INTERPLAY OF MENTAL TIME TRAVEL, EXECUTIVE FUNCTIONING, AND SELF-REGULATION WITH EMOTIONAL WELL-BEING OF UNIVERSITY STUDENTS

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Candidate of **Master of philosophy** at the National University of Modern Languages do hereby declare that the thesis **" Interplay of Mental Time Travel, Executive Functioning, and Self-regulation with Emotional Well-being of University Students "** submitted by me in partial fulfillment of MPhil degree. It is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

I also understand that if evidence of plagiarism is found in my thesis/dissertation at anystage, even after the award of a degree, the work may be cancelled, and the degree revoked.

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ABSTRACT

Title: Interplay of Mental Time Travel, Executive Functioning, and Self-regulation with Emotional Well-being of University Students.

Mental time travel (MTT) is the capacity to mentally transport one's self to the past or future and is widely considered an important factor to the development of executive functions and self-regulation, as well as, emotional well-being (EWB). The purpose of the current research was to investigate the relationship between MTT and the emotional experience of university students as mediated by executive functioning (EF) and self-regulation (SR). For this study, 515 undergraduate students, aged 18-25 years (M=21.55, SD=2.06) were recruited through convenience sampling from different universities of Rawalpindi, Islamabad and Karachi. This research was conducted in two parts. For the first phase (pilot study) of the study, the psychometric characteristics of the chosen measures were assessed in order to verify their suitability in measuring the variables of interest in the Pakistani context. In the second phase (main study), Prospective and Retrospective Memory Questionnaire (PRMQ), Adult Executive Functioning Inventory (ADEXI), Cognitive Flexibility Scale (CFS), Short Self-Regulation Questionnaire (SSRQ) and Emotional Well-being Scale (EWBS). The results revealed a significant positive correlation between mental time travel (both prospective and retrospective) with positive emotional well-being. Regression analyses showed that MTT significantly predicted different components of EF including working memory, inhibitory control and cognitive flexibility. The results also showed that there is a sequential mediation of the relationships between mental time travel and emotional well-being by executive functioning and self-regulation. Analysis for group differences indicated that gender on the study variables yielded non-significant results. However, employed students had significantly higher means in positive emotional well-being and self-regulation than unemployed students. These results underscore the need for specific interventions that foster the MTT and EF competencies of university learners in order to help improve their overall emotional health and self-regulation. The study provides important findings to educational policymakers, mental health professionals, and scholars, which restate the importance of using multifaceted approaches to enhance students' academic and psychological performance.

TABLE OF CONTENTS

TABLE OF CONTENTS

1. INTRODUCTION

2. LITERATURE REVIEW

3. METHOD

4. ANALYSIS AND INTERPRETATION OF DATA

4. SUMMARY, DISCUSSIONS, CONCLUSIONS AND SUGGESTIONS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

MTT	Mental Time Travel
RMTT	Prospective Mental Time Travel
PMTT	Retrospective mental Time Travel
EF	Executive Functioning
WM	Working Memory
IC	Inhibitory Control
CF	Cognitive Flexibility
SR	Self-regulation
EW	Emotional Well-being
PEW	Positive Emotional Well-being
NEW	Negative Emotional Well-being
PRMQ	Prospective-Retrospective Memory Questionnaire
ADEXI	Adult Executive Functioning Inventory
CFS	Cognitive Flexibility Scale
TSSRQ	The Short Self Regulation Questionnaire
EWBS	Emotional Well-being Scale

LIST OF APPENDICES

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DEDICATED

TO

Ammi & Abbu

May Allah’s grace and blessings always surround them.

CHAPTER 1

INTRODUCTION

University students represent a vulnerable population, transitioning from adolescence to early adulthood, navigating their academic, social, career, and familial complexities. These challenges profoundly shape their emotional experiences and cognitive processes that potentially leads to either adaptive or mal-adaptive lifestyle patterns. The core of this phenomenon is mental time travel, where undergraduate students often reflect on their academic journey, anticipate future career prospects, and contemplate personal relationships and familial responsibilities. This age group experiences a pivotal juncture marked by a constant oscillation between past experiences and future expectations.

Phenomenon of mental time travel which involves the ability of a person where he/she is able to transport him or herself in time to either the past or the future is widely held to be one of the most basic human mental processes. Meta-cognitive deficits are quite broad in nature that often involve disruption in the mental time travel and mental time travel serves as a fundamental aspect of psychopathology particularly in conditions like depression and anxiety. Exploring its implication with university students can go a long way in providing early notification on possible mental illnesses.

Other abilities such as working memory that is a component of the executive functions like planning and decision-making, are required to enable the process of mental time travel as well as self-regulation. Disorders in these areas have a direct effect on the feelings and emotions of an individual. Analyzing the relations between these factors would help to describe how students are able to cope with stress and emotions .

Relating to the ensemble hypothesis, it is stated that ability of mental time travel together with the executive functions and self-regulation are part of the superordinate cognitive system that developed as part of human cognitive toolkit. Studying these components in university students would serve to understand the developmental changes and their relation to the contemporary world. Therefore, concept of mental time travel, working memory and attention, and self-regulation interconnect and affect students' reactions to academic challenges and various contingencies. It is crucial to know such contacts in order to develop strategies with a view to improving the students' resistance and optimize learning climate. In this research, it is proposed to study these dynamics among university students in order to reveal patterns of successful adaptation and psychological resilience.

The purpose of the current research is to probe the complex relations between mental time travel, executive functioning, and self-regulation as well as emotional well-being of the university students. As a result, the present study aims to shed the light on the cognitive processes affecting the emotional state of the students.

1.1 Rationale

The proposed research intends to do the empirical analysis of the relationship between mental time travel, executive functioning, self-regulation and emotional well-being of the university students. It is being conducted in order to fill the lack of literature encompassing both theoretical and empirical research about the inter-relatedness of these psychological constructs and their implications for students' well-being and performance.

Drawing on research limitations and gaps in the literature concerning the role of mental time travel, executive functioning, self-regulation in university students' well-being, this study aims to explore the interplay between all these psychological factors. Previous research mainly only utilizes depression and distress as the corresponding variable of mental

time travel, rather ignoring its importance to the struggles of university students. University students are exposed to various stressors pertaining to academics, social relations, and individual attributes with a great impact on their emotional well-being, thus informing the rationale for studying mental time travel among this population of students.

The impetus for this investigation arises from the socio-academic realities of the university students' experience, encompassing learning demands, development transitions and personal stress, all of which might interfere with their emotional well-being. Reading through the correlation between mental time traveling, flexibility in shifting between cognitive tasks, self-regulation, and students' well-being, the study aims to offer insights that can be applied for developing appropriate instructional and assistance approaches for university students.

University students especially undergraduate groups are included within this study because they are part of the developmental period identified as longitudinally appropriate for looking back at previous events while at the same time alternatively looking forward to future occurrences. It is in this demographic that one can find a group of participants for examining the relationship between thinking about and traveling to the future and past, which is termed as mental time travel, executive functions, self-regulation, and emotional well-being.

Importance of emotional health of the university students is another factor that has triggered research interest given that students in universities are in a vulnerable stage in their lives. It is crucial to note that they go through so many changes that are so sensitive emotionally; a change of class, preceding pressure of having to score good grades, social changes, financial pressures all these lead to students achieving independence. This sample is therefore ideal for analyzing the interactions of mental time travel, executive functions, and self-regulation concerning emotional health.

Despite separate research on executive functioning, self-regulation, and emotional well-being among university students, there remains a lack of comprehensive understanding of their interconnectedness. Investigating the relationships among mental time travel, executive functioning, self-regulation, and emotional well-being promises insights into the underlying mechanisms shaping student welfare, contributing to a refined understanding of student well-being.

1.2 The Statement of the Problem

Concerns over the mental health and emotional well-being of university students have equally grown to be of major concern in recent past as more students are found to be suffering from anxiety, depression and stress (Williams & Penman, 2011). However, there is an astonishing lack of knowledge on how specific top-down processes like mental time travel, executive functions or self-regulation affect emotional well-being. Current research has mainly proposed discrete elements of mental health that have not been well examined in terms of how their combined burdens affect students' moods and overall emotional well-being.

This problem has an impact on a vast number of stakeholders, such as university students experiencing academic stress and, or personal difficulties. Also at times, the students, faculty, and the administrative staff are affected since they attempt to meet the students' emotional needs while addressing organizational requirements. Emotional ill-health is not an individual student's problem; it can be called as an organizational problem affecting student-outputs, student drop-out statistics and campus culture.

Lack of full focus on these interrelated problems could have devastating outcomes. There may occur raised rates of emotional disturbance which can lead to worsening academic results, high student attrition, and adverse future mental health outcomes (Douglass & Islam,

2009). Also, failure to investigate these cognitive-emotional relations might limit attempts at designing suitable strategies for enhancing emotional coping in learners.

As it is currently constructed, extant literature offers limited insights into the precise relationship between retrospectively and prospectively based mental time travel, on one hand, and executive function and self-regulation on the other hand for emotional processes. Even though research has been carried out on these cognitive processes to support learning in individual levels, there is limited literature that looks into the cumulative interaction of these processes in the way that they influence the emotional status of learners in university.

1.3 Research Objectives

- To explore the connection between mental time travel, executive functioning, self-regulation and emotional well-being of university students.
- To investigate the sequential mediating role of executive functioning and self-regulation between mental time travel and emotional well-being of university students.
- To explore the gender based mean differences of mental time travel among the university students.

1.4 Research Questions

- How are mental time travel and emotional well-being connected in university students?
- In what way does executive functioning affect the emotional well-being of university students?

- How does self-regulation mediate the effect of mental time travel on emotional well-being of university students?
- How do mental time travel, executive functioning, and self-regulation correlate with each other?
- Is there a relationship between the social outlook practices of mental time travel, executive functioning, self-regulation and emotional well-being of university students based on age gender or family type?

1.5 Hypotheses

H1. There is significant association between mental time travel and emotional well-being in university students.

1a. There is positive association between prospective mental time travel and positive emotional well-being.

1b. There is negative association between prospective mental time travel and negative emotional well-being.

1c. There is negative association between retrospective mental time travel and positive emotional well-being.

1d. There is positive association between retrospective mental time travel and negative emotional well-being.

H2. There is significant positive correlation between mental time travel (prospective ans retrospective) and executive functioning (working memory, inhibitory control, and cognitive flexibility) in university students.

H3. There is a significant relationship between executive functioning and emotional well-being in university students.

3a. There is a positive relationship between executive functioning (working memory, inhibitory control, and cognitive flexibility) and emotional well-being (positive).

3b. There is a negative relationship between executive functioning (working memory, inhibitory control, and cognitive flexibility) and emotional well-being (negative).

H4. There is significant positive association between mental time travel (prospective and retrospective) and self-regulation in university students.

H5. There is significant positive correlation between executive functioning (working memory, inhibitory control, and cognitive flexibility) and self-regulation of university students.

H6. There is significant relationship between self-regulation and emotional well-being in university students.

6a. There is positive relationship between self-regulation and emotional well-being (positive).

6b. There is negative relationship between self-regulation and emotional well-being (negative).

H7. Mental time travel is a significant predictor of emotional well-being of university students.

H7a. Mental time travel (prospective) is a positive predictor of emotional well-being (positive).

H7b. Mental time travel (retrospective) is a positive predictor of emotional well-being (negative).

H8. Mental time travel (prospective and retrospective) is a positive predictor of executive functioning (working memory, inhibitory control, and cognitive flexibility) in university students.

H9. Mental time travel (prospective and retrospective) is a positive predictor of self-regulation in university students.

H10. Executive functioning (working memory, inhibitory control, and cognitive flexibility) is a positive predictor of self-regulation in university students.

H11. Self-regulation is a predictor of emotional well-being in university students.

H11a. Self-regulation is a positive predictor of emotional well-being (positive).

H11b. Self-regulation is a negative predictor of emotional well-being (negative).

H12. Executive functioning (working memory, inhibitory control, and cognitive flexibility) and self-regulation sequentially mediate the relationship between mental time travel (prospective and retrospective) and emotional well-being (positive and negative) in university students.

H13. Females exhibit greater executive functioning skills and self-regulation than males.

H14. Males exhibit higher levels of positive emotional well-being whereas females demonstrate greater tendency towards negative emotional well-being.

1.6 Conceptual Framework

The conceptual framework of this study seeks to lay out interconnections between prospective and retrospective mental time travel, executive functioning (working memory, inhibitory control, cognitive flexibility), self-regulation and emotional well-being; that has been used to explain how university students plan, organize and regulate their thoughts, actions and feelings. The key to this framework is the independent variable, mental time travel. Studies have shown that, mental time travel will improve emotional regulation by virtue of giving a wider-angle view of them, thus, leading to improvement of their emotional status (Williams & Penman, 2011).

The first mediator is executive functioning; Mental time travel depends on interactively receiving context information from Executive functioning while, on the other hand, executive functioning or any given sub-domain of executive functioning contributes to higher quality of mental time travel.

The second mediator is self-regulation; Better executive skills lead to better regulatory skills that are crucial for the emotional well-being of an individual (Douglass & Islam, 2009). The sequencing depicted in this framework is that mental time travel results in better Executive functioning, thereby improving self-regulation and, therefore, greater emotional well-being among university students. Given below is the theoretical basis for the conceptual framework of this study.

