

THE ROLE OF EMOTION REGULATION, STRESS, AND BINGE EATING IN WOMEN WITH POLYCYSTIC OVARY SYNDROME (PCOS)

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ABSTRACT

The present study was planned to explore the relationship between emotion regulation, stress and binge eating in women with Polycystic Ovary Syndrome (PCOS). Understanding how these specific variables contribute to the development and exacerbation of Polycystic Ovary Syndrome in women can provide valuable insights for prevention strategies. To collect the data from participants, the sample size was (N=100) women with Polycystic Ovary syndrome women were recruited to participate in the current study. The sample size was determined by analyzing the previous research (Khan et al., 2024). The one hundred participants were selected through Purposive sampling technique and correlational research design was used. The scales Emotion Regulation Questionnaire (Gullone & Taffe., 2011), Stress Scale (Cohen et al., 1988) and Binge Eating Scale (Gormally et al., 1982) were used to measure the study variables. Results on correlational analysis affirmed that in women with polycystic ovary syndrome, there is a positive correlation between perceived stress and binge eating in women with PCOS. On the other hand, there is a negative correlation between emotion regulation and binge eating. Findings indicates that higher stress level can cause binge eating in women who have PCOS. Further results demonstrate that emotion regulation is not the reason to cause binge eating in women with PCOS. Current research reinforces the understanding that PCOS is not only a physiological disorder but also one with substantial psychological and behavioral dimensions. Women with PCOS often face significant emotional challenges, including stress anxiety depression which negatively impact their body image and self-worth.

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INTRODUCTION

In modern psychology and current research, there is a growing focus on the complex relationship between emotional control, stress, and their impact on various health outcomes. The aim of this paper is to explore the intricate intersection between emotion control, stress, and excessive eating among women with Polycystic Ovary Syndrome (PCOS). The field of reproductive health addresses various conditions, and

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one of the significant issues is Polycystic Ovary Syndrome (PCOS), which affects women during their fertile years. PCOS presents a combination of symptoms, including hormonal imbalances, ovarian cysts, and irregular menstrual cycles. The prevalence of PCOS varies across different demographic groups and regions, affecting around 5-10% of women of reproductive age globally. However, it's important to note that the actual prevalence might be higher due to under-recognition and variations in diagnostic criteria (Singh et al., 2023).

The regulation of emotions involves a complex process that includes managing and changing emotional responses to achieve desired outcomes. (Grolnick et al., 1996, 2005) described emotional regulation as "the set of strategies involved in initiating, maintaining, and modifying emotional responses, both positive and negative." This encompasses a wide range of methods and tactics aimed at understanding and dealing with emotions in various situations. One such strategy is cognitive reappraisal, which involves reframing or reinterpreting the significance of a situation to manage emotional reactions. By changing how events are perceived, individuals can effectively and adaptively regulate their emotions (Wang & Yin., 2023). Expressive constraint is another way that people regulate their emotions. This involves holding back or hiding their true emotions in social or work environments. This can involve hiding genuine feelings to fit in with social norms or avoid negative consequences. While being able to express constraint can be beneficial in certain situations, like maintaining professionalism at work, suppressing emotions too much can lead to psychological distress and difficulties in relationships (Muhtadie et al., 2021). On the other hand, emotional acquiescence involves accepting and submitting to one's emotional ups and downs without trying to control or manage them. This approach recognizes that emotional experiences are unavoidable and emphasizes the importance of embracing emotions without judgment or resistance. Allowing the full experience of emotions can help individuals develop greater self-awareness and emotional strength (Clore & Parrott., 2020).

Stress can be defined as an individual's perception, assessment, and response to various stimuli from the surrounding environment. It occurs when the person's ability to cope is surpassed by the demands and pressures of the environment (Khaled et al., 2020). Stress is not a simple phenomenon but rather a complex combination involving various aspects of physiology, cognition, and behavior. It is not limited to a single source but can originate from both internal and external factors, significantly affecting an individual's health and overall well-being. The range of stressors is vast, encompassing a wide range of experiences from major life events to ongoing environmental pressures (Sharma., 2018).

