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Original article

## Using Time-Varying Effect Modeling to Examine Age-Varying Gender Differences in Coping Throughout Adolescence and Emerging Adulthood

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 A B S T R A C T

**Purpose:** Little is known about how and when coping trajectories differ between males and females. The current study aimed to examine gender differences in the use of specific coping strategies across developmental ages using time-varying effect modeling (TVEM) in a large, diverse community sample.

**Methods:** A longitudinal study following adolescents across 4 years of high school and 5 years post graduation (N = 1,251) was combined with a nationally representative cross-sectional study of 18- to 22-year-olds (N = 595) to examine changes in gender differences in the use of coping strategies between ages 13 and 25. The same coping questionnaire was administered to both samples. TVEM was used to examine the age-varying prevalence rates of coping in males and females.

**Results:** Gender differences were greatest during middle-to-late adolescence (15–19 years) for active coping, social support seeking, planning, and venting emotions. Females reported greater use of these strategies than males, but males' use increased over time and became equivalent to females after the age of ~19–20. Gender differences in the use of humor did not emerge until the age of 22, at which point the use of humor increased continuously among males but remained stable among females. The use of denial was fairly stable across time, with no gender differences at any age.

**Conclusions:** Findings highlight the utility of TVEM for advancing our knowledge on gender and coping across developmental time, as males and females used coping strategies at differing rates throughout adolescence and emerging adulthood. Implications for tailoring gender- and age-specific intervention efforts to improve coping and related health behaviors are discussed.

**IMPLICATIONS AND CONTRIBUTION**

This study used time-varying effect modeling to examine dynamic developmental shifts in the use of coping strategies across the ages of 13–25. Gender differences in coping strategies fluctuated throughout development, highlighting potential avenues for tailoring intervention efforts. Findings underscore the utility of time-varying effect modeling for enhancing knowledge on coping behaviors across developmental time.

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**Contributions:** K.F. and A.V. conceptualized the aims and hypotheses for the study and conducted analyses. K.F. took primary responsibility for drafting the manuscript text and figures. A.V. assisted with drafting the manuscript. C.O. designed the original studies as principal investigator, collected the data, and provided feedback on the conceptual direction and text of the manuscript. All authors approved the final article.

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Coping is defined as intentional, effortful strategies used to regulate stress [1]. In addition to helping to prevent the many negative physiological health risks associated with stress, the use of effective coping strategies has been shown to protect against the development of both psychological and physical health problems [1–3]. Despite the health benefits associated with effective coping, there has been little consensus regarding the most theoretically and empirically appropriate method to discriminate among coping strategies [4,5]. Common conceptualizations of coping have involved broad dimensions, including two-factor models (e.g., problem-focused vs. emotion-focused, approach vs. avoidance [6,7]) and three-factor structures (e.g., active, internal, and avoidant [8,9]). Broad coping dimensions serve as good organizational principles to characterize overarching stress responses, but fail to capture the complexity of the subtypes of coping strategies that may differ markedly in their intentions, actions, and effects. As such, some researchers have recommended examining individual coping strategies separately to allow for more nuanced distinctions and understanding of developmental processes [5].

The ability to cope with stressors is crucial to daily functioning, psychological adjustment, and physical health [1,10]. Learning to utilize effective coping strategies is a central task of adolescence and emerging adulthood [5]. Coping strategies are in constant flux throughout development as a result of changes in the nature of stressors and the extent of resources available (e.g., biological maturity, executive functioning, emotion regulation capabilities, and social context [4,11]). A small number of studies have found decreases in the use of avoidant and emotion-focused strategies, increases in active and problem-focused strategies, and stable use of social support seeking from adolescence to adulthood [11–14]. Some studies have examined age differences in more specific individual coping strategies, but have focused only on children and adolescents (e.g., see References 15 and 16) and have not evaluated developmental differences between adolescents and adults.

Although gender differences in the use of coping strategies have been observed during adolescence and emerging adulthood (e.g., see References 15, 17, and 18), because of the many different conceptualizations and assessments of coping, the literature on gender differences in adolescents' and emerging adults' dispositional use of coping strategies is difficult to interpret. For instance, some studies found that males reported greater use of problem-focused strategies and active coping than females, whereas females tended to report using more emotion-focused strategies and demonstrated greater reliance on social support [15,19,20]. However, others have found no gender differences or even the opposite, with females using multiple strategies at greater rates than males, including active coping [2,17,21,22]. Gelhaar et al. [15] posited that gender differences may be more apparent when considering specific individual coping strategies than when considering broader coping dimensions, prompting the need for additional work.

It is possible that gender differences in specific coping strategies may emerge more consistently when developmental factors are considered. The literature has been neither consistent nor integrated enough across ages to present a truly developmental perspective on coping [5]. It remains unclear as to *when* gender differences in coping emerge and *how* these differences change across developmental ages. Preliminary evidence has suggested that the presence of gender differences in active coping, in avoidant coping, and in support seeking may differ as a function of age, although the nature of these differences was difficult

to discern because of mixed findings [11,15,23]. Methodological differences in how age groups have been defined across studies may account for the lack of consistency. For example, Gelhaar et al. [15] operationalized early (11–13 years), middle (14–16 years), and late adolescent (17–21 years) age groups, whereas Amirkhan and Auyeung [11] created age groups defined as preteen (9–12 years), early teen (13–15 years), late teen (16–19 years), and young adult (20–29 years). Not only do these studies assess different age ranges in their groups, but also these studies impose artificial constraints on the continuous construct of age in the creation of such groups. Furthermore, the use of imposed age groups may mask the emergence and the disappearance of gender differences that occur within or across these broadly defined developmental periods.

Given the limitations associated with defining broadly pre-conceived age groups to distinguish developmental age, the use of time-varying effect modeling (TVEM [24]) may be especially appropriate for understanding how and when gender disparities in the use of coping strategies differ across adolescence and early adulthood. TVEM is a novel, innovative statistical approach used to model a large number of cross-sectional intercept coefficients as a continuous function of age [24]. Unlike traditional parametric analytic strategies that are subject to strong assumptions about how change is modeled, TVEM is incredibly flexible and allows researchers to examine the unique, nonparametric coefficient functions over time [25]. TVEM is especially important when examining coping, as previous research suggests that coping strategies develop in a nonlinear manner [11]. TVEM has been used to examine age-varying gender differences in depressive symptoms, exposure to violence, the number of sexual partners, and substance use [24,26,27], but has yet to be applied in coping.

Given the health benefits associated with effective coping, understanding when in development the use of coping strategies differs for males and females is necessary to advance theory on the nature and changes of responses to stress and to inform intervention efforts for males and females to match their developmental age. Therefore, the objective of the current study was to utilize TVEM to examine the relative frequency with which males and females utilized specific coping strategies dynamically across early adolescence into emerging adulthood in a large, diverse community sample.

## Methods

### Participants

The majority of the participants were drawn from a longitudinal study<sup>1</sup> (N = 1,251) of high school students from the Mid-Atlantic region of the U.S. At baseline, the participants' mean age was 15.05 (standard deviation = 0.78 years). Overall, 65% of the participants self-identified as non-Hispanic white, 19% as African-American, 10% as Hispanic, 2% as Asian American, and 4% as other.

A nationally representative cross-sectional sample of emerging adults (N = 595; ages 18–22; M = 20.00, standard deviation = 1.42 years) was also included in the present study. The race/ethnicity composition of the sample closely mirrors the U.S. population [28]. Of the total sample, 63% self-identified as

<sup>1</sup> For additional information about other measures included in this larger study, see the website <https://adolescentadjustmentproject.org/>.

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