


A pattern-centered analysis of adolescents' concerns and hopes about future crises: Differences in ways of coping and personal adjustment

Melanie J. Zimmer-Gembeck¹  | Kathryn Modecki¹ | Amanda L. Duffy¹ |
Tanya Hawes² | Lara J. Farrell¹ | Allison M. Waters¹ | Alex A. Gardner² |
David Shum³ | Ellen A. Skinner⁴

¹School of Applied Psychology and Griffith Centre for Mental Health, Griffith University, Southport, Australia

²School of Applied Psychology, Griffith University, Southport, Australia

³Department of Rehabilitation Sciences and Mental Health Research Centre, The Hong Kong Polytechnic University, Hong Kong, Hong Kong

⁴Department of Psychology, Portland State University, Portland, Oregon, USA

Correspondence

Melanie J. Zimmer-Gembeck, School of Applied Psychology, Griffith University, Parklands Dr, G40_7.86, Southport QLD 4222 Australia.
Email: m.zimmer-gembeck@griffith.edu.au

Funding information

Australian Research Council,
Grant/Award Number: DP170102547

Abstract

Introduction: Many adolescents are concerned about global and future crises, such as the health of the planet or terrorism/safety. Yet, adolescents can also express hope about the future. Thus, asking adolescents about their concern *and* hope could yield subgroups with different ways of coping and personal adjustment.

Method: Australian adolescents ($N = 863$; age 10–16) completed surveys to report their concern (worry and anger) and hope about the planet, safety, jobs, income, housing, and technology, as well as their active and avoidant coping, depression, and life satisfaction.

Results: Four distinct subgroups were identified using cluster analysis: *Hopeful* (low on concern and high on hope across all issues, 32%), *Uninvolved* (low in concern and hope; 26%), *Concerned about the Planet* (CP, 27%), and *Concerned about Future Life* (CFL, 15%). When compared (adjusting for age, sex, and COVID timing), the CP subgroup was highest in active coping (e.g., taking action) but moderate in personal adjustment. *Hopeful* had the most positive adjustment, whereas CFL had the poorest adjustment. *Uninvolved* were lowest in coping but moderate in adjustment.

Conclusions: Findings suggest ways of coping and adjustment may not always align, in that CP is connected with more active coping but also some cost to personal adjustment, whereas *Hopeful* is associated with optimal adjustment but perhaps at the cost of active coping. In addition, although CFL adolescents emerged as the at-risk group, the low levels of hope and coping in *Uninvolved* adolescents raise the possibility that they are at risk of future problems.

KEYWORDS

adolescents, anxiety, climate change, coping, future, hope

1 | INTRODUCTION

Many children and adolescents report worries (and other negative reactions) about major world and national “crises,” such as climate change, safety and terrorism, and opportunities for work, income, and affordable housing (Buijzen et al., 2007; Burke et al., 2018; Caporino et al., 2020; Ojala, 2012a; Vassallo & Swami, 2018). For example, in a large 2021 study of about 10,000

OPEN PRACTICES STATEMENT The study reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials can be sent via email to the lead author at m.zimmer-gembeck@griffith.edu.au.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *Journal of Adolescence* published by Wiley Periodicals LLC on behalf of Foundation for Professionals in Services to Adolescents.

youth between the ages of 16–25 from 10 countries, about 59% were very or extremely worried and 84% at least moderately worried about climate change (Hickman et al., 2021). Despite these statistics, few studies focus on the range or pattern of concerns across multiple crises adolescents could face in the future. What adolescents are most concerned about could vary across adolescents and could relate to the ways they cope and their personal adjustment. In addition, past research has tended to focus on adolescents' concerns only, often operationalized as worry (Brown et al., 2006; Burke et al., 2018; Hickman et al., 2021), but in a handful of studies, it has been important to incorporate adolescents' hope about global and future issues (Bishop & Willis, 2014; Kleres & Wettergren, 2017; Ojala, 2012a). In two studies, constructive hope was associated with adolescents' coping behavior (i.e., engagement in environmental actions) and self-efficacy (Ojala, 2012b, 2015). Our primary aims in the current study were (1) to describe worry, anger, and hope across six issues that are frequently identified as crises that youth face in the future, (2) to divide adolescents into clusters (i.e., subgroups) based on their levels of worry, anger, and hope across these issues, and (3) to examine how clusters differ in their reported ways of coping and personal adjustment (depressive symptoms and life satisfaction). The six issues were the future of the planet, job opportunities, financial prospects, safety, housing, and technological changes that could affect future jobs and other opportunities (computers and artificial intelligence [AI]).