However, it's important to be aware that prolonged exposure to stress can disrupt these systems, leading to long-term health issues such as hypertension, cardiovascular disease, and weakened immune function (Fleshner & Johnson., 2007). Understanding these processes can help us develop strategies to manage stress and promote overall well-being. Cognitively, stress can manifest as increased vigilance, overthinking, and tension. It can hinder cognitive function, affecting memory, concentration, and decision-making abilities. Persistent stress has been linked to cognitive decline and an increased

likelihood of developing mood disorders such as anxiety and depression (Sharma., 2018). Behaviorally, stress can affect an individual's actions and reactions in various ways. Some may resort to maladaptive coping mechanisms such as substance abuse or avoidance, while others may display hyperarousal or aggression. Additionally, stress can impact social interactions and relationships, leading to conflicts and strained communication (Moore et al., 2011).

Binge eating is a form of disordered eating behavior characterized by consuming large amounts of food in a short period. It is often marked by a loss of control overeating and a sense of compulsivity, where individuals feel driven to eat even when not physically hungry. After episodes of excessive food intake, individuals may experience feelings of guilt, shame, or disgust (Rosenbaum & White., 2013). The act of binge eating can be emotionally distressing for individuals as they struggle with the consequences of their actions and the negative emotions that come with it. Furthermore, binge eating may be a way for individuals to cope with overwhelming emotional states or stressful situations. During times of distress, food can offer temporary comfort and distraction from underlying issues. For some, eating becomes a way to numb difficult emotions or ease psychological pain (Dingemans et al., 2017).

THEORETICAL & CONCEPTUAL FRAMEWORK

PCOS is not merely a physiological condition, but a multifaceted phenomenon influenced by psychological, social, and environmental factors. By integrating theories from psychology and health behavior models, we endeavor to unravel the intricate dynamics at play within the context of PCOS (Reaney et al., 2015).

Drawing from psychological paradigms such as attachment theory, cognitive-behavioral theory, and social learning theory, we seek to comprehend how individuals with PCOS navigate their emotional experiences, cope with stressors, and engage in behaviors related to food consumption. Moreover, wellbeing behavior models such as the Wellbeing Conviction Demonstrate, the Trans theoretical demonstrate this framework will not only enhance our theoretical understanding of PCOS but also inform the development of targeted interventions and strategies to support individuals in managing their condition more effectively (Tang et al., 2022)

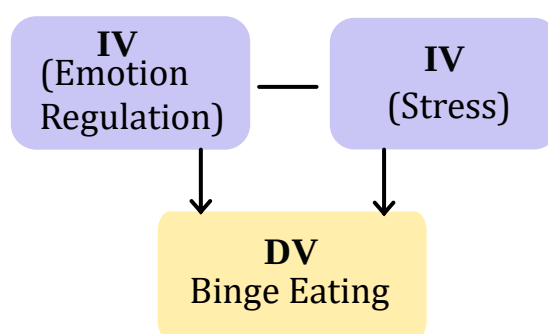


Figure 1: *Conceptual Framework*

By illustrating the perplexing interconnects between mental components and wellbeing results, able to enable healthcare suppliers to convey more all-encompassing and compelling care to this helpless populace. In doing so, we not as it were improving the quality of life for people with PCOS but moreover contribute to the headway of information within the field of women's wellbeing and regenerative pharmaceutical.

MATERIAL AND METHOD

Study Design

In the current study, a correlational research design was utilized to examine the relationships between variables of interest, namely emotion regulation, stress, and binge eating behaviors, among women with PCOS. An independent sample T-test was used to determine the difference between age group and duration of treatment.

Sampling Technique

The sampling technique employed in this study is purposive sampling, also known as judgmental or selective sampling. Purposive sampling involves the deliberate selection of participants based on specific criteria relevant to the research objectives (Patton., 1990; Nyimbili & Nyimbili., 2024).

