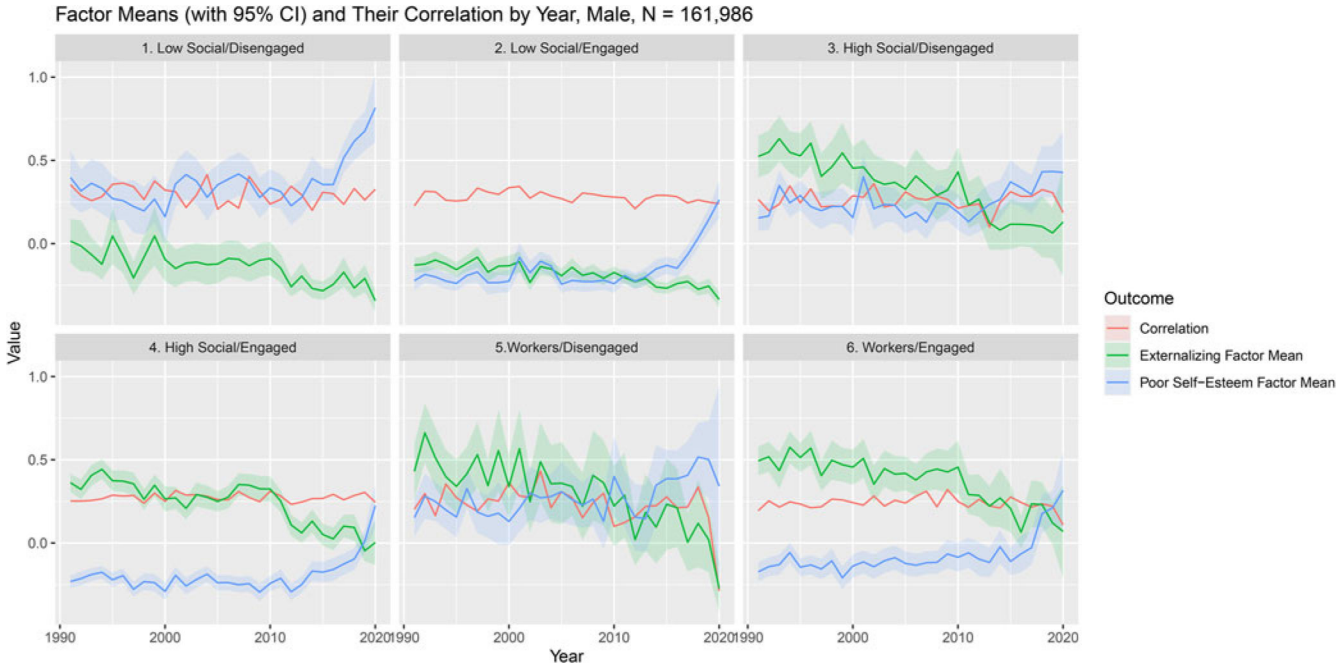

Figure 1.

Poor self-esteem and externalizing factor means and their correlation, by time use group, male, 1991–2020.