2 | WORRIES, ANGER, AND HOPE ABOUT THE FUTURE

Research on children's and adolescents' worry and other negative emotions about future crises and global challenges has expanded rapidly as the world continues to face a number of pressing problems (Bishop & Willis, 2014; Burke et al., 2018; Hickman et al., 2021; Ojala, 2012a). Other research has concentrated on what has been called *hope* or *optimism*, arguing that a positive outlook can play multiple roles in the face of stressors (Bishop & Willis, 2014; Carver & Scheier, 1999; Folkman, 2008; Ojala, 2012a, 2012b, 2015). Most relevant for the present study, hope has been described as having a direct role in motivating youth's positive behavior and maintaining engagement in self-development or societal issues (Bishop & Willis, 2014; Hicks, 2014; Ojala, 2012a, 2012b, 2015). Nevertheless, possibly reflecting a dual role of hope, high hope can also be founded on disbelief in the seriousness of world events, as well as being associated with disengagement and inaction (e.g., Gifford, 2011; Ojala, 2012a, 2015). In the present study, we asked adolescents to report not only their level of worry and anger, but also their hope, about each of six pressing global issues for youth. We expected that using a person-oriented analysis (cluster analysis) of worry, anger, and hope would identify a subgroup of adolescents with high hope plus high worry and anger, but another subgroup with high hope combined with low worry and anger.

We also asked adolescents about six different target issues, expecting that worry, anger, and hope about one issue may not necessarily align with emotions about other issues. During early and middle adolescence (age 10–16 years), young people are developing the capacity to manage complex viewpoints and consider specific areas of interest or concern (Sameroff, 2010). At the same time, adolescents can also be susceptible to peer influence and media pressures (Nesi et al., 2018; Steinberg & Morris, 2001). Thus, major world issues in some arenas that attract more youth attention (and perhaps activism), such as the health of the planet, could be especially gripping for some, but other issues may be less so for the same adolescents. For these reasons, we examined adolescents with different patterns of worry, anger, and hope across six world and future issues. Expecting that adolescents would also be differentiated by the issues of most concern and least hope, we refer to the groups of adolescents that emerged from our cluster analysis as *clusters of concern*; these clusters were expected to differ in their pattern of worry, anger, and hope *and* what they felt most strongly about.

3 | CLUSTERS OF CONCERN: RELATIONS WITH COPING AND PERSONAL ADJUSTMENT

Previous research suggests that considering adolescents worry, anger, and hope should reveal differences in ways of coping and personal adjustment, such as the extent to which they take action to address these issues or show signs of inaction. For example, in two studies (Ojala, 2012b, 2015), two forms of hope (constructive hope vs. hope based on denial) about climate change were identified. These forms of hope suggested to us that hope will not always be in opposition to negative emotions and that there may be individual differences in emotion profiles about world crises. In addition, constructive hope (but not hope based on denial) had positive associations with proenvironmental action and self-efficacy. Therefore, we expected that hope coupled with some feelings of worry and anger (indicative of less denial of pending crises) could lead to active coping responses, such as taking action to drive change. However, hope without some worry and anger could help to identify adolescents low in active coping (i.e., inaction). Also, worry and anger without much hope may yield high avoidance coping. Research on coping with climate change supports these expected associations (Ojala, 2012a, 2012c) and suggests that coping responses can be either approach/engagement oriented (i.e., taking action and problem-solving) or avoidance/disengagement oriented (e.g., concealment, minimization). In addition, we considered personal adjustment, measured as depressive

symptoms and life satisfaction, expecting that better adjustment would align with more active coping and less avoidant coping, consistent with past research (Compas et al., 2017; Connor-Smith et al., 2000).

4 | THE CURRENT STUDY

In summary, we used cluster analysis to identify adolescents in different clusters of concern from their reports of worry, anger, and hope about six crises that they could face in the future. We then compared the clusters on their active and avoidant ways of coping, and relatedly their personal adjustment—measured as depressive symptoms and life satisfaction. Although it was difficult to make specific hypotheses based on the available previous research, we did expect that:

- H1: At least one cluster of adolescents would show a profile of high worry, anger, and hope about future crises suggesting a balance between concern and hope.
- H2: A second cluster would be more hopeful with low worry and anger.
- H3: Clusters will differ by issues of concern, particularly identifying worry and anger about the planet as more salient for some youth.
- H4: Adolescents in profiles characterized by high hope relative to other profiles would report the most optimal coping responses (high active coping and low avoidant coping) and personal adjustment.

5 | METHOD

5.1 | Participants

The participants were 863 Australian late primary (grades 5 and 6) and secondary (grades 7–10) school students ($M_{\text{age}} = 12.2$, standard deviation [SD] = 1.72, age 10–15 years) recruited from eight schools (429 boys, 423 girls, and 11 nonbinary/other). Adolescents could tick multiple items to indicate their race/ethnicity and/or their place of birth (Australia, New Zealand, or other). Sixteen (1.8%) did not report their race/ethnicity or their place of birth, and 264 (30.6%) reported their place of birth but did not report race/ethnicity. Among all participants, about one-half (47%) reported white Australian, 6% instead or in addition ticked Asian, 4% instead or in addition ticked Australian First Peoples/Torres Strait Islander or Pacific Islander, 29% reported other and gave a written description of their backgrounds. Just over one-half (56%) reported their birthplace as Australia and another 6% reported New Zealand.

5.2 | Measures

5.2.1 | Worry, anger, and hope about the planet and life in the future

Adolescents reported their worry, anger, and hope about six pressing issues that could affect the planet and their future opportunities: (1) The future of the planet and the people/animals on it (planet); (2) getting a good job in the future (job); (3) having the money needed to be okay on my own or with a family in the future (money); (4) being able to live where I want to in the future (live); (5) technology (e.g., robots) and AI taking over my life (computers); and (6) being safe in the future (safety). Participants reported how worried, angry, and hopeful they felt in the past year on a scale from 1 (*No! not at all true for me*) to 7 (*Yes! Totally true for me*). For topic five (AI), only worry and anger were analyzed, given a floor effect for hope.

