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Article

Evaluating stress-relieving methods of high school students

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SUMMARY

Today's high school students experience significant stress across various aspects of their lives. If left unmanaged, this stress can escalate into chronic stress, potentially leading to clinically significant physical and mental health issues, including substance use. Thus, the stress-relief strategies adolescents employ to manage stress are crucial in preventing the onset of chronic stress and related disorders. By coming to a greater understanding about the effectiveness of certain stress-relief methods in relation to others, the risk of chronic stress can be reduced. Our study aimed to assess the effectiveness of different stress-relief strategies, with a particular focus on comparing positive distraction and avoidance methods. Currently, limited research exists on the relative effectiveness of these coping mechanisms or on distinguishing between types of disengagement strategies. We predicted that more frequently used methods would tend to be less effective at relieving stress than less popular methods, and that positive distraction strategies would be more effective than avoidance strategies. Using a pre-existing dataset from an anonymous high school survey, we examined the common stress-relief strategies employed by adolescents and evaluated their relationship with stress levels and substance use. Our findings indicated that among disengagement coping strategies, positive distraction methods (such as exercise) were associated with lower reported stress levels compared to avoidance strategies. However, no clear trend was observed regarding the frequency of use of specific methods and their effectiveness. We discuss potential applications of our findings in everyday life and provide recommendations for future research to further explore these results.

INTRODUCTION

Stress is a universal experience that triggers physiological, cognitive, emotional, and behavioral responses aimed at either modifying the stressor or adapting to its effects (1–3). While acute stress can be a natural and temporary response to challenges, chronic stress has been linked to a wide range of psychological and physiological disorders (1,2). Adolescents are particularly susceptible to the effects of chronic stress due to critical periods of plasticity (CPP) in brain development (3). As a result, the neurological circuits of the prefrontal cortex, responsible for situational awareness and decision making in adolescents, are especially vulnerable to environmental influences (3,4). Studies suggest that persistent stress during adolescence can impair prefrontal cortex development, increasing the risk of long-term behavioral disorders such as schizophrenia and ADHD, as well as cardiovascular complications in adulthood (5).

The prevalence of psychiatric disorders linked to chronic stress is a growing concern, with approximately one in seven adolescents experiencing some form of mental health disorder (6). Depression, anxiety, and behavioral disorders have emerged as leading causes of illness and disability in adolescents, and are associated with increased risks of suicide, self-harm, and substance use (6,7). Chronic stress has been found to contribute to these outcomes by impairing brain structures that regulate emotion and impulse control, thus making adolescents more vulnerable to maladaptive coping mechanisms (8). The prefrontal cortex, which plays a critical role in distinguishing between right and wrong and making sound judgments, is particularly affected by stress due to increased dopaminergic and estrogenic projections during adolescence, amplifying stress responses (8). Consequently, the way adolescents manage stress can serve as an indirect predictor of their likelihood to engage in substance use or other high-risk behaviors, underscoring the necessity of evaluating their stress-coping strategies.

Positive distraction refers to engaging in activities that evoke positive emotions as a means of diverting attention from a stressor (9). A key area of investigation in stress management is the distinction between avoidance strategies, which focus on evading thoughts and emotions related to the stressor, and positive distraction strategies, which have been suggested to provide measurable stress relief (9). Both are classified as disengagement coping strategies; however, while disengagement coping is often linked to negative outcomes, emerging research suggests that certain forms of positive distraction—such as creative activities or social interactions—may be more effective in mitigating stress than traditional avoidance behaviors (10). Understanding these nuances is crucial for developing targeted mental health interventions, rather than broadly categorizing all disengagement strategies as detrimental. While the classification of a coping strategy as either positive distraction or avoidance ultimately depends on an individual's personal response, aligning these strategies with psychological outcomes observed in prior research allows for reasonable predictions about whether a given method is likely to induce positive emotions (11–24). For instance, exercise has consistently been shown to promote self-esteem, improve cognitive functioning, and enhance overall well-being (19). Thus, categorizing exercise as a positive distraction method is justified, as it reliably induces positive psychological outcomes in most cases.