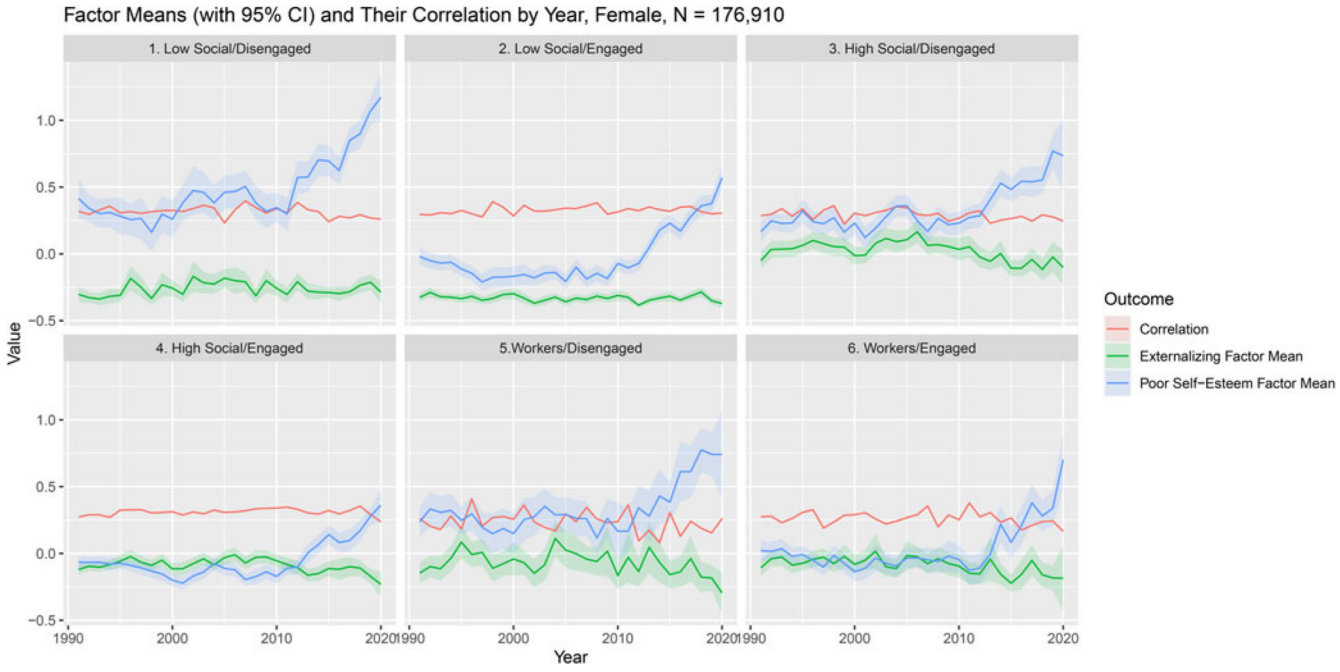

Figure 2.

Poor self-esteem and externalizing factor means and their correlation, by time use group, female, 1991–2020.

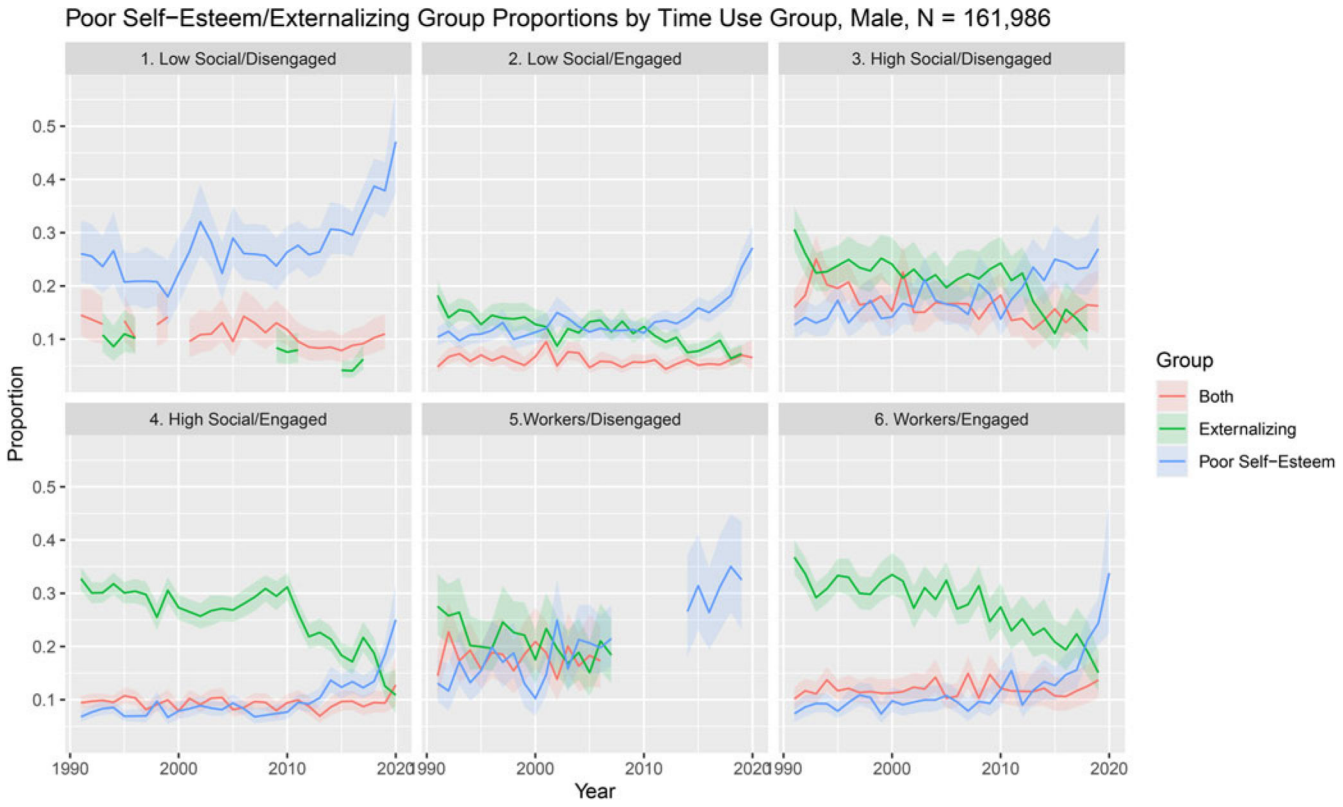

Figure 3.

Proportions with high levels of poor self-esteem, externalizing, or both, by time use group, male, 1991–2020.