Procedure

The primary aim of the current study was to examine the relationships between emotion regulation, stress, and binge eating among women diagnosed with PCOS. To achieve this goal, the current study plan, topic, and method material were approved by ASRB (Advance Study Research Board). A Correlational research design was used and sampling technique employed in the study was purposive sampling. And participants were administered the research tools, data were collected and analyzed to explore patterns and associations among the variables of interest. The procedure involved obtaining informed consent from participants, taking demographic information including age range, siblings, marital status, birth order education, occupation, number of family members, family system (joint, nuclear), duration of PCOS treatment, and any other hormonal issue. Three questionnaires were administered such as Emotion Regulation Questionnaire (Gullone & Taffe., 2011), Stress Scale (Cohen et al., 1988) and Binge Eating Scale (Gormally et al., 1982). Two questionnaires (Stress scale and Emotion regulation scale) had 10 items and the Binge eating scale had 8 items.

An Emotion Regulation Questionnaire is a standardized measure designed to assess individuals' ability to regulate and manage their emotions effectively. The purpose of a 10-item measure is to gauge respondent's predisposition for either expressive suppression or cognitive reappraisal of their feelings. Respondents react to each question using a Likert-style scale with 1 for “strongly disagree” and 7 for “strongly agree”. Along with J. Taffe and E. Gullone (2011, OCT 24) , a questionnaire was prepared.

The Stress Scale (SS) is one of the world's most widely used stress perception assessment instruments (Lee., 2012). The scale was originally developed in (1983) by Cohen et al. and was designed to assess the degree of stress people felt in unpredictable, out of control, and overloaded situations. The original version of the PSS had 14 items (PSS-14) with seven negative items (“Unable to control the important things in your life”) and seven positive items (“Confident about your ability to handle your personal problems”). Based on factor analysis, the researcher removed the four items with the lowest factor loadings on the PSS-14 to create a shortened 10-item version (PSS-10) (Cohen et al., 1988).

In Binge Eating Scale, a validated questionnaire was used to assess the frequency and severity of binge eating episodes. The Binge Eating Scale is a simple self-assessment tool for evaluating binge eating behaviors. It consists of carefully constructed questions to measure the frequency of binge eating and its emotional impact. The Binge Eating Scale is a well-established and validated self-assessment tool intended to evaluate and measure the seriousness of binge eating behaviors in individuals. Created by (Gormally et al., 1982), the BES is a valuable tool for clinicians, researchers, and individuals to gain an understanding of the existence and severity of binge eating tendencies. The BES is an eating disorder examination questionnaire consisting of a series of questions that capture the frequency and emotional impact of binge eating episodes. Binge eating is defined as the consumption of unusually large amounts of food within a short period, is accompanied by a sense of loss of control, and is a significant component of various eating disorders, including binge eating disorder. A Likert scale is used by respondents to assess their experiences, giving a numerical representation of their binge eating habits.

Then, ensuring the confidentiality and anonymity of the collected data. The research data was collected from different places including private hostels, private hospitals (like Kazmi Poly Clinic and Maternity home, Faisal Hospital, Chiniot Hospital, and Government College Women University, Riphah International University,) Faisalabad. After completion of data participants were thanked for their cooperation.

RESULTS

Table 1: Demographic Characteristics of the Research Participants (n= 100)

Variable	Categories	F	%
Age	15-25 years	63	63%
	26-36 years	37	37%
Siblings	1 – 3	31	31%
	4 – 6	61	61%
	7 – 9	8	8%
Family system	Joint	22	22%
	Nuclear	78	78%
Duration of treatment	1month – 5 years	98	98%
	6years – 10 years	2	2%
Other hormonal problem	No	77	77%
	Yes	23	23%

Demographic Characteristics of the Research Participants (n=100)

The table below summarizes the demographic characteristics of the 100 research participants involved in the study. Understanding these demographics is crucial for interpreting the study's findings within the context of the participants' backgrounds. The age distribution groups are 15-25 years have 63 participants (63%) and 26-36 years have 37 participants (37%). The majority of the participants are between the ages of 15 and 25, making up 63% of the sample. The remaining 37% are aged between 26 and 36 years. This distribution indicates that the study predominantly involves younger women within the reproductive age range, which is relevant given the focus on PCOS.