Despite the well-documented effects of chronic stress on

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adolescent development, research on stress-relief methods among high school students remains limited. While numerous studies have categorized different coping strategies, few have assessed their relative effectiveness in reducing stress and preventing long-term adverse outcomes (25–27). Our study aimed to bridge this gap by compiling a list of commonly utilized stress-relief methods among high school students and evaluating their effectiveness based on past studies and dataset analysis. By examining correlations between stress levels and specific coping strategies, as well as comparing the effectiveness of various methods using statistical tests, we sought to provide insights into the efficacy of adolescent stress-management techniques.

To conduct this analysis, we used a publicly available dataset from a high school survey addressing mental health and substance use. Our goal was to identify the most commonly used stress-coping methods among students and evaluate their effectiveness by examining correlations with reported stress levels. Considering the increasing rates of adolescent depression and anxiety, we hypothesized that many frequently used coping strategies would be linked to higher average stress levels than some less commonly used methods (6). Furthermore, within the category of disengagement coping, we predicted that positive distraction strategies, such as exercise, would be associated with lower stress levels than avoidance-based approaches.

RESULTS

The dataset included responses from high school students with an average age of 15.93 years. Gender distribution was relatively balanced, with 47.5% identifying as male and 52.5% as female. Stress levels were assessed through a survey question in which students rated their overall stress on a scale from 1 (“not a problem”) to 5 (“a severe problem”), yielding an average rating of 2.92 (**Figure 1**). Additional qualitative responses provided insight into both the primary sources of stress and the coping strategies students employed (**Figures 2 and 3**). The most commonly reported stressors included homework, academic pressure, managing expectations, and concerns about college admissions. The most frequently cited stress-relief methods included listening to music (n=541), talking with friends (n=446), streaming television shows (n=437) and exercise (n=408).

To evaluate the effectiveness of various stress-relief methods, we correlated each method with reported stress levels (**Figure 3 and 4**). To compare methods of stress-relief with each other, we performed t-tests with an alpha value of 0.005 (after Bonferroni statistical corrections). Among all methods, exercise was associated with the lowest average stress rating, along with methods like yoga, talking with friends, and social media. Students who used exercise as a stress-relief strategy reported significantly lower stress levels compared to those who relied on drugs and alcohol (p = 0.0006747) or watching television (p = 0.00438). They also had lower stress levels than students who used music (p = 0.03458) and napping (p = 0.04888), although these results were not statistically significant. Conversely, students who used drugs and alcohol to manage stress exhibited significantly higher stress levels than most other methods, excluding mindfulness meditation (p = 0.02992), watching television (p = 0.00954), and reading (p = 0.00668). Music, napping, mindfulness meditation, reading, social media, yoga and talking with friends were all statistically similar in their relationship to stress.

To explore the relationship between stress relief strategies and substance use attitudes, we analyzed responses to question 37, which asked students to rate their approval of daily alcohol consumption on a scale from “Strongly Disapprove” to “Strongly Approve” (**Figure 5**). We compared this endorsement of alcohol use across different stress-relief methods (**Figure 6**). Students who relied on drugs and alcohol as a stress-coping strategy showed somewhat higher approval ratings for frequent drinking compared to those who used exercise (p = 0.06127), music (p = 0.09246), talking with friends (p = 0.07623), social media (p = 0.0858), or streaming television (p = 0.06964), although none of these results were statistically significant with our alpha value of 0.0083.

DISCUSSION

This study set out to investigate the relative effectiveness of commonly used stress-relief strategies among high school students, with a specific focus on differentiating between positive distraction and avoidance-based disengagement coping methods. By analyzing a publicly available dataset from a school-wide survey, we aimed to identify which strategies were most frequently used and how these methods correlated with self-reported stress levels and endorsement of substance use. Given the growing mental health challenges facing adolescents, our goal was to provide insight into which coping mechanisms may offer greater psychological benefit and inform future mental health interventions.

