INPLASY

The impact of savoring interventions on positive emotions among university students: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - Self-finance.

Review Stage at time of this submission - Data extraction.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202370053

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 July 2023 and was last updated on 14 July 2023.

INTRODUCTION

Review question / Objective The purpose of this review was to assess the impact of savoring interventions on college students' overall positive emotions.

Rationale Despite an increasing number of empirical research studies indicating that savoring, as a positive psychological intervention, can effectively help individuals enhance positive emotions, there are still some studies that have found certain types of savoring interventions to be ineffective in boosting positive emotions. For instance, Lyubomirsky and her colleagues (2006) adopted three different methods, namely writing, talking and thinking, to savoring college students' positive life experiences. The results showed that students who processed a positive experience through thinking reported significant improvement in positive emotions, while writing and talking did not have significant affect. The researchers explained that the organized, analytical nature of writing and talking may make people feel critical,

which is incompatible with positive emotions (Lyubomirsky et al., 2006). In contrast, Seligman et al.(2005) revealed that students who were asked to write about three good things experienced positive affect, and this effect lasted six months. Given these inconsistent results, it is still unclear whether employing various savoring interventions that involve writing can enhance emotional well-being among college students. Almost all savoring interventions require participants to document their savoring process and feelings in written form.

Furthermore, there are inconsistent findings regarding the effectiveness of specific savoring interventions in generating positive psychological outcomes. Some research suggests that practicing all types of savoring intervention strategies is the best way to maximize positive emotions (Quoidbach et al., 2010), However, recent studies have argued that present-focused savoring interventions are more powerful than past and future-based interventions in generating positive emotions (Wellenzohn et al., 2016). Thus, it remains unclear which type of savoring

intervention is more effective in enhancing individuals' positive emotions.

Given that the mental health status of college students worldwide is deteriorating, with increasing rates of mental health issues such as depression and anxiety (Auerbach et al., 2016), this study has two main purposes: The first purpose is to conduct a meta-analysis to investigate the impact of overall savoring interventions on college students' positive emotions. The research question is: What is the efficacy of savoring interventions on positive emotions, compared with control, among college students? The hypothesis is that diverse savoring interventions significantly impacts college students' positive emotions. The second aim is to evaluate whether present-based savoring interventions are more powerful than past and future-based savoring interventions. Our hypothesis is that present-focused savoring interventions have higher effect sizes on positive emotions than other past and future- oriented savoring interventions among college students.

According to the broaden-and-build theory (BBT) of positive emotions (Fredrickson, 1998; 2001), positive emotions can help alleviate distressed feelings by expanding individuals' attention and broadening their thought-action repertoires (Fredrickson & Branigan, 2005), thus subsequently reducing negative emotions (Isen et al.,1987; Estrada et al., 1994;1997). Additionally, positive emotions can establish a greater number of enduring personal resources, enabling individuals to better cope with negative emotions and achieve superior performance (Fredrickson, 2000). Therefore, positive emotions have the potential to initiate upward spirals of emotional well-being, leading to an overall improvement in emotional well-being.

Condition being studied In recent years, the mental health status of university students globally has become a matter of concern, with an increasing prevalence of mental health issues, such as depression and anxiety. A 2019 questionnaire survey conducted by the World Health Organization among 19 universities in 8 high-income countries revealed that approximately 30% of university students reported varying degrees of mental health problems, including depression, anxiety, and substance abuse (Auerbach et al., 2019). Currently, the academic field primarily focuses on preventing and intervening in depression among university students through cognitive-behavioral therapy (Ma et al., 2020). Cognitive-behavioral therapy utilizes core intervention techniques that help individuals address the problem itself, modify irrational thoughts, and improve depressive mood while promoting positive behaviors. However, this problem-focused intervention approach raises several issues. Firstly, these interventions only target students with diagnosed depression, disregarding the majority of students who may not have been identified with problems or display tendencies towards depression, thereby increasing their vulnerability to future adversities (Sharp et al., 2018; Tze et al., 2016). Secondly, students participating in intervention programs may experience labeling and stigma, leading to reluctance in actively seeking help and missing the optimal intervention period, resulting in more severe consequences (Clement et al., 2015; O'Connell et al., 2009; Sharp et al., 2018; Stewart et al., 2019). Thirdly, these interventions focus solely on alleviating depressive symptoms while neglecting the cultivation of other positive psychological qualities and abilities in students (Mann & Robinson, 2009).