To examine commonality of emotions measured across the six issues, a factor analysis was conducted with the items (17 items; worry, anger, and hope about planet, job, money, live, and safety, as well as worry and anger about computers). Given that our questions about emotions related to six different world issues were designed to capture a smaller set of distinguishable (but correlated) latent constructs (each indicated by multiple intercorrelated items), we used principal axis factoring to identify possible factors for extraction and an oblique method of rotation (direct oblimin) (Fabrigar & Wegener, 2012). Using these methods of extraction and rotation, five factors were extracted with eigenvalues of 5.08, 3.17, 1.55, 1.21, and 1.02, with the factors accounting for 70.8% of the variance in the items. The first factor had high loadings for worry about job, money, live, and safety (four items); loadings ranged from 0.67 to 0.81. The second factor had high loadings for all hope items (five items); loadings ranged from 0.48 to 0.85 (the lowest loading was for hope about the future of the planet, so it was kept as a separate indicator from hope about job, money, live, and safety to parallel the separate factors for worry and anger—see below). The third factor had high loadings for worry and anger about technology (two items), with loadings of 0.86 and 0.89, respectively. The fourth factor had high loadings for anger about job, money, live, and safety (four items), with loadings from 0.39 to 0.83. Finally, the fifth factor had high loadings for worry and anger about the future of the

planet (two items), with loadings of 0.77 and 0.72, respectively. Only two items had cross-loadings of 0.20 and 0.29 on a second factor; thus, all items loaded highly on one factor only.

Based on the results of the factor analysis, subscales were formed by averaging the items that showed high loadings on one of the six factors. These six measures are referred to here as *future stability worry* (four items, Cronbach's $\alpha = .85$), *future stability hope* (four items, Cronbach's $\alpha = .85$), *technology concerns* (two items, Cronbach's $\alpha = .87$), *planet concerns* (two items, Cronbach's $\alpha = .76$), *future stability anger* (four items, Cronbach's $\alpha = .81$), and the single item *planet hope*.

5.2.2 | Ways of coping

Guided by the Motivational Theory of Coping (Skinner & Wellborn, 1994; Skinner et al., 2003) and other measures of adolescent coping (Compas et al., 2017; Connor-Smith et al., 2000), two active and five avoidant ways of coping were measured. The active ways of coping (Cronbach's $\alpha = .65$) included problem-solving (*think about ways to keep it from happening*), and taking action (*get active or involved to try to change it*). The avoidant ways of coping (Cronbach's $\alpha = .69$) included surrender (*feel or say that it's too hard or just unfair*), confusion (*feel unsure about what to do*), minimization (*say or feel like you don't want to care about it*), concealment (*don't let anybody know how you feel*), and rumination (*keep thinking about it over and over*). Response option ranged from 1 (*I do not do this at all or I do it a little*) to 4 (*so much! I do this all the time*). Relevant responses were averaged to form total scores for active and avoidant coping.

5.2.3 | Personal adjustment

Depressive symptoms and life satisfaction were measured with items from the Children's Depression Inventory (Kovacs, 1985; *I feel sad*) and the Student Life Satisfaction Scale (Huebner, 1991; e.g., *My life is going well*), respectively. Responses options ranged from 1 (*No! Not at all true for me*) to 6 (*Yes! Totally true for me*). Item responses were averaged to form a total score for depressive symptoms, Cronbach's $\alpha = .90$, and a total score for life satisfaction, Cronbach's $\alpha = .88$, respectively.

5.3 | Procedure

The present study was approved by the Griffith University Human Research Ethics Committee (protocol 2019/178) before contacting schools. Local schools were contacted via email and telephone and the first two consenting secondary schools were included in the study, and then all their feeder primary schools were also included. One additional secondary school participated, selecting to survey one classroom in each of grades 7, 8, 9, and 10. These eight schools were all located in an urban area and each school attracted students from all income brackets. School reported 14%–29% of the student population within the lowest income quartile, and 4%–30% within the highest income quartile. The proportion of students in each school who usually spoke a language other than English at home ranged from 5% to 29%.

Students were eligible for the study if they were in grades 5–10 at one of these eight schools, and students took consent forms home to their parents for completion and returned them to the school. Across seven schools (excluding the additional secondary school where only a few classrooms participated), 52% of students returned consent forms to the school and, of these, 80% of parents gave informed consent for participation. All consent processes were conducted in the schools in 2019 and 2020, before national pandemic stay-at-home (SAH) orders in early 2020. In 2019, questionnaires were completed by 356 students in their regular classrooms. However, in 2020, COVID sparked a shift to one-on-one online data collection with data collected from 248 students under SAH orders (while school continued online). The remaining 259 students completed the questionnaire online from home in 2020 after classroom teaching started again, but schools did not allow researchers to attend in person. The portions of the survey included in this study were completed in approximately 30 min. Each student received a small gift for their participation.