Tulving's Autonoetic Consciousness (Tulving, 1985): According to Tulving's theory of MTT, there is an improvement in decision making because the MTT helps people retrieve past experiences or create future experiences. These abilities lie within executive functioning's skill set of plan and problem develop and solve, two indispensable assets of executive functioning.

Miyake and Friedman's Unity and Diversity Model (2000): In its turn, EF helps individuals control their prompts, sustain attention and adapt the enacted method in the process if necessary. The model identifies EF as necessary for turning the knowledge that MTT has into plans and conducive behaviors.

Self-Regulation Theory (Baumeister & Vohs, 2007): The theory also supports the principals of the theory that well-functioning EF is necessary for self-regulation. For instance, inhibitory control avoids engaging in a specific activity with no proper thinking, working memory helps to pursue goals to their accomplishment and cognitive flexibility enables one to change from one goal to another.

Broaden-and-Build Theory of Positive Emotions (Fredrickson, 1998): Self-regulation has positive effects on emotional health because successful self regulation leads to appropriate coping with stress and goal attainments. Self-regulation is strengthened, in the long run, by positive emotional experiences.

MTT (Tulving, 1985) is the source of cognitive advance agency for EF (Friedman & Miyake, 2000) for planning and decision. In turn, EF supports self-regulation (Baumeister & Vohs, 2007) as a process of volitional regulation of cognitive processes and behaviour. Self-regulation is the last facet because it facilitates an ideal affect and results in positive emotional functioning (Fredrickson, 1998).

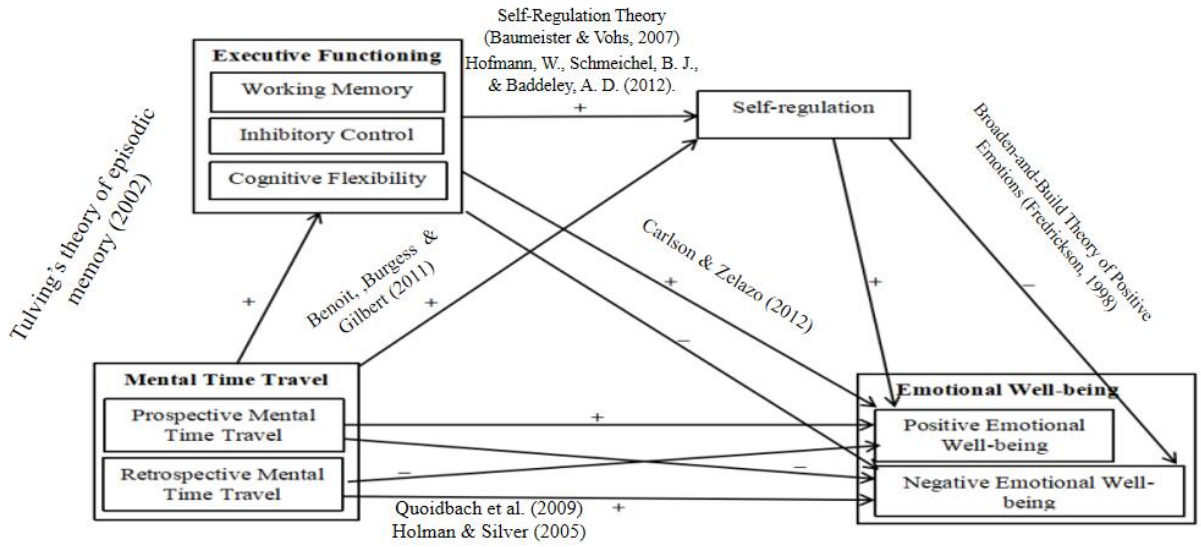

Figure 1.1 Conceptual Framework of the Study

1.7 Operational definitions

1.7.1 Mental Time Travel

Mental time travel (MTT) defines a process by which an individual mentally transports oneself back in time in an effort to relive past incidences (retrospective memory); or transports oneself to the future in view of prospective events (prospective memory). (Smith et al., 2000). In this study, the MTT is attained by using the Prospective and Retrospective Memory Questionnaire (PRMQ) consisting of 16 items, to be used to quantify the estimated memory of an individual and their capability of recalling past experiences and planning or remembering their intentions in future effectively presenting a standard test of both the retrospective and prospective parts of MTT.

The 16-item PRMQ consists of 2 sub-categories i.e. prospective and retrospective memory, each represented by 8 items. It's a 5-point Likert scale ranging from (*1=Very Often/Mostly to 5=Never*). Higher mean scores represent greater frequency of respective memory failure.

1.7.2 Executive Functioning

Executive functioning (EF) is often described as the higher order cognitive skills which are the ability to: maintain relevant information in mind and manipulate it (working memory); resist a dominant response and wait for a more appropriate one with a higher reward value (inhibitory control); and switch back and forth between two or more mental sets (cognitive flexibility). In this study, executive functioning is quantified utilizing the Adult Executive Functioning Inventory (ADEXI) developed by Holst & Thorell (2018). It only focuses on working memory and inhibitory control. Working memory is assessed using 9 items in the ADEXI while inhibitory control is under 5 items all on a 5-point Likert scale

(*1=Definitely not true, 2=Not true, 3=Partially True, 4=True, 5=Definitely true*). Higher scores on each sub-scale would predict higher working memory and better inhibitory control.

To measure the third component of executive functioning i.e. cognitive flexibility (CF) is measured by Cognitive Flexibility Scale (Martin et al., 1995). This is 12-item scale obtained from 6-point Likert scale (*1=Strongly Disagree, 2=Disagree, 3= Slightly Disagree, 4= Slightly Agree, 5=Agree, 6=Strongly Agree*). It is important to note that the higher the scores within CFS, the greater the cognitive flexibility of the respondents.

1.7.3 Self-Regulation

Self-regulation is the ability to regulate ones thinking, feeling, and activeness in order to achieve personal goals. It entails controlling of impulses, sustaining attention and changing behavior in response to new stimuli. In this study, self-regulation is evaluated with Short Self-Regulation Questionnaire (SSRQ) (Carey et al., 2004) that concern the goal directed self-control and adaptive behavior of the respondents. The SSRQ is a a 31-item scale derived from 5 point Likert scale ranging from (*1=Strongly Disagree to 5=Strongly Agree*) where a higher value is an indication of improved self-regulation skills.

1.7.4 Emotional Well-Being

Emotional well-being can be defined as the occurrence of positive affective states, including happiness, satisfaction, or contentedness on one hand, and negative affective states such as distress, sadness, dissatisfaction on the other. The participants' level of emotional well-being is assessed via the Emotional Well-being Scale (EWBS) by Simsek (2011) in the present study. EWBS is composed of 14 items with the Likert scale of 1 to 5 where (*1=Very slightly or not at all, 2=Slightly, 3=Moderately, 4=Very, 5=Extremely*). Positive and negative emotional well-being is represented 7 items each in the EWBS. The present study considers both categories separately where higher scores on each sub-scale

indicate higher level of respective category (either positive or negative emotional well-being).

CHAPTER 2

LITERATURE REVIEW

2.1 Mental Time Travel

Mental Time Travel is defined as people's ability to mentally transport themselves in time and revisit events that were done before, or envision events which are planned in the future. This idea has been employed in numerous cognitive-developmental psychology related works and apparent from research about own-perspective self, goals, adjustment, and attachment (Tulving, 2002; Suddendorf & Corballis, 2007).

Brocas and Carrillo introduced an overview of the theoretical model regarding MTT with attention as the key element. Based on their theory, attention initiates a memory-based model that encodes the novel events, helps in recalling during MTT, and improve decision making. This memory-based process is accompanied by the second habit process which treats all other events as equal. (Brocas & Carillo, 2018). The framework of the memory indicates that the memory-based model is most helpful in environments where new experiences are probable to shape future courses of action and therefore require accurate recall. On the other hand, the habitual mode is more beneficial when the environment is fixed or the likelihood of an event's repeat is low. The authors suggest that the application of such dual-proces IM framework can illuminate the differential evolutionary pathways of the human MTT compared to other species. They also extend their speculations relative to decision-making in the light of their theory.

Following Tulving's classical view (1985a), memory has the singular function of allowing people to transport their minds through both the past and the future. This MTT enables a person to remember past occurrences, evaluate them, and use the knowledge to

avoid possible risks or make right choices about future actions. Episodic memory is at the center of MTT, it stores and processes personal experiences as silent movies. Episodic memory supports the ability to use appropriate past experiences to build or generate a scene that incorporates the event in question or imagine what might happen if the situation occurs in the future. (Tulving, 1895)

Mental time travel (MTT) has been divided into retrospective mental time travel (RMTT), where a person is asked to recall experience of the past and prospective mental time travle (PMTT), where the person has to imagine future scenarios. Investigations also proved that MTT employs considerable use of episodic memory which is a memory system that enables retrieval of events with contextual details more appropriately put, (Klein, 2013). For example, episodic recall in MTT was studied by Klein and Nichols (2012); they noted that those who generated more detailed episodic memories do report to have more vivid mental time travel ability, especially of past personal events. Moreover, MTT has been associated with functional connectivity with brain regions including the hippocampus for memory retrieval and the prefrontal cortex for planning as examined by (Addis et al., 2007). Addis and coworkers (2007) revealed that both the retrospective and prospective MTT generated the similar patterns of neural connectiveness, in support of the conclusion that there are overlaps between the neural substrates for remembering and imagining.

Mental time travel rises gradually with the development milestones assayed at preschool age (Atance & O'Neill, 2005). While prospective MTT increases with age and children's development of a proper understanding of time, cause and effect, overall MTT skills may be influenced by experiences during early childhood. Atance and O'Neill (2005) conducted a study to investigate the planning and viewing of future possibilities by young children, the authors observed that whereas children prior to middle childhood may be able to plan simple future requirements, the organization and sophistication of their visions becomes

considerably richer and more intricate during middle childhood. During adulthood, MTT is vital in executive functions to enable a person set long term goals for him or her and effectively deal with personal circumstances (Spreng Levine, 2006). Spreng & Levine (2006) using data from older adults indicated that retrospective MTT is frequently found to deteriorate with ageing despite relatively maintained prospective MTT.

MTT also affects self-identity because the thinking about the past and future selves helps form a cognitive structure of self-identity (D'Argembeau et al., 2012). In their study, D'Argembeau and colleagues (2012) also identified when and how frequently people engage in future-oriented MTT. It makes sense that engaging in more future-oriented MTT results in higher levels of self-continuity and purpose. Further, and in support of this category, more frequent and positive prospective MTT has been found to positively predict psychological well-being since it encourages optimism and positive goal cognizance (Arnold et al., 2011). On the other hand, negative MTT including worry about past mistakes or concern over the future is related with heightened level of depressive and anxious symptoms (Brown et al., 2013).

Imaginative temporal perspective is generally disrupted in clinical samples, including those with depressive/anxiety disorders (Williams, et al., 2007). An analysis of MTT in the major depressive disorder participants revealed that such patients are less future-oriented; they are likely to often produce negative outlooks as they imagine themselves in the future. These negative prospective MTT have been associated with decreased motivation and goal-setting approach/behavior in these groups, and that attempts to boost MTT may hold potential for the mental health of people in general (MacLeod et al., 2008). MacLeod et al. (2008) also showed that the focused future-orientated exercises enhance both MTT and mood in depressive spectrum disorders, making positive prospective MTT can be important therapeutic aim.

2.1.1 Prospective Mental Time Travel

Prospective mental time travel (PMTT) is the ability to mentally travel into the future, in other words, to develop and execute plans into the future, and is a prime component of goal-directed functioning and motivation. Cross sectional research shows that PMTT is critical at goal difficult in that it enables one to envision the goals, future and develop methods to achieve them (Schacter et al., 2007). Schacter and Addis (2007) employed functional neuroimaging to investigate the neural substrates of PMTT and discovered that the parietal sector of the brain, which is associated both with future, real and hypothetical, as well as the hippocampus and medial prefrontal cortex engaged in self-generated imagery, are all regions that are active during prospective remembering. Indeed, there is a double dissociation: there is a clear overlap of the episodic memory and the future-directed thinking, namely how our past experience shapes our expectations of the future.

From a developmental perspective, the capacities to use PMTT increases in complexity throughout the life cycle. Atance and Jackson (2009) further showed a general improvement in children's ability to plan future in advance, with steep developmental progression in the middle childhood stage as children learn about cause effect relationships and time contingencies. This developmental trajectory bears important significance for studying life span changes and individual development, as reasoning level usually rises with higher PMTT capabilities while adults with high level of planning abilities are characterized by increased levels of resilience (Spreng&Levine, 2006). Neuropsychological research indicates that a mindful impairments in PMTT, including the inability to anticipate positive eventualities, presence in depressed patients is often accompanied by reduced motivation and the lack of goals among them (MacLeod et al., 2008).

2.1.2 Retrospective Mental Time Travel

Retrospective mental time travel (RMTT) encompasses thought processes that are characterized by mentally performing or going through past events, and focuses on the self-relevant event. RMTT is critical for autobiographical memory for personal identity through the construction of a narrative on experience (Conway & Pleydell-Pearce, 2000). The findings of research on RMTT prove this theory, as adoption of RMTT benefits identity development and processing of emotions due to the ability of recalling particular incidents and making meaning of them (Klein, 2013).