In the past two decades, the development of positive psychology has provided a new perspective and approach to the prevention and intervention of depression. Positive psychology primarily seeks to discover effective mechanisms that can help individuals achieve happiness through scientific research methods, thereby promoting a state of flourishing. Positive psychology interventions refer to a series of activities developed based on the theories and fundamental principles of positive psychology, aiming to enhance positive emotions, behaviors, and cognitions. An increasing body of empirical research indicates that savoring, as a positive psychology intervention, can effectively enhance students' positive emotions.

METHODS

Search strategy We conducted a comprehensive search across four prominent electronic academic databases, including Web of Science, Scopus, PubMed, and PsycINFO. Additionally, we reviewed the citations and reference lists of the included articles, as well as relevant review articles, to identify any additional potential sources for inclusion.

Participant or population Restricted to university or college students only.

Intervention Our search encompassed any savoring-based intervention, which refers to a structured activity that employs savoring strategies to enhance individuals' capacity to fully enjoy positive experiences.

Comparator We included studies that did not have any intervention or alternative intervention control groups in our review.

Study designs to be included We included studies that utilized randomized controlled trials (RCTs), cluster randomized controlled trials, or trials involving matched pairs with randomization. These rigorous study designs help ensure that the allocation of participants to different groups is done randomly, reducing bias and increasing the validity of the findings. By including studies with these designs, we aimed to strengthen the quality and reliability of the evidence in our review.

Eligibility criteria The PICOS tool was employed as the inclusion criteria for selecting the relevant articles in this review. Specifically, the criteria were as follows:Participants: Only university or college students were included in the studies.Interventions: Studies that utilized a savoring intervention or program, defined as a structured activity employing savoring strategies to enhance individuals' capacity to enjoy positive experiences, were included.Comparison: Studies that had no intervention or alternative intervention control groups were included.Outcomes: Studies were required to assess positive emotions using reliable measurements before and after the intervention.Study design: Studies that employed randomized controlled trials (RCTs), cluster randomized controlled trials, or trials involving matched pairs with randomization were included to reduce the risk of bias.By utilizing the PICOS tool and applying these specific criteria, we aimed to ensure the selection of relevant articles that met rigorous methodological standards for this review.We excluded studies that utilized qualitative or non-randomized experimental study designs, as these designs may have limitations in establishing causal relationships. Furthermore, studies that were not published in English were also excluded due to limitations in our language proficiency and accessibility. Additionally, studies that integrated other well-being-enhancing strategies into a savoring-related intervention were excluded, as this could complicate the interpretation of whether the savoring intervention alone was responsible for the observed positive emotions. Case studies, theoretical articles, and surveys were also excluded to ensure a focus on empirical research. By applying these exclusion criteria, we aimed to maintain a rigorous and focused selection of studies for our review.

Information sources We conducted a comprehensive search across four major electronic academic databases, including Web of Science,

Scopus, PubMed, and PsycINFO. These databases cover a wide range of academic disciplines and provide access to a diverse range of scholarly articles. By searching across multiple databases, we aimed to ensure a thorough and comprehensive coverage of relevant literature in our study.

In addition to the database search, we also reviewed the citations and reference lists of the included articles. This process allowed us to identify additional relevant studies that may not have been captured in the initial database search. Furthermore, we examined review articles related to our topic of interest, as they often provide a comprehensive summary of the existing literature and can help identify additional studies for inclusion.

By conducting a comprehensive search across multiple databases and exploring citations and reference lists, we aimed to minimize the risk of missing relevant studies and ensure the inclusion of a wide range of high-quality academic sources in our review.

Main outcome(s) In this review, the main outcome of interest was positive emotions. The researchers specifically focused on assessing positive emotions using reliable measurements both before and after the savoring intervention. By utilizing reliable measurement tools, the study aimed to obtain objective and valid data on the impact of savoring interventions on participants' positive emotions. This approach allowed for a rigorous evaluation of the effectiveness of savoring interventions in promoting positive emotional experiences among university or college students.

Quality assessment / Risk of bias analysis The methodological quality of the included studies was assessed using the quantitative studies assessment tool "QualSyst" developed by Kmet et al. (2004). This tool consists of 14 items, and each item is scored based on the degree to which the specific criteria are met. A score of 2 is assigned for "yes," 1 for "partial," and 0 for "no." The summary score for each paper was computed based on the relevant items. The scoring procedure was carried out independently by two reviewers, ensuring a robust evaluation of the methodological quality of the included studies.