Most participants come from larger families, with 61% having between 4 and 6 siblings. A smaller portion, 31%, have between 1 and 3 siblings, and only 8% have between 7 and 9 siblings. This could

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reflect cultural or regional norms regarding family size. The vast majority of participants, 78%, live in nuclear family systems, while 22% live in joint family systems. This information is useful for understanding the social and support structures that might influence health behaviors and stress levels. Nearly all participants (98%) have been receiving treatment for PCOS for a duration of 1 month to 5 years. Only a small fraction (2%) have been undergoing treatment for a longer period of 6 to 10 years. This data is important for correlating treatment duration with health outcomes and symptom management. Most participants (77%) do not have other hormonal problems, while 23% do. This variable helps in understanding whether additional hormonal issues might confound the study's findings regarding PCOS-specific symptoms and behaviors.

Table 2: *Correlation between Emotion Regulation and Binge Eating in Women with PCOS (n=100)*

Variable(s)	ERQ	BES
Emotion Regulation Questionnaire	-	-0.76
Binge Eating Scale		-

Note: ERQ=Emotion Regulation Questionnaire, BES=Binge Eating Scale.

This table of correlation shows the correlation between emotional regulation and Binge Eating in Women with PCOS correlate with both variables is -0.76. Which shows that both variables have a negative correlation?

Table 3: *Correlation between Binge Eating and Perceived Stress in Women with PCOS (n=100)*

Variable	BES	PSS
Binge Eating Scale	-	.315**
Stress Scale	-	-

Note: Correlation is significant at the 0.01 level (2-tailed).

This table of correlation shows the correlation between Binge Eating and Perceived Stress in Women with PCOS correlate both variables .315**. This shows that both variables have a positive correlation on the significance level 0.01.

Table 4: *There would be a significant age difference in Perceived Stress, Binge Eating, and Emotion Regulation in women with PCOS (n=100)*

Variables	Age (1)		Age (2)		T	p	95% CI	
	M	SD	M	SD			LL	UL
PSS	23.9841	4.99836	26.7027	3.47902	-2.917	.004	-4.56831	-.86884
BES	13.8571	6.36740	14.8108	6.27976	-.727	.469	-3.55768	1.65035
ERQ	47.3810	7.36037	49.2703	8.20788	-1.187	.238	-5.04708	1.26845

Note: Age (1)=15 years to 25 years, Age(2)=26 years to 36 years

The table 4.5 is showing comparison of all the variables under study according to age of the women with pcos. In case of perceived stress scale from the analysis, it was observed that mean score of second group of age of women is 26.7027 which is highest than first group of age of women mean value is 23.9841 which is lower than second age group of perceived stress scale. The comparison shows that perceived

stress scale varies according to age groups. In case of middle variable binge eating scale, it was observed that mean score of second group of age of women is 14.8108, which is highest than first group of age mean value that is 13.8571, which is slightly lower than the second age group mean value. In case of third variable emotion regulation questionnaire, it was observed that mean value of second group of age is 49.2703 which is highest than first age group mean value of emotion regulation that is 47.3810 which is lower than second age group mean value. The p value of perceived stress scale is .004 that is significant and the p value of binge eating scale is .469, which is insignificant and p value of emotion regulation questionnaire is .238, that is in significant also. Hence, the comparison shows that second age group mean values are highest than first age group mean value of both variables, perceived stress scale, binge eating scale and emotion regulation questionnaire.

DISCUSSION

In recent years, Polycystic Ovary Syndrome (PCOS) has gained increasing recognition not only for its physical manifestations but also for its significant psychological and behavioral implications. A pivotal study, as referenced in the National Center for Biotechnology Information (NCBI), utilized a sample size of 75 participants to explore these interconnections in 2024. In contrast, the research employed a more extensive sample size of 100 participants, thereby enhancing the robustness and generalizability of our findings (Khan et al., 2024).

The demographic profile of the research participants (n=100) is pivotal in contextualizing the study findings. The age distribution indicates a predominant representation of younger women, with 63% aged between 15-25 years and 37% between 26-36 years. This age range aligns with the reproductive age group most commonly affected by PCOS, thereby ensuring the relevance of the findings to the target population. The first hypothesis of the study was there would be a significant relationship between emotion regulation and binge eating in women diagnosed with PCOS. The result showed a negative relationship between emotion regulation and binge eating that was insignificant. PCOS is known to cause irregular menstrual periods, polycystic ovaries, obesity, and hyper androgenism. However, the psychological symptoms and impact of the condition are often disregarded. Eating disorders are serious mental health illnesses that affect eating patterns, attitudes, weight, and body image (Pirota et al., 2019).