Depressive symptoms are traditionally associated with impaired RMTT in clinical settings. According to Williams et al. (2007) autobiographical memories of patients with depression are often characterized by more general recall, and negative content with poor specificity. This overgeneral memory style might actually decreases the exposure to particular positive experiences that could function to control stress. As such, these impairments in RMTT may result to rumination since the client concentrates on negative events without searching for details which can be constructive. It makes different from GAD that anxiety disorders are mostly related to selective RMTT, which means that people tend to rehearse past threats or failures and restore fear and anxiety feeling again and again (Brown et al., 2013).

Prospective and retrospective mental time travel are different but related needs of the human cognitive and affective system. While PMTT brings into existence planning and future oriented adaptation, RMTT relies more on identity and emotional reading based on experiences that one has encountered. Understanding the relative differences of each type of MTT, including how each is associated with mental health issues, may be used to provide

data regarding adaptability and suggests possibilities for therapeutic approaches in those suffering from mood disorders.

2.2 Emotional Well-being

` Emotional well-being (EW) is the capacity to feel and show positive affects and efficiently regulate both positive and negative emotions across the life course (Keyes, 2005). It comprises affective state or emotional responses to daily experiences and psychological states such as satisfaction with life, sense of purpose and of personal development (Ryff, 1989). Positive emotional well-being is characterized by happiness, satisfaction and hope, negative on the other hand is characterized by depression, anxiety, or stress. Higher scores on emotional well-being measures are generally positively correlated with enhanced psychological functioning, positive evaluation of life and improved mental health (Simsek, 2011).

Emotional well-being (EW) is an optimally functioning individual at the optimal level in terms of positive affect and a low level of negative affect in a given period of time (Keyes, 2005). It incorporates hedonistic happiness, that is, mood in response to daily events, and eudaimonic well-being, that is characteristics such as life satisfaction and perceived meaning and meaning in life (Ryff, 1989).

Some researchers have reported that university students have their own special pressures, which heave effects on the aspects of their emotions. Hunt and Eisenberg (2010) established that out of every two students at the university, one has high levels of stress and psychological problems such as depression and anxiety. These problems can be academic related issues, management of time and other social issues which make it very hard for students to sustain positive emotional well-being. This is especially due the transition to university life. (Choi et al., 2018).

Schwarzer et al. (2017) showed in longitudinal study, that students with higher levels of reported emotional well-being, academic results, and life satisfaction were also better at health and social relationships . Specifically, the study pointed out that emotional well-being has the status of a preservative factor for the occurrence of burnout and stress in academic situations, and emotionally stable students will have better coping with the academic and personal conditions. Moreover, positive emotional well-being correlated with academic resources, where increased positive emotional experience was associated with higher ability to deal with academic and personal adversities (Ong et al., 2010).

However, it is worth mentioning that negative emotional well-being might lead to numerous severe mental and physical problems in a student. According to Conley et al. (2013), although positive affect has significant correlation with students' positive psychological health and negatively associated with negative affect, the negative affect was found to be strongly linked to loneliness, reduced motivation, poor physical health including fatigue and sleep disturbances. These results suggest for encouragement motives other than self-enhancement and principle reinforcement that assist the students in the avenues of positive emotional regulative and demoral propositions of negative emotional occurrences for both satisfactory university life and academical successes.

2.2.1 Positive Emotional Well-being

Positive emotional well-being (PEW), in particular, has been reported to relate positively to psychological and physical health, coping, and hardness (Diener et al., 1999). A study found that individuals with higher positive emotional well-being are, overall, more satisfied with life and have better social relationships presumably because positive emotions can interact with stress to elicit resilient, adaptive behaviour (Fredrickson, 2001). In a university setting PEW is related to enhanced performance and study related motivation since

students with higher PEW are well placed to deal with academic demands and sustain motivation (Schwarzer et al., 2017).

A study shows that PEW enhances executive function and specifically cognitive flexibility therefore implying that students are able to think in more than one way and find more than one solution to every problems (Isen, 2000). For example, Ong et al. (2010) showed that those students who experience positive affective states more frequently describe their overall life satisfaction as higher, and burnout frequency as lower. Social and emotional learning programs upholding the perception of enhanced worth, gratitude, and optimism – known as PEW – have been reported to improve student's emotional health and academic success (Emmons & McCullough, 2003) through daily gratitude exercise as well as mindfulness practice.

2.2.2 Negative Emotional Well-being

Negative emotional well-being (NEW) refers to the other type of emotional well-being condition, comorbing affective states such as sadness, anxiety, and anger that become comparatively mal-adaptive if chronic. Long standing negative affect has been reported reflect poor health outcomes including some commonly observed mental health issues such as depression and anxiety disorders and impacts academic and social achievement of the students (Hunt & Eisenberg, 2010). NEW decreases the motivation of university students, reduces their contacts with peers and compromising their academic results due to negative emotions which affect the cognitive processes and turn them into a ruminative kind of thinking, (Conley et al., 2013).

Research indicates that high levels of NEW may affect thinking abilities in a negative way, deterioration of psychological flexibility and executive skills, as constant stress and concern take up cognitive space (Lyubomirsky et al., 2006). It is also believed that university

students with high NEW have poor physical health which includes consequences such as sleep disturbances, fatigue, all of which leads to the deterioration of the overall well-being of the students. Cognitive behavioral techniques and stress reducing measures have been shown to help enhance mental health and self control over NEW in students as suggested by (MacLeod & Fernando et al., 2008) in their studies.

2.3 Mental Time Travel and Emotional Well-being

It has been found that MTT has a strong relationship with emotional well-being as both the retrospective as well as prospective MTT has the ability to reduce stress along with helping the individuals achieve goals and build resilience, according to findings by D'Argembeau et al. (2012). It is also found that MTT may have a moderating role in the relationship between well-being and other psychological concepts including resilience, coping resources and self esteem (Levine & Spreng, 2006). Taking into consideration retrospective and prospective MTT scenarios, students are capable of drawing on positive emotional resources, promoting their academic/school and interpersonal lives, with cultivating resilience and growth orientation (Ong et al., 2010). For example, students who can look back to achievements and picture further accomplishments are likely to experience positive affect emotions and readiness to face skills demands. These MTT abilities combine to promote resiliency so that the students are able to protect themselves emotionally when under stress.

A number of clinical reports suggests that positive MTT, including CBT techniques which promote positive recall and positive imagining, leads to better subjective well-being in students (MacLeod et al., 2008). These results indicate that the efficiency of different mental time travel based programs would possibly be expressed in the decrease of negative affective processing modes, including rumination and worry.

2.3.1 Prospective Mental Time Travel and Emotional Well-being

The planning section of the MTT operates by displaying possible future situations, hence the term prospective mental time travel (PMTT) in relation to achieving goal and optimism. This helps to looking forward in enabling positive requisite individuals in preparing for these positive events hence improving on motivation and on the emotional health of the individuals (MacLeod et al., 2008). A study explores such beneficial effects of prospective MTT involves linking it to enhanced levels of life satisfaction and reduced levels of psychological distress because people are more hopeful and resolved when they develop positive thoughts about the future. When comparing the results of the prospective MTT in university students, MacLeod and Conway (2007) identified that the students who scored higher on the positive MTT often reported better levels of optimism and overall emotional health. Students are likely to stay motivated and avoid developing negative thoughts about failure in academic or other related settings through encouraging them to think positively and imagine success.

However, negative prospective MTT, defined as concerns in relation to concerns about future, trouble, and worry, was associated with the higher level of anxiety and lower quality of emotional well-being (Brown et al., 2013). In university students, persistent preoccupation with academic or social consequences results in chronic stress and negative impact on well-being because these negative expectations enhance fear of failure and self-questioning (Hazlett-Stevens, & Craske, 2002). Specifically, negative prospective MTT can counterproductive for a student, especially for those who have a high frequency in their thinking pattern; it is hard to maintain optimism in achieving academic and personal goals.

2.3.2 Retrospective Mental Time Travel and Emotional Well-being

Retrospective mental time travel (RMTT) or mentally travelling through time necessary for narrative construction, generating positive meaning from the event occurrence and emotion regulation (Conway and Pleydell-Pearce, 2000) . When it comes to Positive retrospective MTT, people describe significant personal accomplishments and happy memories, it increases people's well-being because it adds to their self-esteem and satisfaction (D'Argembeau & Van der Linden, 2008). In their study of university students, Rasmussen and Berntsen (2009) showed that students with high level of positive retrospective MTT had higher positive mood and greater life satisfaction. In other words, such a positive memory helps students to buffer stress during some difficult circumstances, and enhances their mental health in some way.

On the contrary, inappropriate use of negative retrospective MTT including brooding which refers to focus on past failures or regrets, is said to have negative link with emotional well-being as it leads to increased symptoms of depression and anxiety as postulated by Williams et al., (2007). Self-reported negative past memories can make university students more vulnerable to stress since negative states get repetitive without successful resolution (Lyubomirsky et al., 2006). This can interfere with the students' adaptive emotional processing, by dampening positive moods which is vital in helping the students restore their emotional equilibrium.

Research have confirmed that PMTT and RMTT are significant for emotional functioning because they enable the individual to focus on the successful outcomes of the past and the expected achievement in the future. Students who give positive content to PMTT, like how success and positive outcomes will be like feel better emotionally in spite of challenges since they help students build hope and motivation for success (MacLeod et al.,

2008). On the other hand, students with negative RMTT (rumination on past failure) may tend to have the reduced emotional well-being caused by the underline cost of ruminating on negative experience (Williams et al., 2007).

2.4 Executive Functioning

Executive Functioning (EF) can be described as a complex ability of enhanced or higher cognitive processes that are instrumental for goal directed behavior, decision making, and self-regulation (Miyake et al., 2000). EF is directly involved in handling academic chores, managing emotions and extra curriculum desires hence it is important to university students who experience exhaustion of cognitive and more emotional challenges. Fortunately, the use of executive functioning skills is positively correlated with performance, stress control, and general satisfaction as these skills assist the students with organizing assignments, modulating feelings, and responding to new tasks (Blair & Razza, 2007). Working memory, inhibitory control, and cognitive flexibility make up the basic structure of EF in students and independently have different impacts on their achievements and well-being.

Executive functioning is crucial for university students, especially for those who are experiencing high levels of expectancies for self-organised learning, time management and social integration. The outcomes of the studies indicate that students with well developed EF skills make good grades because they are capable of planning and managing time when exercising their skills (Best & Miller, 2010). Executive functioning skills drill often assist the students in how to deal with amount of information at school, how to concentrate on tasks and how to deal with other tasks and assignments at the same time. It is also very useful for stress regulation as within such framework individual can set achievable aims, observe own performance and modify it when necessary (Blair & Razza, 2007).

Also, EF skills promote students' socio-emotional aspects of learning and development. Students who join universities must be able to deal with many people of different backgrounds, handle many issues within social settings, and even live away from home ever for the first time. EF skills like inhibitory control and cognitive flexibility empower an individual to engage in effective communication, manage conflict, and adapt other diverse things (Zelazo, Carlson). Strong executive functioning also tends to be related with optimal self- regulation for stress and adversity since those students who are efficient in regulating themselves tend to have higher level of life satisfaction and lower level of depression and anxiety (Hofmann et al., 2012).

2.4.1 Working Memory

The ability to store the information temporarily and manipulate it. Is important for most higher order activities such as learning and problem-solving (Baddeley, 1992). On the academic side, Working memory helps to retain and transform the information, comprehend instructions with sequences of steps, and do complex tasks. Specifically, working memory has been shown to positively correlate with academic performance and stress management because of the each individual and his/her ability to learn and manage information in a short and effective manner.

Memory also has behavioral aspect, and students can use their work-related working memory to re-appraise negative thought patterns or to recall constructive ways of coping with a task in case of difficulties (Schmeichel & Demaree, 2010). Working memory on the other hand has been linked to problems in regulating emotions and higher level of academic stress, this is perhaps due to poor working memory since students have been associated with high levels of stress and poor ability to focus on task (Gathercole & Alloway, 2008).

2.4.2 Inhibitory Control

Inhibitory control, or the capacity to override a dominant response toward a conflicting one that helps pursue goals and modulates behavior and emotion, are central to decision making (Barkley, 1997). This skill enables university students to avoid getting distracted, learn how to control impulses as well as to concentrate on long-term objectives as a learner, worker, and a person. Proper inhibitory control especially aids in scholastic learning since it helps students avoid procrastination, distractions and ensures they have an ability to study for longer duration (Duckworth & Seligman, 2005).

Inhibitory control is beneficial for the emotional aspect for the same reasons that it benefits the behavioral aspect, as inhibitory control can keep impulsive emotions from getting in the way and from making toxic decisions for the students' academic and social well-being. For instance, when students re with high inhibitory control, they will easily cope with pressure without being hasty in their reaction, therefore will have minimal or trivial anxiety, and or pressure (Diamond, 2013).

2.4.3 Cognitive Flexibility

One of the identified major functions of executive functioning is cognitive flexibility (CF), which reflects the capacity of the individual to change from one perspective to another, as well as accommodate new data, and switch to other approaches when solving problems (Deak, 2004). First, high levels of CF are useful in handling academic pressure since university users can easily shift perspectives, accommodate themselves to various approaches to studying and task management and adapt to pressure put forward by their academic pressure (Friedman & Miyake, 2012). Another aspect of CF is also significant in social situations or in organizations since students will have to switch between applying the interactional and transactional modes of behavior as required by the distinct interactions.