Our findings indicate that music, the most popular stress-relief method, was significantly more effective at reducing stress than using drugs and alcohol, but it was not more effective than any other stress-relief method. Prior research has shown that music can help adolescents cope with unhappiness, isolation, and depression, particularly among minority groups (11). Additionally, music has been linked to increased emotional stability and cognitive development (12). However, its impact on stress relief is complex, as certain

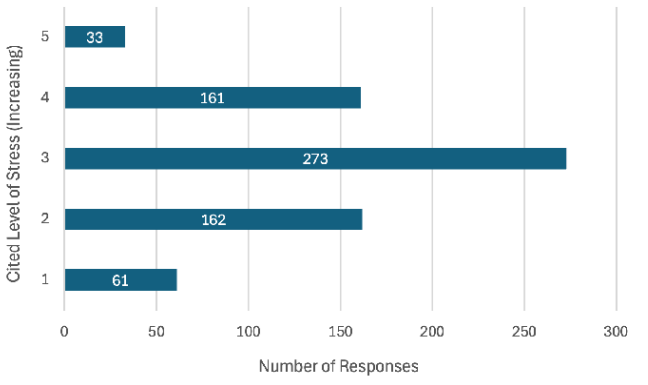

Figure 1: The raw number of respondent’s level of stress. Students were asked to rate their stress on a scale of 1-5 (n=690), with the distribution being shown above. This data was taken from question 31 of the survey, “Please indicate the level of stress in your life, using the scale below, where "1" means "not a problem" and "5" means "severe".”

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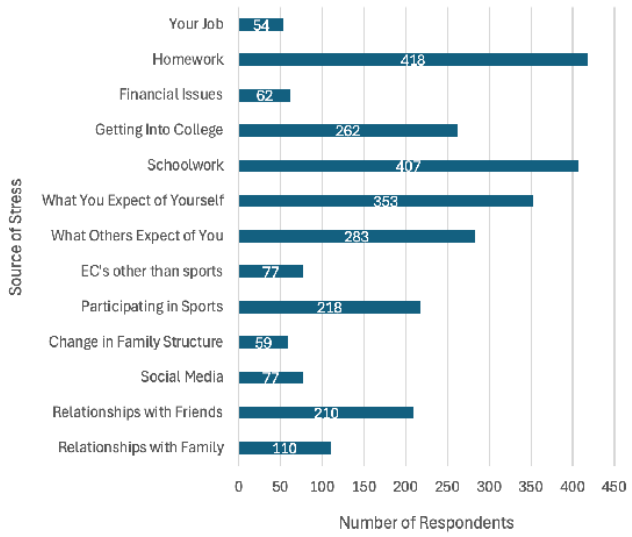

Figure 2: The raw number for the respondent's primary sources of stress. Students were allowed to choose up to three sources that applied to them resulting in the sum of respondents being greater than the number that filled the question (*n*=677). This chart presents the number of respondents that selected a source of stress. Methods with less than 50 respondents were omitted from the chart. EC, extracurricular activities.

types of music—particularly those with melancholic or intense tones—may exacerbate negative emotions, including stress (13). Moreover, exposure to lyrics referencing violence, substance use, or discrimination has been associated with heightened emotional distress in adolescents (14). These mixed effects align with our findings, as music did not consistently correspond with the lowest stress levels among coping methods. While music can serve as a positive distraction when genuinely enjoyed, it may function as an avoidance strategy when it reinforces negative emotions. However, no conclusions can be made relative to other stress relief methods, other than it being more effective than drugs and alcohol.

Our findings further indicate that talking with friends was the second most chosen stress-relief method. This method was associated with a low average stress level, along with methods like yoga and exercise. Existing literature suggests that peer relationships play a crucial role in mitigating stress and mental health challenges, offering support in ways that parental relationships may not fully provide (15). Additionally, seeking emotional support from peers is often more accessible than professional mental health care, while still offering significant benefits over receiving no support at all (16). However, reliance on friends as a primary stress-relief mechanism is not without potential drawbacks. One concern is the influence of negative peer pressure. While adolescents demonstrate cognitive abilities comparable to adults in assessing risk, they are significantly more susceptible to peer influence (17). This heightened susceptibility stems from the adolescent brain's ongoing development, particularly in the reward system, which is highly responsive to peer approval and social reinforcement. When peer pressure activates this reward system, it can override impulse control, leading to riskier decision-making (18). Therefore, while peer support can be beneficial, over-reliance on friends for stress relief may impede independent decision-making and emotional regulation. Despite these potential risks, a potential reason why talking with friends was associated with lower stress levels than drugs and alcohol may be because discussing stressors with peers allows individuals to actively process and address their challenges, contributing to greater emotional relief and problem-solving efficacy. Once again, however, it is hard to accurately draw conclusions because of the lack of significant results.