5.4 | Data analyses

Twenty students (2.3%) did not complete one of the worry, anger, or hope items for one issue (no student missed more than one item across all issues) and six students (0.7%) did not complete up to six coping or personal adjustment items. Little's Test for Missing Completely at Random (MCAR) confirmed that these items were MCAR ($p = .99$). Given minimal missing data and missing values completely at random, we replaced missing values with the mean of the completed items on a measure for the person to maintain all 863 participants in all analyses.

We first describe levels of worry, anger, and hope across the six issues. Next, to identify clusters of concern based on worry, anger, and hope and what students were concerned and/or hopeful about, we subjected the six subscale scores described above (i.e., future stability worry, future stability anger, planet concern, technology concern, future stability hope, and planet hope) to cluster analysis. After identifying four clusters of concern (see below), 4 (cluster) \times 3 (COVID data collection timing) analysis of covariances (ANCOVAs) (with age and gender as covariates) were used to determine between-cluster differences in adolescents' active and avoidant coping, depressive symptoms, and life satisfaction. Given three gender groups (boys, girls, and other/nonbinary), the data were analyzed in four ways. First, all participants were included in the analyses and gender was coded 1 = boy, 2 = girl, 3 = other/nonbinary. Second, the other/nonbinary students were combined with the boys (1 = boy or other/nonbinary, 2 = girl). Third, the other/nonbinary students were combined with the girls (1 = boy, 2 = girl or other/nonbinary). Fourth, the other/nonbinary students were excluded. The four sets of analyses did not reveal any meaningful differences for the comparisons of the clusters of concern, so the first analyses with three gender groups are reported below.

6 | RESULTS

6.1 | Descriptive statistics

Means and SDs for all measures are shown in Table 1. Paired *t*-tests showed that students were less positive about the planet than about other issues. Hope for the planet (planet hope) was lower than the composite score for hope about safety, jobs, income, and housing (future stability hope), paired $t(862) = 14.88$, $p < .001$, whereas concern about the planet (planet concern) was higher than worry or anger about safety, jobs, income and housing (future stability worry and anger), paired $t(862) = 4.90$ and 30.01 , respectively, both $p < .001$. Technology (AI) concern fell in-between.

6.2 | Cluster identification and description

We followed best practice recommendations for cluster analysis (Gore, 2000). Before using a 2-step clustering procedure, the data file was ordered randomly and standardized z-scores were computed for the six measures (future stability worry, future stability anger, planet concern, technology concern, future stability hope, and planet hope) entered into the analysis. In the first analytic step, a hierarchical cluster analysis using Ward's method of squared Euclidian distances was undertaken. Evaluation of Schwarz's Bayesian criterion (BIC) indicated a five-group cluster as the best fit (BIC for three clusters = 2922.67, for four clusters = 2786.21, and for five clusters = 2693.73). The BIC change was very small after five clusters. Thus, in the second step, we conducted an iterative k-means clustering procedure specifying three, four, or five clusters. These cluster groups were compared for theoretical meaningfulness, parsimony, and explanatory power (Milligan & Cooper, 1985). A four-cluster solution was accepted, as the five-cluster solution, although producing good-sized clusters (100+ adolescents in each cluster), generated an additional cluster that was a derivation of a cluster already in the four-cluster solution; hence, it was not theoretically meaningful.

TABLE 1 Means and SDs of all measures ($N = 863$).

| Measure | Mean | SD |
|---|------|------|
| Future stability (job, money, live, and safety) worry | 3.26 | 1.70 |
| Future stability (job, money, live, and safety) anger | 1.76 | 1.11 |
| Future stability (job, money, live, and safety) hope | 5.04 | 1.52 |
| Technology concern (worry and anger) | 3.03 | 2.02 |
| Planet concern (worry and anger) | 3.57 | 1.82 |
| Planet hope | 4.09 | 1.93 |
| Active coping | 2.08 | 0.81 |
| Avoidant coping | 1.96 | 0.65 |
| Depressive symptoms | 2.44 | 1.50 |
| Life satisfaction | 4.11 | 1.21 |

Note: Worry, anger, and hope scores ranged from 1 to 7. Possible range for ways of coping was 1–4; other measures ranged from 1 to 6. Abbreviation: SD, standard deviation.

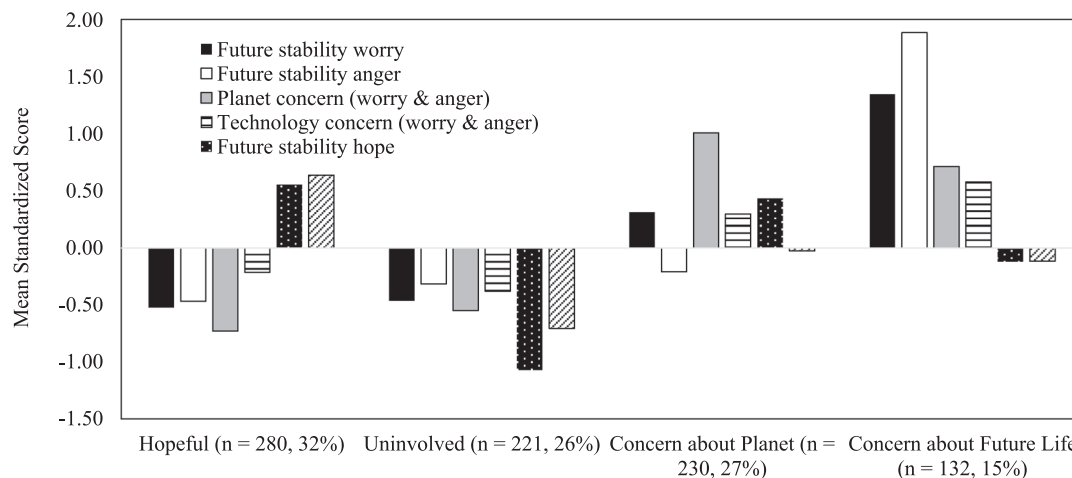


FIGURE 1 Illustration of mean levels of standardized scores for worry, anger, and hope composite scores for each of the four identified clusters of concern.