From the aspect of emotional health, Cognitive flexibility enables adaptive regulation coping styles because the thought process of students can easily change from negative or dysfunctional patterns to positive and effective coping styles. It has also emerged that there is a negative correlation between the trait of cognitive flexibility and tendency to ruminate over negative event or adopt a negative coping strategy which is beneficial to the development of hardness and emotional resilience in the individual (Davis et al., 2004). Whereas cognitive flexibility, was found to be negatively correlated to stress levels, as well as academic and social achievement, low levels of this characteristic can result in rigid thinking patterns, high stress levels and the inability to cope with stresses associated with academic and social changes and demands (Dennis & Vander Wal, 2010).

2.5 Self-regulation

Self regulation has one defining characteristic which is the self control people demonstrate in their daily lives as they seek to achieve long term objectives. It comprises direction, visibility, control, responsiveness, and regulation of impulses in the course of challenges. Being able to manage oneself is another quality that can be thought of as foundational for personal, academic, and career success correlates with initial and higher mental well-being, resilience and adaptive coping (Baumeister and Vohs 2007; Zimmerman 2000).

Self- regulation is vital for emotional health especially in acute stressors contexts as is university. Duckworth et al. (2007) established that students in their samples with greater self regulation had better grades, less anxiety and more positive well-being. Students are also able to control negative emotions, have long-term perspectives, and do not get burned out which will overall be beneficial for their emotional health.

This skill is central to dealing with the challenges of every day life, especially for university students who are in a position of receiving academic and social challenges that demands hardworking, initiative in handling stress, ability in dealing with adversity. Self-regulation keeps the students motivated on tasks and encourages the ability to delay rewards, and work towards completing academic and personal-achievement goals, making it a key to success in higher learning (Pintrich, 2004).

Self-regulation has long been associated with academic achievement because learners are able to effectively plan, solve academic pressure and maintain focus on long-term goals when studying (Zimmerman and Schunk, 2011). For example, students with effective self-regulation are more likely going to prepare good study timetables, focus on priorities as well as the removal of distracters. These students are also have the sense of higher academic resilience because when they failed, they can change their goals and approaches toward how to handle the failure (Pintrich, 2000).

Perhaps, the most inspiring evidence for students' self-regulation enhancing effects comes from academic self-regulation studies of educational intervention. Self-regulation training plans including goal stating sessions and time management lectures, meditation sessions for instance have been appreciated as a method of enhancing student's ways of working (Duckworth et al., 2014).

More than does achievement, self-regulation as reported by the participants influences affective states. Self-regulation competency encapsulates the ability to deal with stress and control emotional reactions to stressors and to use constructive coping strategies. In university students, self regulation can assist in managing performance pressure, social integration pressure and personal stress thus; minimizing the possible occurrence of anxiety and depression (Gross, 2002).

Self-regulation empowers student to act in ways that will help them address their mental health, involved goal setting for class performance, engaging in self-care measures, and seeking assistance. This attitude is linked with higher levels of life satisfaction, coping styles and psychological well-being, as a population of students intervene their behaviors in order to stay emotionally stable in stressful situations (Baumeister et al., 2007). For example, Tangney et al., (2004) observed that students who have higher Self regulation score low on stress and more likely to practice behaviours that reflect good mental health, for example exercise, and sleep well.

Self-regulation is known to be supported by EF in the in many ways, such as, by allowing the person to maintain goals in working memory, inhibit a response, and shift when it is needed. Hofmann et al. (2012) stressed that all the concepts of EF are crucial for the development and regulation of self-regulation since they enable goal focused behavior and help to sustain effort and avoid distractions in performing complex tasks. By preventing learners from being easily distracted or giving in to likely distractions such as the use social media while doing their assignments, inhibitory control helps learners regulate themselves. Armted flexibility helps one to shift from one goal or plan due to some event which is helpful in adaptive self regulation. In the same regard, the functional subsystem of working memory enables a person to contain and manipulate goal relevant information and thereby track the progress made and make amendments where necessary (Diamond, 2013).

2.6 Role of Executive Functioning and Self-regulation

The working memory (WM) seems to be vital for the processes of MTT. It enables people to store and retrieve the information concerning past experiences and future expectations with ease (Baddeley, 2000). An efficient working memory means efficient encoding of episodic memories that are central in MTT (Schacter et al., 2007). This raises the

possible prognostication that those high in working memory will show superior MTT abilities, further contributing to positive emotional well-being.

Furthermore, the relationship between working memory and other executive functioning factors determine how optimally an individual can perform MTT (Miyake et al., 2000). It is the executive functions that enable selectivity for relevant cues and aimed forgetting that are useful for proper response during MTT; aspects of emotion. It therefore implies that there are growths in working memory and the executive functioning which may improve MTT in a way that there will be a positive impact on the emotional well-being.

Optimal self-regulation allows the use of MTT skills to preview some of the potential consequences of their behavior to make better decisions that will promote their emotional health (Duckworth et al., 2019). For instance, if one imagines his/herself in such situations – one will shrink from short-term gains as they anticipate the longer-term advantages, thus showing that self-regulation and emotional health are connected.

Self-regulation tactics can also promote temporal imagery by directing the thought process towards constructive to-be goals rather than past could-have been goals (Carver & Scheier, 1998). This constructive use of MTT can eliminate anxiety and depressing moods which make people to be emotionally strong. Therefore, self regulation plays not only a role in enabling effective MTT, but it factors as an integral process through which MTT impacts on positive emotional well-being.

Research evidence suggests that inhibitory control is essential for the modulation of both thoughts and emotions during mental travel in time. For example, successful inhibitory control helps one to either suppress information which is irrelevant and or irrelevant memories and or other future events so as to improve on the MTT (Miyake et al., 2000). If

negative thoughts or ruminative patterns can be regulated during MTT, positive reflective processes are more likely to occur which will enable the individual's emotional health.

Research shows that disparities related to self-regulation deficiencies leads to problems in MTT especially for people with mood disorder conditions (Schacter et al., 2007). These impairments result into improved disposition towards negative prior events or negative predictions in the future thus worsening anxiety and depression. Therefore, increasing efficiency of inhibitory control may increase capabilities of MTT and result in more favorable effects on individuals' emotions.

Some ways of self-regulation make the application of MTT to be effective since a person is able to train his or her brain to think positively and not keep on recalling bad experiences that he or she had in the past. For instance, during MTT efficiency of the self-regulation tactics like mindfulness or cognitive restructuring helps individuals regulate their emotions efficiently. The creative ways in which MTT can be used constructively can reduce anxiety and depression, and hence foster good psychological health.

Another factor closely linked to mental time travel is Cognitive Flexibility since it enables the individual to think through various possibilities and or probable consequences of past actions, future occurrence or event. The analysis of literature reveals that with increased cognitive flexibility there is also an improvement in the quality of MTT because individuals are able to produce more positive affective future images and regulate their emotions better (Cohen, 2020).

The second aspect is the ability of the people with high cognitive flexibility is to adjust the ways they view situation to find out that they are not as bad as they once thought and thus they can be easily regulated emotionally (BMC Psychology, 2024). For example, students with high cognitive flexibility score lower on the anxiety scale during academic

assessment owing to their cognitive processes of changing the way a stressful event is viewed (Korhan et al., 2024). In this way, cognitive flexibility does not only play a major role regarding successful MTT but is also significantly involved in the further aspect of emotional resilience. Self-regulation, on the other hand, is connected to both, cognitive flexibility and MTT and it therefore, allows a person to use MTT in anticipation of certain consequences of an action, so that the person can make a positivism emotionally-apt choices.

2.7 Literature in Pakistani Context

A study was conducted by Fatima and mates in 2016 that aimed to explore te association of parent-child relationships with the executive functioning of the children in South Asian population. The study was conducted on 370 participants who aged between 13 to 19 years, preferably adolescents. The results of this research reflect that perceived neglect by the parent correlates negatively with the development of executive functioning skills. Another finding of this study claims that the parental education and socioeconomic status positively predicts almost 3 different domains of executive functioning in participants via Design Fluency Test (DFT), Colour Word Inference Test (CWIT), and Card Sorting Test (CST). upon further correlational analysis, it was found that inhibition and problem solving are also predicted by the perceived parent-child relationship. (Fatima at al., 2016)

A cross-sectional study conducted by Shafaque Fatima and colleagues in 2021 exactly intended to explore how the dimensions of feedback received by the students may influence the academic self-efficacy and self-regulation of the students. As part of the other findings identified in the study regarding feedback dimensions and self- efficacy, the study also found that self efficacy is positively related to self regulation with a statistically significant value. (Fatima et al., 2021).

Khawar along with her team conducted a correlational study at Faisalabad in 2023 to analyse a connection between self-regulation and cognitive emotion regulation strategies in adolescents. The sample in the study included 718 adolescents from different schools in the city. The analysis held showed that long- term self regulation of emotion was positively correlated with several direct adaptive cognitive emotion regulation strategies such as : Refocusing to planning, positive refocusing, positive reappraisal and putting into perspective. In the short-term analysis, only self-regulation turned out to be a significant negative predictor of positive reappraisal. (Khawar et al., 2023)

Tufail and his friends conducted research in 2024 in order to investigate the integral transmission of parental practices and their impact on executive functioning across three generations in Rawalpindi and Islamabad, Pakistan. Using a cross-sectional survey of 400 participants from distributed evenly across the gender, correlation analysis determined that the various forms of parental practice influenced executive functioning in the different generations. The main resultant of the study focused on the main roles tat the parent bonding played on the executive functions of children in the Rawalpindi and Islamabad areas. The study also showed another critical and notable factor is the age factor that has the potential to influence parental care, over protection and executive functioning to suggest that there is a reciprocation of generations in influencing development. (Tufail et al., 2024)

CHAPTER 3

METHOD

3.1 Introduction

The objective of the present research study was to establish how mental time travel, executive functioning, self regulation and emotional well-being relate with each other among the university students. The purpose of this research was to determine relationship between these constructs. Self- report information were gathered from university students via scheduled questionnaire-administered purposefully validated instruments. More precisely, mental time travel was assessed by the Prospective-Retrospective Memory Questionnaire (PRMQ), 2 components of executive functioning called as working memory and inhibitory control were explored by the Adult Executive Functioning Inventory (ADEXI) and the other component known as cognitive flexibility was measured using Cognitive Flexibility Scale (CFS). Self-regulation was assessed using 311-item scale named the Short Self-regulation Questionnaire (SSRQ) and Emotional Well-being was measured with the 14-item Emotional Well-being Scale (EWBS). To permit comprehensive understanding of the research design, the methodology section is grouped to present an indication of the measuring instruments to be used to measure the variables involved, their validation methods, sampling techniques, mode of data collection, target population, and statistical analysis strategies. Through the strictly scientific approach applied in the present work, it will be possible to provide meaningful to the understanding of the affects from the mnemonic and emotional state of university students..

3.2 Research Design

This current research was eventually divided into two parts, the pilot study and the main study as the first and second respectively. The research was conducted by employing the convenient cross-sectional method. In the context of the present work, the English versions of the The Adult Executive Functioning Inventory (ADEXI; Holst and Thorell., 2018), Cognitive Flexibility Scale (CFS; Martin & Rubin1995), Prospective-Retrospective Memory Questionnaire (PRMQ; Smith et al., 2000), Short Self-regulation Questionnaire (SSRQ; Carey et al., 2004) and Emotional Well-being Scale (EWBS; Simsek, 2011). To test the hypotheses of the current study, an initial pilot study was conducted using all the scale that are mentioned above. This was followed by the main study afterwards.

3.3 Instruments

The study utilized the below mentioned instruments.

A demographic sheet (comprising of relevant information to be provided by the participant) was given along with The Adult Executive Functioning Inventory (ADEXI; Holst and Thorell., 2018), Cognitive Flexibility Scale (CFS; Martin & Rubin1995), Prospective-Retrospective Memory Questionnaire (PRMQ; Della Sala, Logie, & Maylor & Smith G, 2000), The Short Self-regulation Questionnaire (SSRQ; Carey et. al 2004) and Emotional Well-being Scale (EWBS; Simsek, 2011).

3.3.1 The Adult Executive Functioning Inventory (ADEXI)

The Adult Executive Functioning Inventory (ADEXI) was designed by Holst and Thorell in 2018 as a brief and focused rating instrument specifically developed in order to assess executive functioning (EF) in adults. The ADEXI comprises of 14 items based on six-points Likert-type responses where (*1=Definitely Not True ranging upto 5= Definitely*

True). It intendeds to evaluate impairments in working memory and inhibitory control. Scoring of the ADEXI involves evaluating responses to the 9 items to generate a total score that reflects the individual's working memory and taking the total score on 5 items that represent the construct of inhibitory control. Higher scores on each sub-scale would predict higher working memory and better inhibitory control.

3.3.2 Cognitive Flexibility Scale (CFS)

The Cognitive Flexibility Scale (CFS) is a self-administered questionnaire that was developed by Martin, & Rubin in 1995 to assess cognitive flexibility, which is said to be the ability where a person is able to switch between different thoughts and actions. This scale consists of 12 statements based on six-points Likert-type responses (*1= Strongly Disagree ranging up-to 6= Strongly Agree*) that individuals rate based on their beliefs and feelings about flexible behaviors. Some statements are reverse-scored (2,3,5 and 10) to capture various aspects of cognitive flexibility. Scoring the CFS involves summing up the responses to the 12 items in the questionnaire. The total score obtained reflects the individual's cognitive flexibility, where overall higher scores reflect greater levels of cognitive flexibility. In our study, The Cronbach's alpha for this measure demonstrated an acceptable reliability ($\alpha = .742$).