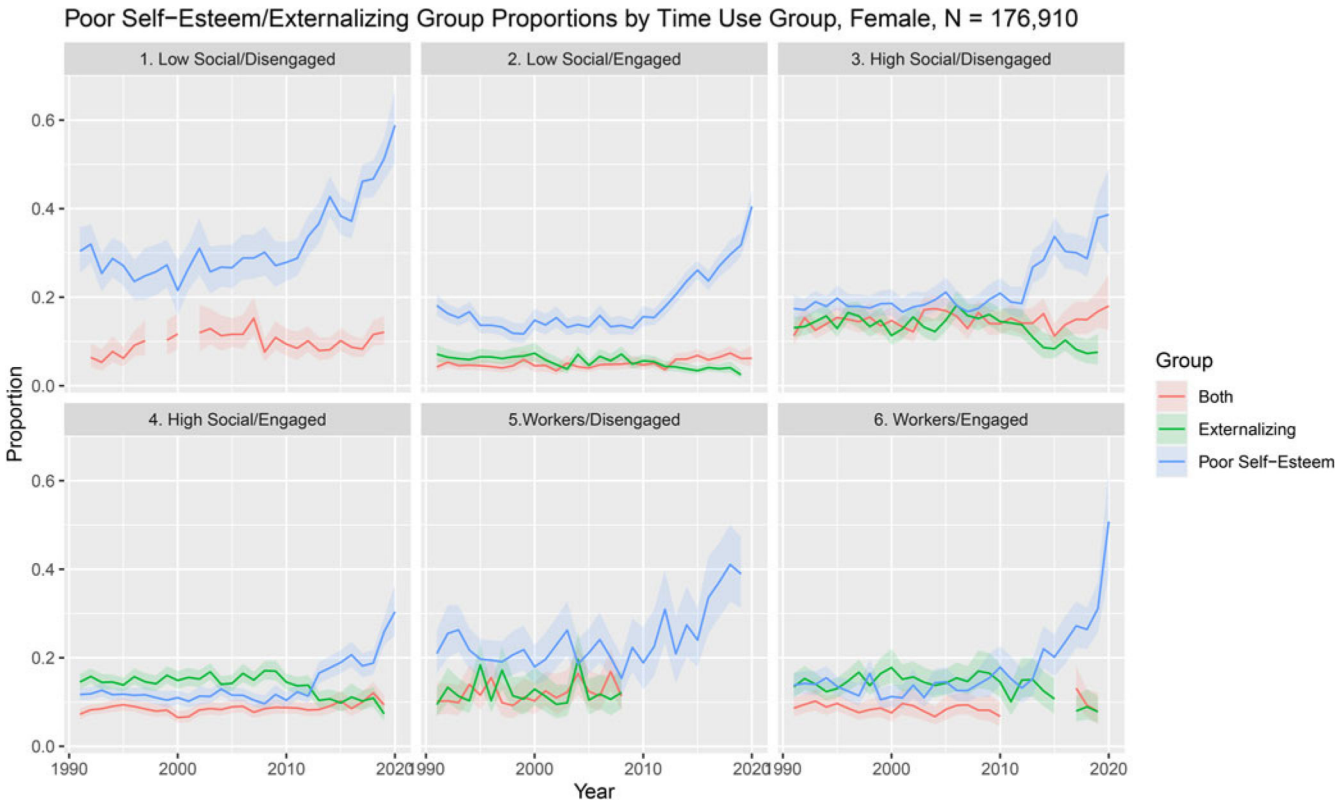

Figure 4.

Proportions with high levels of poor self-esteem, externalizing, or both, by time use group, female, 1991–2020.

Table 1.

Sample characteristics of 8th, 10th, and 12th grade students in Monitoring the Future from 1991 through 2020

	Overall	Overall	Overall	Male	Male	Female	Female
	N	Unweighted %	Weighted %	*N*	Weighted %	*N*	Weighted %
Sample size	338 896	100	100	161 986	100	176 910	100
Time use group							
1. Low social/disengaged	26 522	7.83	8.01	11 806	7.41	14 716	8.56
2. Low social/engaged	93 884	27.70	28.35	46 572	29.24	47 312	27.54
3. High social/disengaged	40 994	12.10	12.12	13 513	8.43	27 481	15.51
4. High social/engaged	118 881	35.08	35.07	59 022	36.31	59 859	33.94
5. Workers/disengaged	14 584	4.30	4.07	6331	3.80	8253	4.32
6. Workers/engaged	44 031	12.99	12.37	24 742	14.81	19 289	10.13
Sex							
Male	161 986	47.80	47.88	161 986	100	0	0
Female	176 910	52.20	52.12	0	0	176 910	100
Decade							
1991–2000	134 477	39.68	39.92	63 795	39.76	70 682	40.07
2001–2010	110 118	32.49	32.61	52 291	32.54	57 827	32.66
2011–2020	94 301	27.83	27.47	45 900	27.70	48 401	27.27
Grade							
8	137 114	40.46	42.34	65 359	42.13	71 755	42.53
10	141 333	41.70	42.18	67 867	42.34	73 466	42.04
12	60 449	17.84	15.48	28 760	15.53	31 689	15.43
Highest level of parental education							
Less than high school	23 191	6.84	7.17	9592	6.17	13 599	8.09
High school/some college	120 260	35.49	36.14	55 186	34.89	65 074	37.29
College or more	175 783	51.87	50.69	86 510	52.12	89 273	49.39
Missing	19 662	5.80	5.99	10 698	6.82	8964	5.23
Race/ethnicity							
White	209 402	61.79	61.95	101 258	62.70	108 144	61.26