Our findings indicate that exercise was the stress-relief method associated with the lowest average stress rating. It was also the only stress relief method to be associated with significantly lower average stress levels than another method (watching television) that was not drugs and alcohol. This aligns with extensive research demonstrating that exercise enhances cognitive function, self-image, and social skills while alleviating symptoms of depression, in addition to providing numerous physiological benefits (19). The primary exception to these benefits occurs in cases where individuals suffer from eating disorders, such as anorexia, where exercise can contribute to compulsive behaviors and negatively impact mental health (20). However, for the majority of individuals, prior studies suggest that exercise is a highly effective and versatile coping strategy for managing stress and improving mental well-being. Our findings further support exercise as a beneficial stress-relief method, due to its low average stress ratings. Past findings on its enhancement of cognitive function and self-image suggest that exercise functions as a positive distraction strategy. This reinforces the broader effectiveness of positive distraction methods in reducing stress and promoting mental well-being.

We found napping to be another relatively popular coping mechanism. In our analysis for the effectiveness of napping as a stress relief method, we found it to be similar to music in the sense that the average stress level was significantly lower than using drugs and alcohol. When comparing our findings to existing literature, we generally found that napping can have some positive results. Due to the high correlation of poor quality of sleep with daytime napping in students, napping

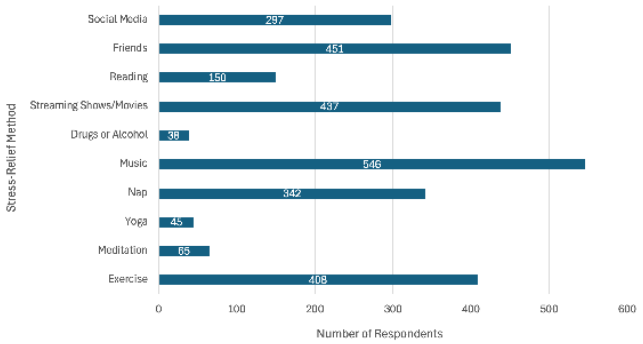

Figure 3: The raw number for the respondent's primary sources of stress relief. Students were allowed to choose up to three relief methods that applied to them resulting in the sum of respondents being greater than the number that filled the question (*n*=677). This chart presents the number of respondents that selected a source of stress relief. This matches the data shown in Table 1. The option "Talking to Friends" is shortened as "Friends" in the chart above.

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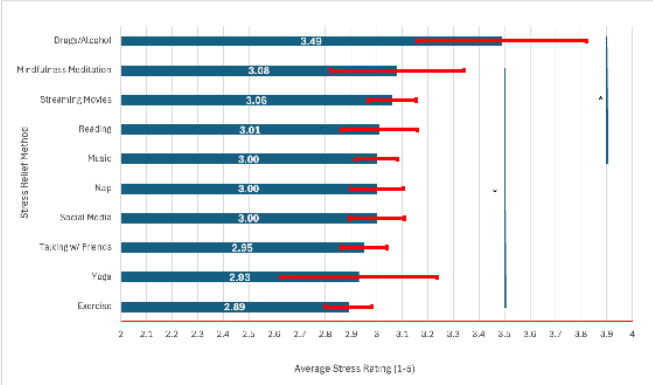

Figure 4: Correlation between stress relief method and average stress rating. Stress ratings were collected on a scale of 1 to 5. We correlated ratings with all stress-relief methods students could respond with in the survey, and the average is displayed on the chart. Error bars represent 95% Confidence Intervals. Asterisks represent statistically significant difference in methods based on *t*-tests with Bonferroni corrections.

is often used to alleviate sleep debt (21). In this respect, napping can be an effective way to decrease sleepiness and increase cognitive functioning for up to several hours at a time, depending on the length and time of day of the nap (22). Thus, because poor overall sleep quality has been shown to increase stress, napping as a remedy to poor sleep quality may be a valid tool for managing stress. The major negative effect of napping we found occurs when it is used as a replacement for high quality, nighttime sleep, at which point it becomes counterproductive (23). Because of the lack of significant results compared to any method other than drugs and alcohol, it is difficult to speculate on how it compares to other methods.