3.3.3 Prospective-Retrospective Memory Questionnaire (PRMQ)

Prospective and Retrospective Memory Questionnaire (PRMQ) is also a self-administered measure comprising of 16 different questions which are designed to evaluate an individual's ability to remember to perform intended actions in the future (prospective memory) and to recall past events (retrospective memory). The scale comprises of 2 sub-scales as mentioned as prospective and retrospective memory each of them being represented by 8 questions. The Questionnaire is designed as five-point Likert-type scale (*1=*

Mostly/Very Often, 2= Quite Often, 3= Sometimes, 4= Rarely, and 5= Never). Higher mean scores represent greater frequency of respective memory failure.

3.3.4 The Short Self-regulation Questionnaire (SSRQ)

Another instrument used in the current research that reflects Self-regulation competencies is called the Short Self-regulation Questionnaire (SSRQ). The SSRQ which was originally formulated by Brown et al in 1999 has had subsequent revisions and validations in different contexts in order to determine to what extent a person is able to control his or her behavior. A shorter version of the questionnaire was developed by Carey et al in 2004; this consists of 31 items and covers various phases of self regulation. The SSRQ is a a 31-item scale derived from 5 point Likert scale that ranges from (*1 representing Strongly Disagree to 5 representing Strongly Agree*) where a higher score is an indication of improved self-regulation skills.

3.3.5 Emotional Well-being Scale (EWBS)

The Emotional Well-being Scale (EWBS) is a self-report psychological instrument developed by Simsek in 2011 that focuses an individual's positive and negative affective experiences. This scale contains 14 statements where 7 of them are for positive emotional well-being (PEWB) and the other 7 are for negative emotional well-being (NEWB). The questionnaire displays respondent's perceived experience on each attribute measured on a five-point Likert scale that has *Very Slightly/Not At All (1)* as the lowest end or minimum score on the scale and *Extremely (5)* as the highest end or maximum score on the scale. Higher scores on each sub-scale indicate greater level of respective emotional state. The EWBS has been found to demonstrate good internal reliability; the Cronbach's alpha coefficient is . 85.

3.4 Phase I: Pilot Study

3.4.1 Objectives of the Pilot Study

The initial phase of the study, known as the pilot study, was set out to ascertain the psychometric properties of the measures in the English version, evaluate the ease of comprehension of each questionnaire, and identify the suitability of study and relevance in the Pakistani context. After confirmation of the validity of each scale and sub-scale, these measures were then used for the second phase of the study i.e. the main study.

3.4.2 Step II: Pilot Testing

All the previously mentioned five scales and their respective sub-scales, were first administered to a small sample that accurately represented the larger the sample for the main study. The primary goal of this first phase, or pilot testing was to check for the psychometric properties, applicability in the Pakistani context, and overall effectiveness of the specific instruments.

3.4.3 Sample

A total of 100 undergraduate university students, aged between 18-25, took part in the pilot study. Out of those 100 participants, 57% were males and 43% were females. All the participants provided the informed consent after they were made fully aware of the purpose of this study. The participants were then assured their identities and any sort of personal data would definitely remain confidential as per the research protocols.

Inclusion/exclusion criteria:

Following inclusion and exclusion criteria was used to collect responses from the sample:

1. Only undergraduate level university students are to participate in the present study.

2. The age of the participants must lie within the specified range i.e. 18-25 years old.

3. The participants must have no history of psychopathology in person.

3.5 Item Total Correlation

Table 3.1

Item-Total Correlation for Prospective and Retrospective Memory Questionnaire (Prospective Mental Time Travel) (N=100)

Items	*M*	*SD*	Item-Total Correlation
PRMQ_1	3.03	1.34	.62
PRMQ_3	4.06	1.08	.27
PMRQ_5	3.28	1.28	.52
PMRQ_7	3.18	1.25	.51
PMRQ_10	3.61	1.17	.38
PMRQ_12	3.79	1.19	.42
PMRQ_14	3.05	1.34	.61
PMRQ_16	3.42	1.24	.64

Table 3.2

Item-Total Correlation for Prospective and Retrospective Memory Questionnaire (Retrospective Mental Time Travel) (N=100)

Items	*M*	*SD*	Item-Total Correlation
PRMQ_2	3.62	1.26	.66

PRMQ_4	3.27	1.27	.55
PMRQ_6	3.37	1.32	.46
PMRQ_8	3.44	1.18	.58
PMRQ_9	3.63	1.12	.61
PMRQ_11	3.4	1.30	.54
PMRQ_13	3.34	1.17	.57
PMRQ_15	4.05	1.12	.51

Table 3.3

Item-Total Correlation for Adult Executive Functioning Inventory (Working Memory) (N=100)

Items	*M*	*SD*	Item-Total Correlation
ADEXI_1	2.94	1.06	.48
ADEXI_2	3.51	1.06	.68
ADEXI_5	3.18	1.20	.56
ADEXI_7	3.31	1.00	.43
ADEXI_8	3.46	1.04	.65
ADEXI_9	3.32	1.14	.68
ADEXI_11	3.23	1.08	.57
ADEXI_12	3.42	1.10	.69
ADEXI_13	3.51	1.08	.62

Table 3.4

Item-Total Correlation for Adult Executive Functioning Inventory (Inhibitory Control) (N=100)

Items	*M*	*SD*	Item-Total Correlation
ADEXI_3	3.33	1.02	.41
ADEXI_4	3.04	1.09	.59
ADEXI_6	3.25	1.12	.45
ADEXI_9	3.16	1.15	.40
ADEXI_10	3.11	1.17	.35

Table 3.5

Item-Total Correlation for Cognitive Flexibility Scale (N=100)

Items	*M*	*SD*	Item-Total Correlation
CFS_1	4.32	1.48	.51
CFS_2	3.47	1.48	.27
CFS_3	2.95	1.57	.19
CFS_4	3.98	1.25	.36
CFS_5	3.86	1.30	.36
CFS_6	4.69	1.20	.68
CFS_7	4.61	1.19	.54

CFS_8	4.22	1.15	.53
CFS_9	4.53	1.22	.60
CFS_10	3.49	1.45	.01
CFS_11	4.51	1.25	.66
CFS_12	4.45	1.18	.52

Table 3.6

Item-Total Correlation for The Short Self Regulation Questionnaire (N=100)

Items	*M*	*SD*	Item-Total Correlation	Items	*M*	*SD*	Item-Total Correlation
SSRQ_1	2.63	1.16	.31	SSRQ_17	2.96	1.33	.55
SSRQ_2	2.33	.94	.36	SSRQ_18	2.93	1.32	.64
SSRQ_3	2.4	.95	.38	SSRQ_19	2.51	1.04	.36
SSRQ_4	2.41	.95	.32	SSRQ_20	2.6	.98	.45
SSRQ_5	2.58	1.14	.53	SSRQ_21	2.63	1.08	.61
SSRQ_6	2.61	.97	.45	SSRQ_22	2.33	.91	.34
SSRQ_7	2.09	.85	.35	SSRQ_23	2.53	1.06	.55
SSRQ_8	2.86	1.33	.41	SSRQ_24	2.52	1.06	.6
SSRQ_9	2.59	1.06	.6	SSRQ_25	2.63	1.11	.51
SSRQ_10	2.39	.9	.35	SSRQ_26	2.81	1.24	.53

SSRQ_11	2.15	.97	.15	SSRQ_27	2.55	1.06	.48
SSRQ_12	2.57	1.13	.43	SSRQ_28	2.78	1.28	.58
SSRQ_13	2.67	1.11	.52	SSRQ_29	2.91	1.22	.45
SSRQ_14	2.84	1.31	.62	SSRQ_30	2.84	1.25	.57
SSRQ_15	2.9	1.31	.53	SSRQ_31	2.74	1.24	.59
SSRQ_16	2.56	1.1	.57				

Table 3.7

Item-Total Correlation for Emotional Well-being Scale (Positive Emotional Well-being) (N=100)

Items	*M*	*SD*	Item-Total Correlation
EWBS_1	3.10	1.24	.62
EWBS_2	3.04	1.25	.73
EWBS_5	2.95	1.03	.47
EWBS_6	3.05	1.26	.63
EWBS_7	2.97	1.25	.76
EWBS_11	3.32	1.29	.6
EWBS_14	3.11	1.36	.72

Table 3.8

Item-Total Correlation for Emotional Well-being Scale (Negative Emotional Well-being) (N=100)

Items	*M*	*SD*	Item-Total Correlation
EWBS_3	2.54	1.17	.68
EWBS_4	2.77	1.36	.62
EWBS_8	2.40	1.25	.78
EWBS_9	2.31	1.28	.77
EWBS_10	2.21	1.19	.77
EWBS_12	2.09	1.14	.68
EWBS_13	2.48	1.43	.58

3.6 Sample

The sample for this present study comprised of 515 undergraduate university students, where 250 participants were make and female participants' count was 265. The research participants aged between 18-25 years old. They were recruited using the convenience sampling method which was achieved through visits to multiple universities.

3.6.1 Inclusion/exclusion criteria:

Given below is the inclusion and exclusion criteria was used to collect responses from the sample for the main study:

I. There should only be undergraduate students.

II. The age of the participants must lie within the specified range i.e. 18-25 years old.

III. No history of psycho pathological treatment in person.

3.7 Procedure

The research process included using convenient sampling method to select the university students and also used consent to administer the questionnaires. It was also ensured that the participants were willing to preserve their anonymity and they were briefed on how to properly fill the questionnaires which they completed at their own will. All the administered questionnaires were later retrieved and kept in a safe place for data entry and further analysis. The rights and welfare of the participants were addressed during the whole research and all the results were reported without revealing the identity of the participants.

3.8 Data Analysis

For the present study, bot primary and secondary hypotheses were tested and objectives were achieved with the help of the data analysis method carried out in SPSS-25 and the Process macro 4.0. The components of this movement included normality assumptions checking and data cleaning, leading to the descriptive analysis of the study variables to determine the psychometric of the results before reportage of kurtosis, skewness, standard deviation, and the mean where necessary. The assessment of the reliability and suitability of the measures applied in the study was conducted through the Cronbach's alpha. Regarding the categorical demographic data, the percent frequency was determined and for the continuous data, standard deviation and mean values. Correlation analysis was determined using Pearson's Product Moment correlation in order to demonstrate the interrelation between the study variables; while regression analysis ware also used, to predict the interaction. In addition to the mentioned analysis, Mediation analysis were conducted for the significant correlation and regression results.

3.9 Results of Pilot testing

Table 3.9

Demographic Characteristics of Pilot Study (N=100)

Variables	*f (%)*	Mean *(SD)*	Variables	*f (%)*	Mean *(SD)*
Age		1.43(.50)	Fathers' Education		3.35(1.56)
Gender			Below Matric	16 (16)	
Male	57 (57)		Matric	18 (18)	
Female	43 (43)		FA/FSc	14 (14)	
Semester			BA/BSc	29 (29)	
2nd	11 (11)		MA/MSc	13 (13)	
3rd	11 (11)		MPhil and PhD	10 (10)	
4th	17 (17)		Mothers' Education		2.63(1.57)
5th	7 (7)		Below Matric	33 (33)	
6th	12 (12)		Matric	21 (21)	
7th	17 (17)		FA/FSc	17 (17)	
8th	25 (25)		BA/BSc	14 (14)	
Employment Status		1.64(.48)	MA/MSc	9 (9)	
Employed	36 (36)		MPhil and PhD	6 (6)	
Unemployed	64 (64)		Working Status of Mother		1.17(.39)
			Housewife	83 (83)	
			Working lady	17 (17)	
			Family Type		1.3(.46)
			Nuclear	70 (70)	
			Joint	30 (30)	

f = Frequency, %= percentage

Table 3.9 summarizes demographics of the pilot study. 100 participants' responses were utilized for the pilot study (57 males, 43 females). One fourth of the total participants

belonged to 8th semester (N=25) whereas 12 participants were from the second semester. 64 out of respondents were found to be employed. Most of the respondents' parental education was BA/BSc. 70% of the total participants live in nuclear family type.

Table 3.10

Psychometric properties of the major study variables (N=100)

Scales	No. of Items	α	*M*	*SD*	Range		Skew
					Actual	Potential	
PRMQ	16	.90	55.54	12.50	24-80	16-80	-.14
Prospective MTT	8	.79	27.42	6.31	13-40	8-40	-.03
Retrospective MTT	8	.83	28.12	6.60	8-40	8-40	-.35
ADEXI	14	.74	87.81	11.36	63-127	26-142	.23
Working Memory	9	.89	29.80	6.60	9-45	9-45	-.21
Inhibitory Control	5	.68	15.89	3.69	5-25	5-25	-.18
CFS	12	.78	49.58	8.50	32-67	12-72	-1.04
TSSRQ	31	.91	80.85	18.17	44-155	31-155	1.5
EWBS	14	.70	38.34	7.96	15-56	14-70	-.89
Positive EW	7	.87	21.54	6.54	7-35	7-35	-.49
Négative EW	7	.89	16.80	6.90	7-29	7-35	.10

Note: PMRQ= Prospective and Retrospective Memory Questionnaire, MTT=Mental Time Travel, ADEXI=Adult Executive Functioning Inventory, CFS=Cognitive Flexibility Scale, TSSRQ=The Short Self-regulation Questionnaire, EWBS=Emotional Well-being Scale, EW=Emotional Well-being, Skew = Skewness.