Eating disorders can have a negative impact on physical health, psychological well-being, and social functioning due to intense feelings, thoughts, and actions surrounding food and body weight. The link between polycystic ovarian syndrome and eating disorders is complex due to several reasons. PCOS symptoms such as weight increase, hirsutism (excessive hair growth), acne, and abdominal bloating can cause body dissatisfaction and low self-esteem. Women with PCOS may experience distress over changes in their appearance due to societal standards of thinness. Hormonal imbalances, such as insulin resistance, can affect appetite regulation and mood fluctuations, potentially leading to ovarian cysts and emotional instability. Metabolic disorders, such as insulin resistance, can impact signaling, nutrition metabolism, and energy balance (Machanda & Bhatt.,2024).

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The second hypothesis of this study was there would be a significant positive relationship between stress and binge eating in women with PCOS. The result showed a positive relation between stress and binge eating with significant value. There is a considerable lack of understanding and awareness about the variables among both medical professionals and the general public. Even women who have been diagnosed with the disorder do not fully comprehend their condition and are misled by doctors and the community. Currently, PCOS is considered a reproductive disorder rather than an endocrine disorder, with a limited impact on the reproductive system (Machanda & Bhatt., 2024).

The third hypothesis of the current study was that there would be age differences in terms of stress, emotion regulation, and binge eating in women diagnosed with PCOS. The comparison showed that the second age group's mean values were higher than the first age group's mean values of both variables, perceived stress scale, binge eating scale, and emotion regulation questionnaire. Previous research suggests that women with PCOS may experience binge eating and bulimia nervosa. Furthermore, reproductive steroids have a significant effect on neuroendocrine pathways in the female brain, altering a wide range of neurotransmitters and Neuropeptides have an important function in numerous emotional and behavioral reactions. A bidirectional linkage connects lifestyle changes are psychologically healthy are more likely to maintain a healthy lifestyle. Lifestyle improvements can also positively impact mood (Barbagallo et al., 2024). Binge eating is a common coping mechanism for women with PCOS, often used to manage negative emotions and stress. However, this maladaptive behavior can lead to weight gain and exacerbate insulin resistance, a common issue in PCOS. Addressing binge eating through psychological interventions and nutritional counseling is crucial for breaking this cycle and promoting healthier eating habits.

LIMITATIONS

Despite rigorous methodological procedures, the study may encounter certain limitations that could affect the generalizability and interpretation of the findings. Some potential limitations are as the use of purposive sampling may result in a sample that is not fully representative of the broader population of women with PCOS. The reliance on self-report measures for assessing emotion regulation, stress, and binge eating behaviors may be subject to social desirability bias.

RECOMMENDATION AND IMPLICATIONS

Current study's findings highlight the importance of a holistic approach in understanding PCOS, addressing both physical and psychological aspects. Healthcare providers should integrate psychological support, such as Cognitive-Behavioral Therapy (CBT) and other evidence-based interventions, with medical treatment to improve symptom management and overall well-being (Akhtar, 2024). Continued research and collaboration are essential for developing effective interventions. Empowering women with PCOS through education and support is also crucial, as providing them with knowledge and tools for symptom management, stress coping, and emotion regulation can lead to better health outcomes. Support groups and educational programs play a vital role in this empowerment process.