Social media was also a relatively popular stress-relief method in our findings. Our analysis revealed no significant differences between social media and any other coping method, with the exception of drugs and alcohol. When comparing these findings to existing literature, prior research on social media's impact on stress and mental health has yielded conflicting results. While some studies highlight its benefits in fostering social connections and providing emotional support, others emphasize its association with increased anxiety, depression, and stress (24, 25). Given these mixed outcomes in addition to our high standard deviation regarding the associated stress level, a definitive conclusion regarding the effectiveness of social media as a stress-relief strategy remains elusive. This likely suggests that the impact of social media on stress levels is highly individual. As a result, we cannot universally classify social media as a positive distraction strategy, as its effects vary significantly depending on personal usage patterns.

Overall, our findings provided partial support for our hypothesis. While we initially predicted that more commonly used coping mechanisms would be less effective than certain less popular methods, this was only somewhat true. Streaming television—a frequently reported coping strategy—was associated with a significantly higher stress level compared to exercise, which had fewer users. However, our other findings do not clearly support this hypothesis. For example, drug and alcohol use was reported far less than exercise as a stress-relieving mechanism but was associated with significantly higher stress levels. Many of the stress-relieving methods we investigated were not associated with significantly different stress levels. It is likely too broad to simply suggest that less popular methods are inherently more effective or vice versa. However, our prediction that positive distraction strategies would be more effective than avoidance-based methods was better supported. Exercise, a method which aligns with positive distraction, was significantly more effective than drugs and alcohol and streaming television, both of which can be classified as avoidance mechanisms. Therefore, our significant findings suggest that positive distraction may be associated with lower stress levels compared to avoidance-based coping strategies.

Several limitations must be considered when interpreting the findings of this study. First, the dataset represents a student population from a high school located in a town with a median household income significantly above the national average (28). Additionally, the demographic composition lacked diversity, with nearly 80% of respondents identifying as White. As a result, the findings may not be generalizable to marginalized communities or schools with differing socioeconomic backgrounds. Another limitation is the potential for response bias, particularly given the sensitivity of certain survey questions. Students may have misrepresented their stress levels and coping mechanisms due to concerns about shame or fear of repercussions. While the survey included a final question prompting students to self-assess their honesty in their responses, this measure does not fully eliminate the risk of bias. Additionally, the survey suffered from incomplete responses, with participation varying across questions. For instance, while 708 students answered the question regarding age, only 661 provided responses about their top three sources of stress. This disparity suggests the presence of voluntary response bias, which may have introduced some degree of inaccuracy in the dataset.

The practical implications of these findings for both mental health professionals and students emphasize the importance of distinguishing between different disengagement coping

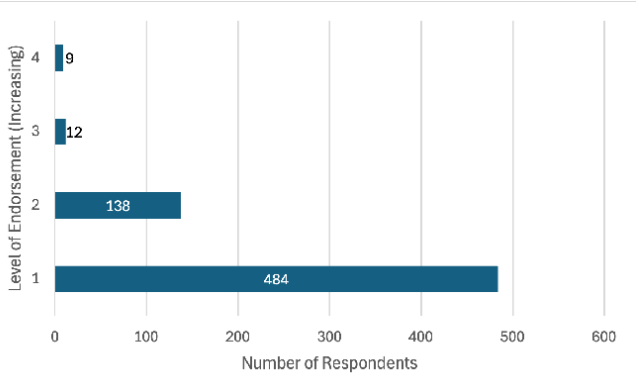

Figure 5: The raw number of respondent's endorsement of heavy drinking. Students were asked "How do you feel about someone your age having one or two drinks of an alcoholic beverage nearly every day?" on a scale of 1-4, with 1 representing "Strongly Disapprove" and 4 representing "Strongly Approve". The distributions of responses are shown in the chart above.