As shown in the table, Cronbach's alpha reliability coefficients of the present forms and sub-forms are acceptable, as the norms for significant internal consistencies per sub-factor are met for the use with Pakistani students. Highest value for Cronbach's alpha

reliability was seen for the Prospective Retrospective Memory Questionnaire (*r=.90*) whereas, negative emotional well-being , a sub-scale of The Emotional Well-being scale showed the second highest value of Cronbach's alpha reliability *(r=.89*) Further, skewness and kurtosis of all the measures are also determined to lie within the range of ± 2, which can be considered to have normal distribution of data and satisfy the conditions of other parametric tests. Therefore, and based on the above emerging findings, it can be claimed that the proved importance and applicability of the above specified scales for the Pakistani students and their measurement of the intended construct showed reliability for the further purposes of their comparative analysis and interpretation.

Table 3.11

Correlation between of the Study Variable (N=100)

	Variables	1	2	3	4	5	6	7	8
1	Prospective Mental Time Travel	-							
2	Retrospective Mental Time Travel	.87**	-						
3	Positive Emotional Well-being	.29**	.21*	-					
4	Negative Emotional Well-being	-.42**	-.50**	-.30**	-				
5	Working Memory	.61**	.61**	.11	-.48**	-			
6	Inhibitory Control	.52**	.51**	.07	-.34**	.76**	-		
7	Cognitive Flexibility	-.23*	-.27**	.20*	.15	-.28**	-.40**		
8	Self-regulation	-.20*	-.14	.02	.07	-.27**	-.24*	.26*	-
	Mean	27.42	28.12	21.54	16.8	29.88	15.89	49.08	80.85
	SD	6.31	6.60	6.54	6.90	6.70	3.69	8.51	18.17

p<0.5, **p<0.01

The table depicts the correlation between study variables and the results indicate the positive relationship between working memory and inhibitory control, similarly self-regulation and working memory and negative emotional well-being. Results in the table also

show a significant positive relationship is observed between metal time travel (prospective and retrospective) with working memory and inhibitory control. For self-regulation, mental time travel is negatively correlated and for positive and negative emotional well-being, the results came out to be non-significant. Both prospective and retrospective mental time travel, positive relationship is seen with positive emotional well-being and negative correlation with negative emotional well-being.

3.10 Main Study

The main study was conducted to test the hypotheses of the current research.

3.10.1 Objectives

1. To examine the relationship between mental time travel, executive functioning, Self-regulation and emotional well-being of university students.
2. To explore the sequential mediating role of executive functioning and self-regulation between mental time travel and emotional well-being of university students.
3. To explore the gender based mean differences of mental time travel among university students.

3.10.2 Sample

The sample for this present study comprised of 515 undergraduate university students, where 250 participants were make and female participants' count was 265. The research participants aged between 18-25 years old. They were recruited using the convenience sampling method which was achieved through visits to multiple universities.

Table 3.12

Demographic Characteristics of the Main Study (N=515)

Variables	*f (%)*	Mean *(SD)*	Variables	*f (%)*	Mean *(SD)*
Age		21.55 (2.06)	Employment Status		1.76 (.43)
18	44 (8.5)		Employed	126 (24.5)	
19	48 (9.3)		Unemployed	389 (75.5)	
20	79 (15.3)		Fathers' Education		3.34 (1.44)
21	83 (16.1)		Below Matric	60 (11.7)	
22	93 (18.1)		Matric	108 (21)	
23	60 (11.7)		FA/FSc	95 (18.4)	
24	56 (10.9)		BA/BSc	138 (26.8)	
25	52 (10.1)		MA/MSc	78 (15.1)	
		1.51 (.50)	MPhil and PhD	36 (7)	
Gender			Mothers' Education		2.71 (1.47)
Male	250 (49)		Below Matric	148 (28.7)	
Female	265 (51)		Matric	104 (20.2)	
Semester		4.81 (2.29)	FA/FSc	98 (19)	
1st	64 (12.4)		BA/BSc	96 (18.6)	
2nd	32 (6.2)		MA/MSc	52 (10.1)	
3rd	55 (10.7)		MPhil and PhD	17 (3.3)	
4th	68 (13.2)		Working Status of Mother		1.16 (.36)
5th	98 (19)		Housewife	435 (84.5)	
6th	58 (11.3)		Working lady	80 (15.5)	
7th	44 (8.5)		Family Type		1.30 (.46)
8th	96 (18.6)		Nuclear	360 (69.9)	
			Joint	155 (30.1)	

f = Frequency, %= percentage

The table summarizes the demographics of the main study. A total of 515 participants' responses were utilized for the main study comprising of 250 males and 265 females. The participants' age was (M = 21.55 years, SD = 2.06) and the largest number, 18.1% were in the

22 years age category. It revealed that 49% of the participants were male and 51% were female reflecting nearly an equal distribution across gender. Semester enrollment mean was 4.81(SD = 2.29) with most students 18.6% in the last semester. In terms of employment status, majority of the participants (75.5 %) were unemployed as compared to 24.5% employed participants (M = 1.76, SD = .43). With regard to father's education, the mean was 3.34 (SD=1.44) , and the most educated fathers attained BA/BSc (26.8%) then Matric (21%). Regarding the education level of mothers, it was relatively lower, with M = 2.71, SD = 1.47; of 28.7% , 30.2% of mothers never attended beyond Matric level. The research findings used include in this study present a diverse sample in regards to education and employment status.

3.11 Delimitations

- Limited cultural context as the sample was exclusively collected from urban setup.
- Sample was focused on specific age range i.e. 18-25 years old.
- Utilization of cross-sectional study design.
- Employment of convenience sampling technique.

Chapter 4

ANALYSIS AND INTERPRETATION OF DATA

The study conducted in the present work was focused on understanding the effects of mental time travel on emotional well-being of the university students, and on examining the mediating roles of executive functioning and self-regulation sequentially in this relationship. Pilot study was also conducted for the measure validation and to check the implementation of somatic items on Pakistani population. In line with the study aims, the correct statistical tests were used in order to run and analyze the data with the help of the SPSS 25 and Process Macro 4.0 tools. The analyses conducted were basic descriptive analyses, independent samples t-tests, regression, mediation, and correlation analyses. Hypothesis test performed in this study was independent samples t-tests which aimed at comparing the means of the study variables with the demographic variables. Various statistical tests, including correlation and regression analyses were used in order to evaluate possible relationships and predictive directions among the variables included in the study.Serial/Sequential mediation analysis was conducted in order to investigate the mediating effects of both executive functioning and self-regulation between mental time travel and emotional well-being. The results reported, are all statistically significant and the presentation of the findings is also logical and easy to follow.

4.1 Descriptive Statistics of Study Measures

Table 4.1

Psychometric Properties of the Study Variables (N=515)

Scales	No. of Items	α	*M*	*SD*	Range		Skew
					Actual	Potential	
PRMQ	16	.88	55.28	11.26	16-80	16-80	-.35
Prospective MTT	8	.78	27.14	6.02	8-40	8-40	-.28
Retrospective MTT	8	.76	28.13	5.84	8-40	8-40	-.43
EWBS	14	.70	39.47	6.90	14-70	14-70	.06
Positive EW	7	.82	22.18	5.63	7-35	7-35	-.08
Négative EW	7	.86	17.29	6.59	7-35	7-35	.29
ADEXI	14	.85	38.48	8.64	14-70	14-70	-.03
Working Memory	9	.80	30.03	5.90	9-45	9-45	-.07
Inhibitory Control	5	.82	15.50	4.14	5-25	5-25	-.10
CFS	12	.79	47.74	7.97	12-72	12-72	-.91
TSSRQ	31	.82	104.19	12.95	69-152	31-155	.44

Note: PMRQ= Prospective and Retrospective Memory Questionnaire, MTT=Mental Time Travel, ADEXI=Adult Executive Functioning Inventory, CFS=Cognitive Flexibility Scale, TSSRQ=The Short Self-regulation Questionnaire, EWBS=Emotional Well-being Scale, EW=Emotional Well-being, Skew = Skewness.

Table 4.2 presents the reliability values and means and standard deviations for the scales and sub-scales examined in the research. Each of the scales showed good to excellent reliability, even signing Cronbach's alpha level of .70 and above. The participants completed the PRMQ, with a good internal consistency, overall mean alpha estimate of .88 the scores achieved for prospective (m = 27.14) and retrospective MTT (m = 28.13) signifies a balanced

score. The reliability for the ADEXI was acceptable (α = .85) while that for the sub-scales: Working memory (α = .80) and inhibitory control (α = .82) were also within acceptable range. The CFS (α = .79) and TSSRQ (α = .82) used in the current study presented good internal consistency reliability. Two factors were established for the EWBS; these included positive emotional well-being (α = .82) and negative emotional well-being (α = .86). Further, skewness and kurtosis of all the measures are also determined to lie within the range of ± 2, which can be considered to have normal distribution of data and satisfy the conditions of other parametric tests.

4.2 Relationship between the Study Variables

Correlation analysis was run using SPSS-25 in order to know the nature and magnitude of relationship among the study variables.

Table 4.2

Correlation Matrix of Study Variables (N=515)

	Variables	1	2	3	4	5	6	7	8
1	Prospective Mental Time Travel	-							
2	Retrospective Mental Time Travel	.80**	-						
3	Positive Emotional Well-being	.22**	.18**	-					
4	Negative Emotional Well-being	-.29**	-.28**	-.37**	-				
5	Working Memory	.46**	.46**	.16**	-.38**	-			
6	Inhibitory Control	.24**	.19**	.10*	-.25**	.46**	-		
7	Cognitive Flexibility	.13**	.156**	.14**	0.05	-0.5*	-.10*	-	
8	Self-regulation	.36**	.37**	.36**	-.42**	-.46**	.28**	.34*	-
	Mean	27.14	28.13	22.18	17.29	30.03	15.50	47.74	104.19
	SD	6.02	5.84	5.63	6.59	5.90	4.14	7.97	12.94

p<0.5, **p<0.01

The table offers correlations, means and standard deviations of the study variables, which exhibited trends of the respective relationships. Prospective mental time travel and retrospective mental time travel were positively correlated ($r = .80$, $p < .01$). Both had positive associations with self-regulation ($r =. 36, . 37$, $p <. 01$) and positive emotional well-being ($r = .22, .18$ $p < .01$) and negative with negative emotional well-being ($r = -. 29. -. 28$, $p < .01$). The correlations between working memory and inhibitory control were positive ($r = .46$, $p < .01$) whereas working memory had positive correlations with the two dimensions of mental time travel self-regulation ($r = .46$, $p < .01$). The computation additionally included inhibitory control which was positively related to self-regulation ($r = .28$, $p < .01$). Cognitive flexibility showed significant positive correlation with self-regulation ($r=.34$, $p<.01$), positive emotional well-being ($r=.10$ $p<.01$) presented significant positive correlation with prospective and retrospective mental time travel ($r=.36$, $r=.37$ $p<.01$). Negative emotional well-being was found to have a significant negative relationship with self-regulation ($r= -.42$, $p < .01$) and positive with positive emotional well-being ($r=.36$ $p < .01$). Self-regulation and working memory had a positive relationship with negative emotional well-being and inhibitory control. The descriptive analysis of the means of scores for each construct shows variability of scores in the given constructs, the mean for self-regulation shows ($M= 104.19$, $SD = 12.94$) and cognitive flexibility ($M= 47.74$, $SD= 7.97$),where self-regulation is central to the level of emotional well-being and cognitive flexibility of the sample.

4.3 Regression Analysis

Table 4.3

Multiple Regression Analysis on Positive Emotional Well-being by Prospective Mental Time Travel and Retrospective Mental Time Travel (N=515)

	Positive Emotional Well-being						
						95% CI	
Variables	*B*	*SE B*	*B*	*t*	*P*	*LL*	*UL*
Prospective Mental Time Travel	.20	.07	.22	2.99	.003	.07	.34
Retrospective Mental Time Travel	.009	.07	.009	.12	.90	-.13	.15
	R = .22, R^2= .05, (F = 13.46, p<.001)						

The table shows the influence of prospective and retrospective mental time travel on positive emotional well-being. The value of R^2 depicts that prospective and retrospective mental time travel explicate 22% variances in the positive emotional well-being with F ratio to be significant (F= 13.46, p<.001). Findings illustrate that prospective mental time travel positively predicts (B =.20, β = .22, p<.01) positive well-being. It shows a positive link with each one unit increase in corresponding to prospective mental time travel leads to increase of .20 units in positive emotional well-being. Further it was found that retrospective mental time travel shows non-significant result (B = 0.09, SE B = 0.07, β = 0.09, p = .90), with a confidence interval spanning zero (CI: -.13, .15)

Table 4.4

Multiple Regression Analysis on Negative Emotional Well-being by Prospective Mental Time Travel and Retrospective Mental Time Travel (N=515)

	Negative Emotional Well-being						
						95% CI	
Variables	*B*	*SE B*	*B*	*T*	*P*	*LL*	*UL*
Prospective Mental Time Travel	-.18	.08	-.17	-2.42	.01	-.34	-.03
Retrospective Mental Time Travel	-.16	.08	-.14	-2.02	.04	-.31	-.00
	R = .30, R^2= .08, (F = 25.14, p<.001)						

The table shows the influence of prospective and retrospective mental time travel on negative emotional well-being. The value of R^2 depicts that prospective and retrospective mental time travel explicate 8% variances in the positive emotional well-being with F ratio to be significant (F= 25.14, p<.001). Findings illustrate that prospective mental time travel negatively predicts (B =-.18, β = -.17, p<.05) negative well-being. It shows a negative link with each one unit increase in corresponding to prospective mental time travel leads to decrease of .18 units in negative emotional well-being. Further it was found that retrospective mental time travel is a negative predictor (B =-.16, β = -.14, p< .05). Negative emotional well-being depicts a negative link with each one unit increase in corresponding to retrospective mental time travel leads to decrease of .16 units in negative emotional well-being.