TABLE 2 Results of ANCOVAs comparing clusters of adolescents differentiated by their worry, anger, and hope about future crises ($N = 863$).

| Measure | Mean (SD) | | | | F (3, 849) | p Value | Effect size, η^2 |
|---------------------|-------------------------------|----------------------------------|--|---|-----------------|-----------|-----------------------|
| | Hopeful ($n = 280$, 32%) | Uninvolved ($n = 221$, 26%) | Concerned about the planet ($n = 230$, 27%) | Concerned about future life ($n = 132$, 15%) | | | |
| Active coping | 2.00 (0.80) ^b | 1.81 (0.69) ^a | 2.32 (0.82) ^c | 2.08 (0.81) ^b | 14.75 | <.001 | 0.05 |
| Avoidant coping | 1.72 (0.56) ^a | 1.83 (0.62) ^a | 2.09 (0.58) ^b | 2.48 (0.66) ^c | 48.47 | <.001 | 0.15 |
| Depressive symptoms | 1.79 (1.14) ^a | 2.38 (1.36) ^b | 2.58 (1.45) ^b | 3.69 (1.66) ^c | 46.27 | <.001 | 0.14 |
| Life satisfaction | 4.65 (1.04) ^c | 3.90 (1.12) ^b | 4.13 (1.19) ^b | 3.28 (1.14) ^a | 39.63 | <.001 | 0.13 |

Note: SAH order status (before, during, after) was included as a fixed effect. Covariates in each model were age and gender (1 = boy, 2 = girl, 3 = other/nonbinary). Possible range for coping composites was 1–4. Other measures ranged from 1 to 6. Values with different superscripts are significantly different, $p < .05$. No Cluster \times SAH term was significant. Details are not reported in this table, but SAH group differences were found for all measures: Depressive symptoms were lowest and life satisfaction was highest in the group who completed surveys online during SAH, and symptoms were highest and life satisfaction lowest in those who completed surveys after COVID SAH orders had been lifted and school was back to in-person.

Abbreviations: ANCOVA, analysis of covariance; SAH, stay-at-home; SD, standard deviation.

Figure 1 illustrates the four *clusters of concern* derived from these analyses. The largest cluster of *Hopeful* adolescents ($n = 280$, 32%) stood out with high hope but low concern. The second cluster, *Uninvolved*, was comprised of 221 adolescents (26%) who reported low levels of concern and very low hope (especially for future life) across all issues. The final two clusters reported high concern but were differentiated by what they were concerned about. One cluster of adolescents was *Concerned about the Planet*, reporting high concern but low hope about the planet; although they also showed less concern and more hope about the stability of life in the future ($n = 230$, 27%). The other cluster of adolescents was *Concerned about Future Life* ($n = 132$, 15%), reporting high concern about future stability (money, job, living, and safety), with more moderate concern about the planet and lower than average hope across all issues.

6.2.1 | Cluster differences in ways of coping and personal adjustment

Of greatest interest were analyses examining whether adolescents in different clusters of concern differed in ways of coping and personal adjustment. Table 2 summarizes the results of ANCOVAs comparing adolescents in the clusters of concern (as well as the three SAH groups), adjusting for age and gender. There were no significant cluster of concern \times SAH status interactions. Thus, only main effects of cluster of concern are interpreted here (see Table 2 for a description of SAH group differences). First, adolescents in the Concerned about the Planet and Concerned about Future Life clusters were higher in both active and avoidant ways of coping relative to the Hopeful and/or Uninvolved clusters. The effect size for active coping was medium ($\eta^2 = 0.05$) and was large for avoidant coping ($\eta^2 = 0.15$; Cohen, 1988). In addition, the Concerned about the

Planet cluster of adolescents was (1) highest in active coping relative to all other clusters and (2) lower in avoidant coping than the Concerned about Future Life cluster.

Personal adjustment also differed between clusters (see Table 2). The effect sizes were large for both depression ($\eta^2 = 0.14$) and life satisfaction ($\eta^2 = 0.13$; Cohen, 1988). The Concerned about Future Life cluster was highest in depressive symptoms and lowest in life satisfaction relative to the other three clusters. The Hopeful cluster had the opposite pattern: the lowest depressive symptoms and highest life satisfaction. The Uninvolved and Concerned about the Planet clusters were moderate on both personal adjustment measures.