	Overall	Overall	Overall	Male	Male	Female	Female
	N	Unweighted %	Weighted %	*N*	Weighted %	*N*	Weighted %
Black	38 088	11.24	11.15	17 315	10.59	20 773	11.66
Hispanic/Latino	48 551	14.33	14.51	22 706	14.19	25 845	14.81
Multiracial	6873	2.03	2.01	3073	1.84	3800	2.16
Asian/Pacific Islander	15 270	4.51	4.18	7580	4.34	7690	4.03
American Indian/Alaskan Native	5262	1.55	1.76	2722	1.90	2540	1.63
Other	9781	2.89	2.81	4826	2.94	4955	2.70
Missing	5669	1.67	1.63	2506	1.50	3163	1.76

Table 2.

Yearly change in factor means (and 95% CIs) by time use group and sex, unadjusted, 2010–2020

	Annual change in poor self-esteem factor mean		Annual change in externalizing factor mean	
	Male	Female	Male	Female
Time use group	**Yearly change (95% CI)**	**Yearly change (95% CI)**	**Yearly change (95% CI)**	**Yearly change (95% CI)**
1. Low social/disengaged	0.046 (0.035–0.058)	0.076 (0.064–0.088)	−0.011 (−0.019 to −0.002)	0.003 (−0.003 to 0.008)
2. Low social/engaged	0.039 (0.032–0.045)	0.059 (0.053–0.066)	−0.009 (−0.013 to −0.005)	0.001 (−0.003 to 0.004)
3. High social/disengaged	0.031 (0.018–0.044)	0.052 (0.040–0.063)	−0.031 (−0.047 to −0.014)	−0.013 (−0.023 to −0.003)
4. High social/engaged	0.028 (0.022–0.035)	0.046 (0.040–0.053)	−0.030 (−0.038 to −0.022)	−0.008 (−0.014 to −0.002)
5. Workers/disengaged	0.028 (0.004–0.052)	0.069 (0.050–0.089)	−0.023 (−0.046 to 0.000)	−0.011 (−0.025 to 0.002)
6. Workers/engaged	0.031 (0.020–0.041)	0.059 (0.046–0.072)	−0.027 (−0.042 to −0.012)	−0.005 (−0.015 to 0.005)
p value for the overall interaction between time use group and time	0.0543	0.0007	<0.0001	0.0070

Table 3.

Yearly change in factor means (and 95% CIs) by time use group and sex, adjusted[a], 2010–2020

	Annual change in poor self-esteem factor mean		Annual change in externalizing factor mean	
	Male	Female	Male	Female
Time use group	**Yearly change (95% CI)**	**Yearly change (95% CI)**	**Yearly change (95% CI)**	**Yearly change (95% CI)**
1. Low social/disengaged	0.048 (0.035–0.061)	0.082 (0.070–0.095)	−0.013 (−0.022 to −0.004)	0.003 (−0.003 to 0.009)
2. Low social/engaged	0.036 (0.030–0.042)	0.061 (0.054–0.067)	−0.010 (−0.014 to −0.005)	−0.000 (−0.004 to 0.003)
3. High social/disengaged	0.027 (0.012–0.041)	0.051 (0.039–0.063)	−0.031 (−0.048 to −0.014)	−0.015 (−0.025 to −0.005)
4. High social/engaged	0.028 (0.021–0.034)	0.048 (0.041–0.055)	−0.029 (−0.037 to −0.022)	−0.009 (−0.015 to −0.004)
5. Workers/disengaged	0.030 (0.007–0.053)	0.068 (0.048–0.087)	−0.030 (−0.054 to −0.005)	−0.015 (−0.030 to −0.001)
6. Workers/engaged	0.030 (0.019–0.041)	0.057 (0.043–0.071)	−0.024 (−0.039 to −0.009)	−0.009 (−0.018 to 0.001)
p value for the overall interaction between time use group and time	0.0696	0.0003	<0.0001	0.0012

[a]Adjusted for race/ethnicity, grade, and parental education.