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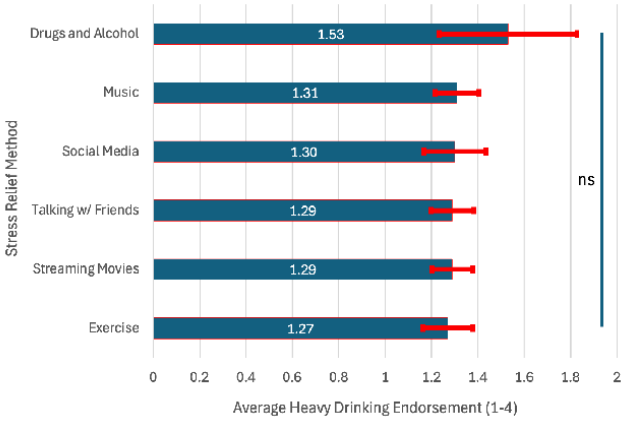

Figure 6: Correlation between stress relief method and average heavy drinking endorsement among high-stress individuals. All students who were rated as high-stress (labeled as a 4 or a 5 on the stress scale) were filtered for their most used stress relief method and their endorsement of heavy drinking (defined as one or two drinks daily) on a scale of 1 (Strongly Disapprove) to 4 (Strongly Approve). Some methods were omitted due to not having enough respondents. The correlation is shown above. There were no significant differences found between any methods based on a two sample *t*-test with Bonferroni corrections.

strategies rather than treating them as universally effective or ineffective. Our results suggest that strategies that genuinely evoke positive emotions tend to be more effective in alleviating stress than those that do not. However, the effectiveness of any given method ultimately depends on the individual. For example, while our findings on social media as a stress relief method were inconclusive, individuals who derive positive emotions from social media are more likely to find it beneficial for stress management.

Further studies should be done on how these methods can be most effectively applied by high school students in particular. For example, future work could investigate whether there are specific approaches to napping or listening to music that are more effective at alleviating stress. Previous findings on stress relief methods often utilized samples older than high school students, like college or graduate school students. To get the most effective methods to benefit high school students specifically, more studies should focus on stress in high school students. Future work can also investigate how reliance on a variety of coping methods benefits individuals as opposed to relying primarily on just one.

MATERIALS AND METHODS

This study utilized data from a pre-existing survey developed by members of Longmeadow Public Schools and administered through the platform SurveyMonkey. The survey was distributed to students at the only public high school in a suburban town with a population of approximately 16,000 and a median household income of $138,000. As of 2023, the town's demographics were 86.6% Caucasian, 5.86% Asian, 2.7% multiracial, 1.3% Black, and 3.5% Hispanic (29). Data collection occurred during the school day in the spring of 2024 through an anonymous survey administered to students. This data was further deidentified before it was given to us for analysis.

Participation in the survey was open to all students at the high school. Given that the majority of respondents were minors, parental consent was obtained via email before survey administration. Students also retained the option to opt out if they desired. Of the 950 students at the high school, 233 did not participate due to logistical challenges, such as absences or scheduling conflicts. Additionally, five students opted out of the survey. To ensure data integrity, students were asked to self-assess their honesty in responding to the survey on a scale from 1 ("I was not honest at all") to 5 ("I was completely honest"). Only responses from students who rated their honesty as a 4 or 5 were included, leading to the omission of four responses. Ultimately, our analysis included 708 student responses, though response rates varied across individual survey questions.

The survey collected data on student demographics, well-being, mental health, and substance use. Participants first provided information on their age, sex, sexual orientation, and ethnicity. They then answered questions regarding their general lifestyle, academic performance, and mental health, including self-harm, stress, anxiety, and coping mechanisms. The survey also covered substance use, inquiring about alcohol, tobacco, and marijuana consumption, as well as parental attitudes toward these substances and students' awareness of associated risks. Our analysis primarily focused on survey questions related to mental health and substance use.

To evaluate the relationship between stress-relief strategies and outcomes such as perceived stress and substance use, we filtered responses based on self-reported stress levels rated on a scale from 1 ("Not a problem") to 5 ("Severe"). For each coping method, we calculated the percentage of respondents using that method at each stress level, then computed an average stress score based on the number of users. A similar procedure was applied to assess the relationship between coping strategies and endorsement of heavy drinking (rated on a scale from 1 to 4). Weighted averages were calculated for each coping method according to respondents' reported drinking levels. All data were compiled and analyzed using Microsoft Excel. Two tailed *t*-tests with Bonferroni corrections were used to individually compare the average associated stress levels of coping strategies to each other for significance.

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