7 | DISCUSSION

Young people face multiple future threats and challenges, but they also have access to more information than ever before, which implies easier access to opportunities to voice their views and get involved in political, climate, and other actions. In the current study, we compared adolescents' reports of their concerns and hope about six major issues facing them in the future and used cluster analysis to identify groups of adolescents who differed in their concerns (worry, anger) and hope about these issues. Overall, adolescents were most worried and angry about the planet relative to their future jobs, safety, money, and housing opportunities. Nevertheless, this pattern was not uniform across all adolescents and four distinct clusters of adolescents were identified—Hopeful (32% of adolescents), Uninvolved (26%), Concerned about the Planet (27%), and Concerned about Life (15%). The first two clusters, Hopeful and Uninvolved, were differentiated by their general pattern of worry, anger, and hope across all issues. The second two clusters, Concerned about the Planet and Concerned about Life, were differentiated by focal issues of concern. In addition, the four clusters of adolescents differed in their ways of coping and personal adjustment (measured as depressive symptoms and life satisfaction).

By identifying particular configurations of concern and hope related to global and future stressors, several notable patterns emerged. First, the Hopeful cluster of adolescents was largest (32% of adolescents) pointing to a general positivity among a significant proportion of youth; finding this group of adolescents supports previous research that has found a substantial proportion who are high in hopefulness and optimism about global and future issues (Bishop & Willis, 2014; Hicks, 2014; Ojala, 2012a; Sanson & Belleomo, 2021). In addition, consistent with hope theory and past research on hope (Snyder, 2002; Snyder et al., 1997; Valle et al., 2004), hopeful adolescents had the most positive personal adjustment. Adolescents in the second largest cluster, Concerned about the Planet, differed from Hopeful adolescents on coping and personal adjustment; they reported more active coping (e.g., more problem-solving and direct action in response to these issues) but were poorer in adjustment. These findings suggest that concerns about the planet are motivating action but personal adjustment can be negatively affected (see Ojala, 2013; Verplanken & Roy, 2013).

Another notable pattern of findings relates to the Uninvolved and Concerned about Future Life clusters. Adolescents belonging to these clusters reported less coping relative to the Hopeful and Concerned about the Planet cluster of adolescents. Nevertheless, adolescents classified as Uninvolved, which included roughly a quarter of participants who were low in anger and worry but also had a very low level of hope across all issues, reported better personal adjustment (fewer depressive symptoms and higher life satisfaction) than adolescents classified as Concerned about Future Life. This pattern suggests that it is high concern about future prospects (not the very lowest level of hope) that identifies adolescents at risk of adjustment problems. However, low levels of coping and use of avoidant coping could reveal low motivation and the potential for increasing adjustment problems in the Uninvolved cluster of adolescents (Li & Lerner, 2011; Skinner & Zimmer-Gembeck, 2016; Skinner et al., 2009). Thus, adolescents in both the Uninvolved and Concerned about Future Life clusters may be at risk of future adjustment problems.

It is also worth noting that across the four derived clusters, coping, in general, was more pronounced when concerns (worries and anger) were high (i.e., Concerned about the Planet, Concerned about Future Life). This suggests a positive association between negative emotionality and coping responses, as has been found in previous studies of adolescents focused on microsocial stressors (see Gardner et al., 2022 for a review; Zimmer-Gembeck et al., 2013). Nonetheless, the level of coping was only low to moderate across all clusters, perhaps suggesting that young people may not identify the ways of coping measured here as that useful for modifying their emotions or the stressful events they were asked about. These findings also suggest that young people could benefit from assistance with their coping responses to better regulate negative emotions, increase constructive hope, and actively engage with the problems they perceive in the world and related to their futures.

8 | STUDY LIMITATIONS

This study had limitations that should be considered when interpreting and generalizing the findings. First, the study had a cross-sectional design; thus, the direction of the tested associations is unclear. Second, although we expanded on past research that has generally queried young people about their worries in one domain at a time, we focused on only worry,

anger, and hope with individual items for each of only six domains. Future research would benefit from consideration of additional emotions such as guilt (see Kleres & Wettergren, 2017) as well as different forms of hope (Ojala, 2015). Third, we did not have individual-level details on family socioeconomic status, which could relate to adolescents' concerns and hopes (e.g., see Bishop & Willis, 2014; Vassallo & Swami, 2018). Fourth, although current findings are consistent with past research, cluster analysis is a data-driven approach and different subgroups might be identified in a study conducted in a different region or with different measures. Further, the measures included in the cluster analysis were derived from exploratory factor analysis. We encourage confirmation of the factor structure with a distinct sample in future research. Thus, although the concerns these adolescents expressed about the planet were comparable to (or even lower than) past research (e.g., Hickman et al., 2021), it is possible that our findings might differ if replicated in a different region, historical time, or age group.