To evaluate publication bias, the study employed several approaches. Firstly, a funnel plot was used, which visualizes the distribution of effect sizes (ESs) in a meta-analysis. In the absence of publication bias, the ESs should be symmetrically distributed around the mean. However, an uneven distribution of ESs indicates the presence of

publication bias. The study examined the funnel plot to assess the symmetry of the ES distribution. In addition to the funnel plot, the study employed Egger's test (Begg & Mazumdar, 1994) and Begg's test (Egger et al., 1997) to further evaluate publication bias. These statistical tests assess the asymmetry of the funnel plot and provide quantitative evidence of potential publication bias.

By employing these assessment methods, the study aimed to evaluate the methodological quality of the included studies and assess the presence of publication bias, ensuring the validity and reliability of the findings.

Strategy of data synthesis The effect sizes (ESs) in this meta-analysis were calculated based on the means, standard deviations (SD), and sample sizes of each study. When mean and SD were not available, ESs were calculated using 95% confidence intervals (CIs), standard error of the mean, and other relevant statistics such as t and F values. To ensure accuracy, Hedges' g was calculated for each comparison between a savoring intervention and a control group. Hedges' g is considered more accurate than Cohen's d for small sample sizes (Cuijpers, 2016).

The meta-analysis employed a random-effects model, as recommended by Borenstein et al. (2010). The magnitudes of the ESs were evaluated using the criteria from Lipsey and Wilson (1993): small (0-0.32), medium (0.33-0.55), and large (0.56-1.2). The heterogeneity of the ESs was assessed using the I2 statistic, with low (25%), moderate (50%), and high (75%) values indicating different levels of heterogeneity (Higgins & Thompson, 2002).

To assess the presence of publication bias, the study used a funnel plot and Egger's test, following the approach suggested by Egger et al. (1997). A significant statistical level was defined as $p < .05$. All data analyses were performed using Comprehensive Meta-Analysis software version 3.7 (Biostat, NJ, USA).

By employing these statistical methods and criteria, the study aimed to provide robust and reliable findings regarding the effect sizes, heterogeneity, and potential publication bias within the included studies.

Subgroup analysis The authors conducted a meta-regression analysis to examine the influence of continuous variables on the impact of savoring interventions on college students' positive emotions. This analysis aimed to identify potential moderators that could explain variability in the effect sizes across studies. By analyzing continuous variables, such as duration of intervention, the authors sought to explore whether

these factors influenced the effectiveness of savoring interventions in enhancing positive emotions among college students.

Additionally, subgroup analyses were conducted to examine the impact of categorical variables on the effectiveness of savoring interventions. These analyses aimed to investigate whether specific characteristics of the intervention or study population, such as type of savoring strategy employed, study location, or participant characteristics, influenced the outcomes. By categorizing the studies based on these variables, the authors could identify potential subgroups that may show differential effects of savoring interventions on college students' positive emotions.

By conducting meta-regression and subgroup analyses, the authors aimed to explore potential factors that may moderate the impact of savoring interventions on college students' positive emotions. These analyses provide valuable insights into the conditions or characteristics that may influence the effectiveness of savoring interventions, thereby enhancing our understanding of how to optimize the outcomes of such interventions among college students.

Sensitivity analysis A meta-analysis of the risk of bias in individual studies was performed using Egger's test. Egger's test is a statistical method used to assess publication bias in meta-analyses. If the result of Egger's test was statistically significant ($p < 0.05$), indicating the presence of publication bias, a sensitivity analysis was conducted.

A sensitivity analysis is a supplementary analysis that examines the robustness of the results by excluding studies with potential bias or by evaluating the impact of different methodological choices on the overall findings. In the context of this meta-analysis, a sensitivity analysis was conducted to assess the influence of studies with potential bias on the overall results. By excluding these studies or making adjustments, the authors aimed to determine if the conclusions of the meta-analysis were sensitive to the inclusion of potentially biased studies.

Performing a meta-analysis of the risk of bias and conducting a sensitivity analysis help to ensure the validity and reliability of the results. These analyses allow for the identification and assessment of potential biases and provide a more comprehensive evaluation of the overall findings of the meta-analysis.

Language restriction In this review, only studies published in the English language were included. The decision to limit the review to English-

language studies was made to ensure that the research team could effectively access, comprehend, and analyze the selected studies.

Country(ies) involved This review was conducted by a team of three authors from two different countries. Zheng Jie is affiliated with a research institution in China, while Samsilah Roslan and Zeinab are affiliated with research institutions in Malaysia.

Keywords savor, intervention, university students, higher education.

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