REFERENCES

- Akhtar, S. (2024). Comparative Study of Cognitive Behavior Therapy and Virtual Reality Exposure Therapy for PTSD Patients. PREPRINT (Version 2) available at Research Square. <https://doi.org/10.21203/rs.3.rs-3897225/v2>
- Barbagallo, F., Tiranini, L., Placentino, C., Mariacci, G., Piccinino, M., Cucinella, L., & Nappi, R. E. (2024). Body Image and Other Mood Vulnerabilities in Adolescents with Polycystic Ovary Syndrome and Metabolic Alterations. *Children*, 11(5), 521-529.
- Clore, G. L., & Parrott, W. G. (2020). Moods and their vicissitudes: Thoughts and feelings as information. In *Emotion and social judgements* (pp. 107-123). Garland Science.
- Cohen, S. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health* (pp. 31–67). Sage Publications, Inc.
- Dingemans, A., Danner, U., & Parks, M. (2017). Emotion regulation in binge eating disorder: A review. *Nutrients*, 9(11), 1274-1282.
- Fleshner, M & Johnson, J. D. (2007). *D. Stress and Innate Immunity*. In Endogenous Extracellular Hsp72 Release Is an Adaptive Feature of the Acute Stress Response (pp. 20-40).
- Gormally, J. I. M., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive behaviors*, 7(1), 47-55.
- Gullone, E., & Taffe, J. (2011). The Emotion Regulation Questionnaire for Children and Adolescents (ERQ–CA): A Psychometric Evaluation-Psychological Assessment. *Advance Online Publication*. DOI, 10, a0025777.
- Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child development*, 67(3), 928-941.
- Khaled, K., Tsofliou, F., Hundley, V., Helmreich, R., & Almilaji, O. (2020). Perceived stress and diet quality in women of reproductive age: A systematic review and meta-analysis. *Nutrition Journal*, 19(1), 1-15.
- Khan, A. Y. R., Abdullah, M. A., Gul, R., Bhutta, H. R., Imran, M., Mazhar, S. B., & Tariq, N. (2024). Prevalence of Anxiety and Depression Among Women With Polycystic Ovarian Syndrome: A Cross-Sectional Study From a Tertiary Care Hospital of Islamabad, Pakistan. *Cureus*, 16(1), 1-12.
- Manchanda, S., & Bhatt, S. (2024). Comparing Anxiety, Depression, Stress, Eating Behaviour, and Health Promotion in PCOS and Non-PCOS Individuals. *International Journal of Interdisciplinary Approaches in Psychology*, 2(4), 1498-1521.
- Moore, B. C., Biegel, D. E., & McMahon, T. J. (2011). Maladaptive coping as a mediator of family stress. *Journal of social work practice in the addictions*, 11(1), 17-39.
- Muhtadie, L., Haase, C. M., Verstaen, A., Sturm, V. E., Miller, B. L., & Levenson, R. W. (2021). Neuroanatomy of expressive suppression: The role of the insula. *Emotion*, 21(2), 405-414.

- Nyimbili, F., & Nyimbili, L. (2024). Types of Purposive Sampling Techniques with Their Examples and Application in Qualitative Research Studies. *British Journal of Multidisciplinary and Advanced Studies*, 5(1), 90-99.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications: Newbury Park London New Delhi.
- Pirotta, S., Barillaro, M., Brennan, L., Grassi, A., Jeanes, Y. M., Joham, A. E., ... & Moran, L. J. (2019). Disordered eating behaviours and eating disorders in women in Australia with and without polycystic ovary syndrome: a cross-sectional study. *Journal of clinical medicine*, 8(10), 1682.
- Reaney, M., Paty, J., Black, P., Elash, C. C., Martin, M. L., & Eek, D. (2015). The Conceptual Framework and Content Validity of the Polycystic Ovary Syndrome Patient Reported Outcome (Pcos-Pro) Scale. *Value in Health*, 18(7), 742-754.
- Rosenbaum, D. L., & White, K. S. (2013). The role of anxiety in binge eating behavior: a critical examination of theory and empirical literature. *Health psychology research*, 1(2), 19-27.
- Sharma, D. K. (2018). Physiology of stress and its management. *Journal of Med Stud Res*, 1(1), 1-5.
- Singh, S., Pal, N., Shubham, S., Sarma, D. K., Verma, V., Marotta, F., & Kumar, M. (2023). Polycystic ovary syndrome: etiology, current management, and future therapeutics. *Journal of Clinical Medicine*, 12(4), 1454-1462.
- Tang, R., Yang, J., Yu, Y., & Fang, Y. (2022). The effects of cognitive behavioral therapy in women with polycystic ovary syndrome: A meta-analysis. *Frontiers in Psychology*, 13(1), 1-11.
- Wang, Y. X., & Yin, B. (2023). A new understanding of the cognitive reappraisal technique: an extension based on the schema theory. *Frontiers in Behavioral Neuroscience*, 17(1), 180-192.