9 | CONCLUSION

In summary, in this study, adolescents reported more concern and less hope about the planet than about their future money, jobs, living, and safety or technology and AI. When we characterized adolescents (age 10–16 years) by their concerns (worry, anger) and hope across these six issues they will face in the future, which we referred to as *clusters of concern*, just over 40% of adolescents in grades 5–10 reported elevated concern about the future of the planet (27%) or about their future life prospects related to work, finances, and safety (15%). At the same time, a substantial minority of adolescents (32%) were Hopeful, reporting high hope (and low worry and anger) across all global and future stressors. Overall, adolescents in the Hopeful cluster reported better personal adjustment (low depression and high life satisfaction). However, although not as well-adjusted as Hopeful adolescents, those in the Concerned about the Planet cluster were the most active copers. Students Concerned about Future Life, as well as those Uninvolved across the six issues (who reported low worry, anger, and hope across all stressors, 26%), showed little or more avoidant coping. Yet, despite having the least hope of any cluster, adolescents in the Uninvolved cluster showed better personal adjustment relative to adolescents who were in the Concerned about Future Life cluster, and Concern about Future Life adolescents had the most problematic pattern overall. Notable research questions to address in the future are how youth in different clusters of concern change in coping and adjustment over time, and how different clusters of concern differ in their civic involvement and their plans for the future.

AUTHOR CONTRIBUTIONS

Melanie J. Zimmer-Gembeck developed the study, performed data analyses, interpreted findings, and produced the paper. All authors contributed to study design. Data collection was led by Tanya Hawes. Other authors provided critical revisions. All authors approved the final version of the manuscript for submission.

ACKNOWLEDGMENTS

Financial support for this research was provided by an Australian Research Council Discovery Project grant (DP170102547) led by the first author. The authors thank the many undergraduate and postgraduate research assistants who were critical to data collection. Open access publishing facilitated by Griffith University, as part of the Wiley - Griffith University agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to report.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The study was approved by Griffith University Human Research Ethics Committee (GU Ref No: 2019/178). The study was carried out in accordance with the World Medical Association Declaration of Helsinki.

ORCID

Melanie J. Zimmer-Gembeck  <http://orcid.org/0000-0001-9100-010X>

REFERENCES

- Bishop, E. C., & Willis, K. (2014). 'Without hope everything would be doom and gloom': Young people talk about the importance of hope in their lives. *Journal of Youth Studies* 17(6), 778–793. <https://doi.org/10.1080/13676261.2013.878788>
- Brown, S. L., Teufel, J. A., Birch, D. A., & Kancherla, V. (2006). Gender, age, and behavior differences in early adolescent worry. *Journal of School Health*, 76(8), 430–437. <https://doi.org/10.1111/j.1746-1561.2006.00137.x>