Table 4.5

Multiple Regression Analysis on Working Memory by Prospective Mental Time Travel and Retrospective Mental Time Travel (N=515)

	Working Memory						
						95% CI	
Variables	*B*	*SE B*	*B*	*T*	*P*	*LL*	*UL*
Prospective Mental Time Travel	.26	.06	.27	4.18	.000	.14	.39
Retrospective Mental Time Travel	.24	.06	.24	3.70	.000	.11	.37
	$R = .48$, $R^2 = .23$, ($F = 78.94$, $p < .001$)						

The table shows the influence of prospective and retrospective mental time travel on working memory. The value of R^2 depicts that prospective and retrospective mental time travel explicate 23% variances in the working memory with F ratio to be significant (F= 78.94, p<.001). Findings illustrate that prospective mental time travel positively predicts (B =.26, β = .27, p<.001) working memory. It shows a positive link with each one unit increase in corresponding to prospective mental time travel leads to increase of .26 units in working memory. Further it was found that retrospective mental time travel is also positive predictor (B = .24, β = .24, p>.05). Working memory depicts a positive link with each one unit increase in corresponding to retrospective mental time travel leads to increase of .24 units in working memory.

Table 4.6

Multiple Regression Analysis on Inhibitory Control by Prospective Mental Time Travel and Retrospective Mental Time Travel (N=515)

	Inhibitory Control						
						95% CI	
Variables	*B*	*SE B*	*B*	*T*	*P*	*LL*	*UL*
Prospective Mental Time Travel	.16	.05	-.24	3.40	.00	.07	.26
Retrospective Mental Time Travel	-.001	.05	.002	-.03	.97	-.10	.10
			R = .24, R^2= .06, (F = 15.97, p<.001)				

The table shows the regression coefficients displaying the prediction of inhibitory control by prospective mental time travel and retrospective mental time travel. The model was statistically significant, F = 15.96, p < .001; the model explained 6% of the variance on inhibitory control, R^2 = .06. Out of the two proactive aspects, only prospective mental time travel was a significant positive predictor of inhibitory control (B = .16, SE B = .05, &beta. =.24, p < 0.001) which showed that the higher level of count for prospective mental time travel positively correlated with the inhibitory control. The 95% confidence interval for this effect. In contrast, retrospective mental time travel did not significantly predict inhibitory control (B = 0.00, SE B = 0.05, β = 0.00, p = .97), with a confidence interval spanning zero (CI: -0.09, 0.10). The results suggest that the PMTT but not the RMTT appears to influence inhibitory control within the study subject population.

Table 4.7

Multiple Regression Analysis on Cognitive Flexibility by Prospective Mental Time Travel and Retrospective Mental Time Travel (N=515)

	Cognitive Flexibility						
						95% CI	
Variables	*B*	*SE B*	*B*	*T*	*P*	*LL*	*UL*
Prospective Mental Time Travel	.01	.10	.01	.14	.89	-.17	.20
Retrospective Mental Time Travel	.21	.10	.15	2.06	.04	.01	.40
	R = .16, R^2= .02, (F = 6.67, p<.01)						

The table shows the influence of prospective and retrospective mental time travel on positive emotional well-being. The value of R^2 depicts that prospective and retrospective mental time travel explicate 2% variances in the cognitive flexibility with F ratio to be significant (F= 6.67, p<.05). Findings illustrate that prospective mental time travel is a not a significant factor in contributing to cognitive flexibility (B = .01, SE B = .10, β = .01, p = .89), with a confidence interval spanning zero (CI: -.17, .20). Further it was found that retrospective mental time travel is a positive predictor (B =.20, β = .15, p<.05). Cognitive flexibility depicts a positive link with each one unit increase in corresponding to retrospective mental time travel leads to increase of .20 units in cognitive flexibility.

Table 4.8

Multiple Regression Analysis on Self-regulation by Prospective Mental Time Travel and Retrospective Mental Time Travel (N=515)

	Self-regulation						
						95% CI	
Variables	*B*	*SE B*	*B*	*t*	*P*	*LL*	*UL*
Prospective Mental Time Travel	.38	.15	.18	2.58	.01	.09	.67
Retrospective Mental Time Travel	.50	.15	.22	3.28	.001	.20	.80
	R = .38, R^2= .14, (F = 43.66, p<.001)						

The table shows the influence of prospective and retrospective mental time travel on self-regulation. The value of R^2 depicts that prospective and retrospective mental time travel explicate 14% variances in the self-regulation with F ratio to be significant (F= 43.66, p<.001). Findings illustrate that prospective mental time travel positively predicts (B = .38, β = .18, p<.001) self-regulation. It shows a positive link with each one unit increase in corresponding to prospective mental time travel leads to increase of .18 units in self-regulation. Further it was found that retrospective mental time travel is also a positive predictor (B = .50, β = .22, p<.001). Self-regulation depicts a positive link with each one unit increase in corresponding to retrospective mental time travel leads to increase of .22 units in self- regulation.

Table 4.9

Multiple Regression Analysis on Self-regulation by Working Memory, Inhibitory Control, and Cognitive Flexibility (N=515)

	Self-regulation						
						95% CI	
Variables	*B*	*SE B*	*B*	*t*	*P*	*LL*	*UL*
Working Memory	.93	.08	.42	10.53	.000	.76	1.10
Inhibitory Control	.36	.12	.12	2.90	.004	.12	.61
Cognitive Flexibility	.60	.06	.37	10.30	.000	.48	.71
	$R = .59$, $R^2 = .35$, ($F = 91.78$, $p<.001$)						

The table shows the influence of working memory, inhibitory control and cognitive flexibility on self-regulation. The value of R^2 depicts that working memory, inhibitory control and cognitive flexibility explicate 35% variances in the self-regulation with F ratio to be significant ($F = 91.78$, $p<.001$). Findings illustrate that working memory positively predicts ($B = .93$, $\beta = .42$, $p<.001$) self-regulation. It shows a positive link with each one unit increase in corresponding to working memory leads to increase of .93 units in self-regulation. Further it was found that inhibitory control is also a positive predictor ($B = .36$, $\beta = .11$, $p<.01$). Self-regulation depicts a positive link with each one unit increase in corresponding to inhibitory control leads to increase of .36 units in self- regulation. Moreover, it was found that cognitive flexibility is a positive predictor ($B = .60$, $\beta = .36$, $p<.001$). Self-regulation depicts a positive link with each one unit increase in corresponding to cognitive flexibility leads to increase of .60 units in self- regulation.

Table 4.10

Multiple Regression Analysis on Positive Emotional Well-being by Working Memory, Inhibitory Control, and Cognitive Flexibility (N=515)

	Positive Emotional Well-being						
						95% CI	
Variables	*B*	*SE B*	*B*	*t*	*P*	*LL*	*UL*
Working Memory	.14	.05	.15	3.11	.002	.05	.24
Inhibitory Control	.05	.07	.04	.84	.399	-.07	.19
Cognitive Flexibility	.11	.03	.17	3.60	.000	.05	.17
			$R = .23$, $R^2 = .05$, ($F = 9.15$, $p<.001$)				

The table shows the influence of working memory, inhibitory control and cognitive flexibility on positive emotional well-being. The value of R^2 depicts that working memory, inhibitory control and cognitive flexibility explicate 5% variances in the positive emotional well-being with F ratio to be significant ($F = 9.15$, $p<.01$). Findings illustrate that working memory positively predicts (B =.14, β = .15, p <.01) positive emotional well-being. It shows a positive link with each one unit increase in corresponding to working memory leads to increase of .14 units in positive emotional well-being. Further it was found that inhibitory control shows non-significant results (B = .05, SE B = .07, β = .04, p = .399), with a confidence interval spanning zero (CI: -.07, .19). Moreover, it was found that cognitive flexibility is a positive predictor (B = .11, β = .15, p<.001). Positive emotional well-being depicts a positive link with each one unit increase in corresponding to cognitive flexibility leads to increase of .11 units in positive emotional well-being.

Table 4.11

Multiple Regression Analysis on Negative Emotional Well-being by Working Memory, Inhibitory Control, and Cognitive Flexibility (N=515)

	Negative Emotional Well-being						
						95% CI	
Variables	*B*	*SE B*	*B*	*t*	*P*	*LL*	*UL*
Working Memory	-.37	.05	-.33	-7.25	.000	-.47	-.27
Inhibitory Control	-.14	.07	-.08	-1.92	.055	-.29	.003
Cognitive Flexibility	.02	.03	.02	.62	.533	-.04	.08
	$R = .39$, $R^2 = .15$, ($F = 29.87$, $p<.001$)						

The table shows the influence of working memory, inhibitory control and cognitive flexibility on positive emotional well-being. The value of R^2 depicts that working memory, inhibitory control and cognitive flexibility explicate 15% variances in the positive emotional well-being with F ratio to be significant ($F= 29.87$, $p<.001$). Findings illustrate that working memory negatively predicts ($B =-.37$, $\beta = -.33$, $p<.001$) positive emotional well-being. It shows a negative link with each one unit increase in corresponding to working memory leads to decrease of .37 units in positive emotional well-being. Further it was found that inhibitory control and cognitive flexibility are not significant factors in contributing negative emotional well-being within this study dimension and population.

Table 4.12

Simple linear Regression Analysis on Positive Emotional Well-being by Self-regulation with (N=515)

	Positive Emotional Well-being						
						95% CI	
Variables	*B*	*SE B*	*B*	*t*	*P*	*LL*	*UL*
Self-regulation	.15	.02	.36	8.70	.000	.12	.19
	R = .36, R^2= .13, (F = 75.50, p<.001)						

The table shows the influence of self-regulation on positive emotional well-being. The value of R^2 depicts that self-regulation explicate 13% variances in the positive emotional well-being with F ratio to be significant (F= 75.50, p<.001). Findings illustrate that self-regulation positively predicts (B =.15, β = .36, p<.001) positive emotional well-being. It shows a positive link with each one unit increase in corresponding to prospective mental time travel leads to increase of .15 units in positive emotional well-being.

Table 4.13

Simple linear Regression Analysis on Negative Emotional Well-being by Self-regulation (N=515)

	Negative Emotional Well-being						
						95% CI	
Variables	*B*	*SE B*	*B*	*T*	*P*	*LL*	*UL*
Self-regulation	-.21	.02	-.42	-10.53	.000	-.25	-.17
	R = .42, R^2= .18, (F = 110.90, p<.001)						

The table shows the influence of self-regulation on negative emotional well-being. The value of R^2 depicts that self-regulation explicate 18% variances in the negative emotional well-being with F ratio to be significant (F= 110.90, p<.001). Findings illustrate that self-regulation negatively predicts (B =-.21, β = -.42, p<.001) negative emotional well-being. It shows a negative link with each one unit increase in corresponding to prospective mental time travel leads to decrease of .21 units in negative emotional well-being.

4.4 Group Comparison on Demographic Variables

Independent sample t-test was executed to reveal the group differences across the study variables. The groups included; male and female participants, participants whose mother is working and the participants whose mother is housewife, employed and unemployed participants and group based on family type i.e. nuclear and joint. The results for group differences based on gender and working status of mother did not come out significant. Hence, the results are not reported.

Table 4.14

Mean, Standard Deviations and t-values for Nuclear and Joint Family Type on Study Variables (N=515)

	Nuclear (n = 360)		Joint (n = 155)				95% *CI*		Cohen's *d*
Variables	*M*	*S.D*	*M*	*S.D*	*t(513)*	*p*	*LL*	*UL*	
Prospective Mental Time Travel	27.38	5.75	26.61	6.59	0.40	0.69	-1.03	1.55	-
Retrospective Mental Time Travel	28.39	5.67	27.53	6.20	-0.17	0.86	-1.28	1.07	-
Positive Emotional Well-being	22.32	5.63	21.84	5.65	1.97	0.05	-0.01	2.48	.085
Negative Emotional Well-being	16.73	6.45	18.59	6.75	-0.16	0.88	-1.53	1.31	-
Working Memory	23.69	5.73	24.64	6.26	-1.59	0.11	-2.15	0.23	-

Inhibitory Control	14.42	3.94	14.7	4.60	-1.02	0.31	-1.27	0.40	-
Cognitive Flexibility	47.70	7.65	47.83	8.71	0.7	0.48	-1.03	2.19	-
Self-regulation	104.42	12.87	103.7	13.16	1.76	0.08	-0.31	5.30	-

The table compares the participants living in nuclear families and the participants living in joint family system on the key variables, analyzing mean differences, standard deviations, statistical significance , and confidence interval (95% CI), and effect size (Cohen's d). The results in the table show no significant differences across the variables except for positive emotional well-being with a small effect size (Cohen's d=.085) where the participants living in nuclear families (M=22.32, SD=5.63) scored a bit higher as compared to the participants living in joint family systems (M=21.84, SD=5.65).