- Buijzen, M., Walma van der Molen, J. H., & Sondij, P. (2007). Parental mediation of children's emotional responses to a violent news event. *Communication Research*, 34(2), 212–230. <https://doi.org/10.1177/0093650206298070>
- Burke, S. E. L., Sanson, A. V., & Van Hoorn, J. (2018). The psychological effects of climate change on children. *Current Psychiatry Reports*, 20, 35. <https://doi.org/10.1007/s11920-018-0896-9>
- Caporino, N. E., Exley, S., & Litzman, R. D. (2020). Youth anxiety about political news. *Child Psychiatry & Human Development*, 51, 683–698. <https://doi.org/10.1007/s10578-020-00972-z>
- Carver, C. S., & Scheier, M. F. (1999). Optimism. In C. R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 182–204). Oxford University Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge.
- Compas, B. E., Jaser, S. S., Bettis, A. H., Watson, K. H., Gruhn, M. A., Dunbar, J. P., Williams, E., & Thigpen, J. C. (2017). Coping, emotion regulation, and psychopathology in childhood and adolescence: A meta-analysis and narrative review. *Psychological Bulletin*, 143(9), 939–991. <https://doi.org/10.1037/bul0000110>
- Connor-Smith, J. K., Compas, B. E., Wadsworth, M. E., Thomsen, A. H., & Saltzman, H. (2000). Responses to stress in adolescence: measurement of coping and involuntary stress responses. *Journal of Consulting and Clinical Psychology*, 68(6), 976–992. <https://doi.org/10.1037//0022-006X.68.6.976>
- Fabrigar, L., & Wegener, D. (2012). *Exploratory factor analysis*. Oxford University Press. <https://doi.org/10.1093/acprof:osobl/9780199734177.001.0001>
- Folkman, S. (2008). The case for positive emotions in the stress process. *Anxiety, Stress, and Coping*, 21(1), 3–14. <https://doi.org/10.1080/10615800701740457>
- Gardner, A. A., Zimmer-Gembeck, M. J., & Skinner, E. A. (2022). Coping skills. In B. Halpern-Felsher & A. Epperson (Eds.), *The encyclopedia of child and adolescent health: Cognitive and psychosocial development*. Elsevier. <https://doi.org/10.1016/B978-0-12-818872-9.00029-7>
- Gifford, R. (2011). The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290–302. <https://doi.org/10.1037/a0023566>
- Gore, Jr., P. A. (2000). Cluster analysis. In H. E. A. Tinsley & S. D. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling* (pp. 297–321). Academic Press. <https://doi.org/10.1016/B978-012691360-6/50012-4>
- Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health*, 5(12), e863–e873. [https://doi.org/10.1016/S2542-5196\(21\)00278-3](https://doi.org/10.1016/S2542-5196(21)00278-3)
- Hicks, D. (2014). *Educating for hope in troubled times. Climate change and the transition to a post-carbon future*. Trentham Books.
- Huebner, E. S. (1991). Initial development of the student's life satisfaction scale. *School Psychology International*, 12(3), 231–240. <https://doi.org/10.1177/0143034391123010>
- Kleres, J., & Wettergren, Å. (2017). Fear, hope, anger, and guilt in climate activism. *Social Movement Studies*, 16(5), 507–519. <https://www.tandfonline.com/doi/abs/10.1080/14742837.2017.1344546>
- Kovacs, M. (1985). The children's depression inventory (CDI). *Psychopharmacology Bulletin*, 21, 995–998. <https://doi.org/10.1002/da.20059>
- Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology*, 47, 233–247. <https://doi.org/10.1037/a0021307>
- Milligan, G. W., & Cooper, M. C. (1985). An examination of procedures for determining the number of clusters in a data set. *Psychometrika*, 50(2), 159–179. <https://doi.org/10.1007/BF02294245>
- Nesi, J., Choukas-Bradley, S., & Prinstein, M. J. (2018). Transformation of adolescent peer relations in the social media context: Part 2—Application to peer group processes and future directions for research. *Clinical Child and Family Psychology Review*, 21(3), 295–319. <https://doi.org/10.1007/s10567-018-0262-9>
- Ojala, M. (2012a). Regulating worry, promoting hope: How do children, adolescents, and young adults cope with climate change? *International Journal of Environmental and Science Education*, 7(4), 537–561.
- Ojala, M. (2012b). Hope and climate change: The importance of hope for pro-environmental engagement among young people. *Environmental Education Research*, 18(5), 625–642.
- Ojala, M. (2012c). How do children cope with global climate change? Coping strategies, engagement, and well-being. *Journal of Environmental Psychology*, 32(3), 225–233. <https://doi.org/10.1016/j.jenvp.2012.02.004>
- Ojala, M. (2013). Coping with climate change among adolescents: Implications for subjective well-being and environmental engagement. *Sustainability*, 5(5), 2191–2209.
- Ojala, M. (2015). Hope in the face of climate change: Associations with environmental engagement and student perceptions of teachers' emotion communication style and future orientation. *The Journal of Environmental Education*, 46(3), 135–148. <https://doi.org/10.1080/00958964.2015.1021662>
- Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, 81(1), 6–22. <https://doi.org/10.1111/j.1467-8624.2009.01378.x>
- Sanson, A., & Bellema, M. (2021). Children and youth in the climate crisis. *BJPsych Bulletin*, 45(4), 205–209. <https://doi.org/10.1192/bjb.2021.16>
- Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, 129(2), 216–269. <https://doi.org/10.1037/0033-2909.129.2.216>
- Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, 69(3), 493–525. <https://doi.org/10.1177/0013164408323233>
- Skinner, E. A., & Wellborn, J. G. (1994). Coping during childhood and adolescence: A motivational perspective. In D. Featherman, R. Lerner, & M. Perlmutter (Eds.), *Life-span development and behavior* (Vol. 12, pp. 91–133). Erlbaum.
- Skinner, E. A., & Zimmer-Gembeck, M. J. (2016). *The development of coping from birth to emerging adulthood: Neurophysiological and social underpinnings, qualitative shifts, and differential pathways towards psychopathology and resilience*. Springer.
- Snyder, C. R. (2002). Target article: Hope theory: Rainbows in the mind. *Psychological Inquiry*, 13(4), 249–275. <https://www.jstor.org/stable/1448867>
- Snyder, C. R., Hoza, B., Pelham, W. E., Rapoff, M., Ware, L., Danovsky, M., Hightberger, L., Ribinstein, H., & Stahl, K. J. (1997). The development and validation of the children's hope scale. *Journal of Pediatric Psychology*, 22(3), 399–421. <https://doi.org/10.1093/jpepsy/22.3.399>
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology*, 52, 83–110. <https://doi.org/10.1146/annurev.psych.52.1.83>
- Valle, M. F., Huebner, E. S., & Suldo, S. M. (2004). Further evaluation of the children's hope scale. *Journal of Psychoeducational Assessment*, 22(4), 320–337. <https://doi.org/10.1177/073428290402200403>
- Vassallo, S., & Swami, N. (2018). Tweens and trends: What do they worry about? In *Longitudinal Study of Australian Children, Annual Statistical Report 2018* (Chap. 12), 133–142. <https://growingupinaustralia.gov.au/research-findings/annual-statistical-reports-2018/tweens-and-teens-what-do-they-worry-about>

- Verplanken, B., & Roy, D. (2013). 'My worries are rational, climate change is not': Habitual ecological worrying is an adaptive response. *PLoS ONE*, 8, e74708. <https://doi.org/10.1371/journal.pone.0074708>
- Zimmer-Gembeck, M. J., Skinner, E. A., Morris, H., & Thomas, R. (2013). Anticipated coping with interpersonal stressors: Links with the emotional reactions of sadness, anger, and fear. *The Journal of Early Adolescence*, 33(5), 684–709. <https://doi.org/10.1177/0272431612466175>

How to cite this article: Zimmer-Gembeck, M. J., Modecki, K., Duffy, A. L., Hawes, T., Farrell, L. J., Waters, A. M., Gardner, A. A., Shum, D., & Skinner, E. A. (2023). A pattern-centered analysis of adolescents' concerns and hopes about future crises: Differences in ways of coping and personal adjustment. *Journal of Adolescence*, 95, 1195–1204. <https://doi.org/10.1002/jad.12194>