Table 4.15

Mean, Standard Deviations and t-values for Employment Status on Study Variables (N=515)

	Employed (n = 126)		Un-employed (n = 389)				95% *CI*		Cohen's *d*
Variables	*M*	*S.D*	*M*	*S.D*	*t(513)*	*p*	*LL*	*UL*	
Prospective Mental Time Travel	27.34	6.57	27.08	5.84	0.42	0.67	-0.95	1.47	-
Retrospective Mental Time Travel	28.06	6.10	28.16	5.77	-0.17	0.87	-1.32	1.11	-

Positive Emotional Well-being	23.11	6.38	21.87	5.35	2.15	0.03	0.11	2.37	.211
Negative Emotional Well-being	17.21	7.22	17.32	6.38	-0.17	0.87	-1.44	1.22	-
Working Memory	30.75	6.47	29.79	5.70	-1.59	0.11	-2.15	0.23	-
Inhibitory Control	15.82	4.49	15.39	4.02	-1.02	0.31	-1.27	0.40	-
Cognitive Flexibility	48.17	8.72	47.59	7.72	0.71	0.48	-1.03	2.19	-
Self-regulation	106.08	14.31	103.6	12.43	1.76	0.03	-0.31	5.30	.19

The table compares the employed and unemployed participants on the key variables, analyzing mean differences, standard deviations, statistical significance , and confidence interval (95% CI), and effect size (Cohen's d). The results in the table show no significant differences based on the employment status across the variables except for positive emotional well-being with a small effect size (Cohen's d=.211) and self-regulation with a effect size (Cohen's d=.19) where the employed participants (M=23.11, SD=6.38) scored higher on positive emotional well-being as compared to the unemployed participants (M=21.87, SD=5.35) as well as employed participants (M=106.08, SD=14.31) scored better on self-regulation too.

4.5 Mediation by Executive Functioning and Self-regulation

In order to determine the mediating role of executive functioning (working memory, inhibitory control, and cognitive flexibility) and self-regulation between mental time travel (prospective and retrospective) and emotional well-being (positive and negative); sequential or serial mediation analyses were run using the SPSS macro that has been developed by Preacher and Hayes (2008). For the sequential mediation, model 6 was used to measure the indirect effect. To generate a confidence interval for these effects, 5000 sample with bootstrapping was used which would create 95% confidence interval. Only those indirect effects are considered significant where the confidence interval did not cover zero in between. Significant results have been reported only. Given below are the results of these mentioned analyses along with their respective explanation.

Table 4.16

Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Positive Emotional Well-being through Working Memory and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Working Memory)				
Predictor (Prospective Mental Time Travel)	.455	.038	.000	.380	.530
	Mediator (Self-regulation)				
Predictors (Prospective Mental Time Travel	.397	.094	.000	.212	.581
Working Memory	.818	.096	.000	.630	1.006
	DV (Positive Emotional Well-being)				
Predictors (Prospective Mental Time Travel)	.119	.044	.008	.032	.205
Working Memory	-.049	.047	.304	-.144	.044
Self-regulation	.146	.020	.000	.106	.186
Total Effect (Prospective Mental Time Travel)	.209	.040	.000	.130	.288

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
PMTT→WM→PEW	-.024	.028	-.072	.035
PMTT→SR→PEW	.062	.018	.029	.099
PMTT→WM→SR→PEW	.058	.013	.035	.087

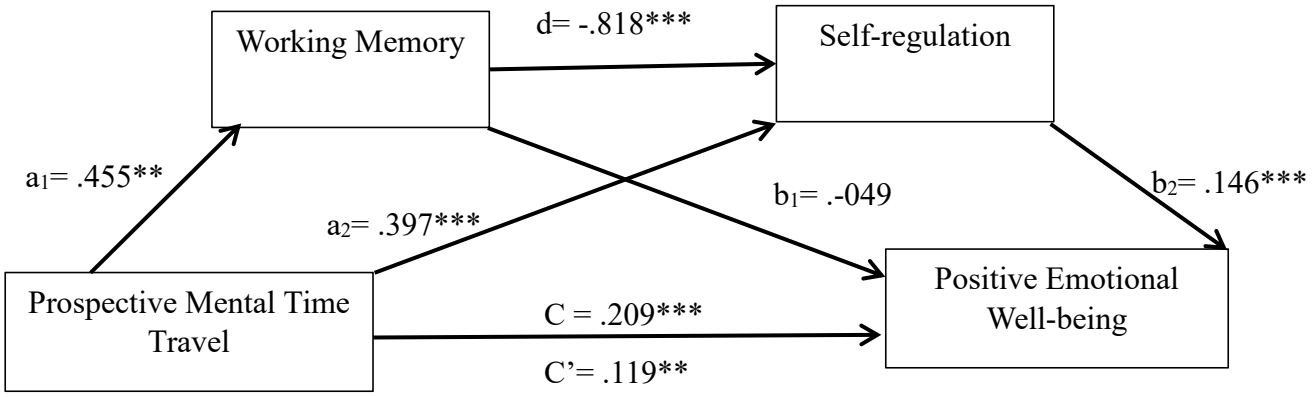

Figure 4.1: *Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Positive Emotional Well-being through Working Memory and Self-regulation*

Table 4.19 shows the sequential mediation analysis for the mediating roles of working memory and self-regulation between prospective mental time travel and positive emotional well-being. The results show a significant positive effect of prospective mental time travel on working memory (a1 path). This suggests that the higher levels of PMTT would reflect higher levels of WM. Similarly, PMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher PMTT is linked to better self-regulation abilities. Additionally, WM positively predicts SR (d path) implying that higher WM is associated with better SR. For positive emotional well-being (PEW), there is a non-significant negative effect of working memory directly on the positive emotional well-being (b1 path) whereas, self-regulation indicated a significant positive effect on the positive emotional well-being (b_2 path). Lastly, the indirect effect of prospective mental time travel through working memory and self-regulation on positive emotional well-being was found to be significantly positive (C' path). These findings indicate that the working memory alone does not mediate the relationship between PMTT and PEW, SR plays a crucial mediating role both directly and in combination with WM.

Table 4.17

Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Positive Emotional Well-being through Inhibitory Control and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Inhibitory Control)				
Predictor (Prospective Mental Time Travel)	.167	.030	.000	.109	.225
	Mediator (Self-regulation)				
Predictors (Prospective Mental Time Travel	.664	.090	.000	.488	.840
Inhibitory Control	.627	.130	.000	.372	.883
	DV (Positive Emotional Well-being)				
Predictors (Prospective Mental Time Travel)	.106	.042	.012	.024	.188
Inhibitory Control	-.029	.059	.627	-.144	.870
Self-regulation	.141	.020	.000	.102	.180
Total Effect (Prospective Mental Time Travel)	.209	.040	.000	.130	.288

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
PMTT→IC→PEW	-.005	.011	-.027	.018
PMTT→SR→PEW	.094	.017	.060	.130
PMTT→IC→SR→PEW	.015	.005	.006	.027

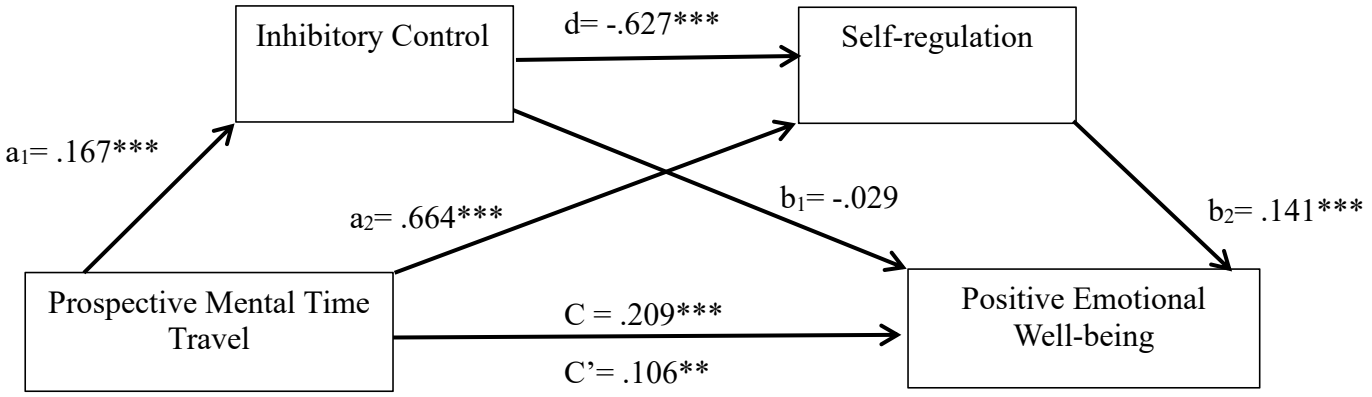

Figure 4.2: *Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Positive Emotional Well-being through Inhibitory Control and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of inhibitory control (IC) and self-regulation (SR) between prospective mental time travel (PMTT) and positive emotional well-being (PEW). The results show a significant positive effect of prospective mental time travel (PMTT) on inhibitory control (a1 path). This suggests that the higher levels of PMTT would reflect greater levels of inhibitory control. Similarly, PMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher PMTT is linked to better self-regulation abilities. Additionally, IC positively predicts self-regulation negatively (d path) implying that lower inhibitory control is associated with higher SR. For positive emotional well-being (PEW), there is a non-significant negative effect of inhibitory control directly on the positive emotional well-being (b1 path) whereas, self-regulation indicated a significant positive effect on the positive emotional well-being (b_2 path). Lastly, the indirect effect of prospective mental time travel through inhibitory control and self-regulation on positive emotional well-being was found to be significantly positive (C' path). These findings indicate that the inhibitory control alone does not mediate the relationship between PMTT and PEW, SR plays a crucial mediating role both directly and in combination with inhibitory control.

Table 4.18

Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Positive Emotional Well-being through Cognitive Flexibility and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Cognitive Flexibility)				
Predictor (Prospective Mental Time Travel)	.174	.058	.002	.060	.288
	Mediator (Self-regulation)				
Predictors (Prospective Mental Time Travel	.686	.085	.000	.519	.853
Cognitive Flexibility	.476	.064	.000	.350	.602
	DV (Positive Emotional Well-being)				
Predictors (Prospective Mental Time Travel)	.102	.041	.013	.021	.183
Cognitive Flexibility	.018	.031	.554	-.042	.079
Self-regulation	.135	.020	.000	.096	.175
Total Effect (Prospective Mental Time Travel)	.209	.040	.000	.130	.288

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
PMTT→CF→PEW	.003	.007	-.010	.019
PMTT→SR→PEW	.093	.018	.060	.129
PMTT→CF→SR→PEW	.011	.005	.002	.022

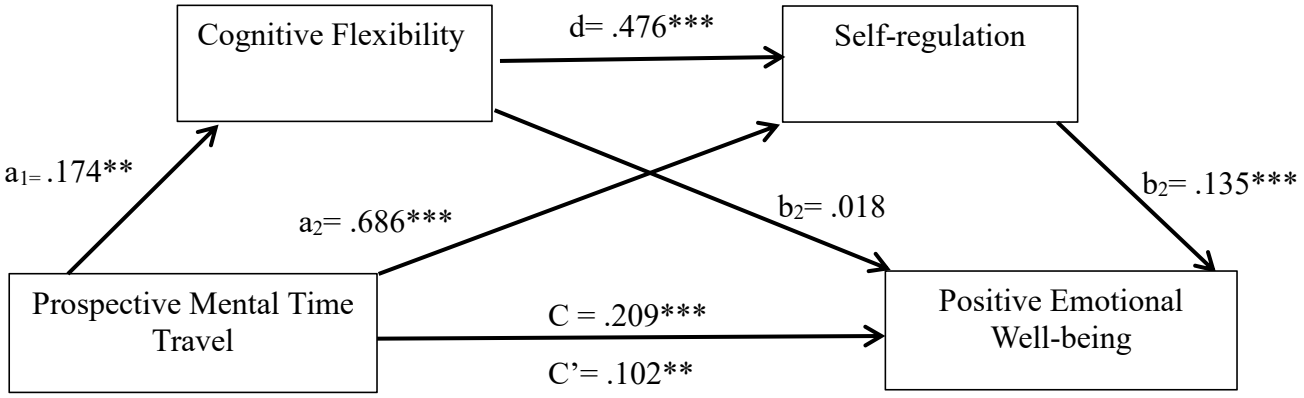

Figure 4.3: *Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Positive Emotional Well-being through Cognitive Flexibility and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of cognitive flexibility and self-regulation between prospective mental time travel and positive emotional well-being. The results show a significant positive effect of prospective mental time travel (PMTT) on cognitive flexibility (a1 path). This suggests that the higher levels of PMTT would reflect greater levels of cognitive flexibility. Conversely, PMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher PMTT is linked to better self-regulation abilities. Additionally, WM negatively predicts self-regulation positively (d path) implying that higher working memory is associated with better self-regulation. For Positive Emotional Well-being (PEW), there is a non-significant effect of cognitive flexibility directly on the positive emotional well-being (b1 path) whereas, self-regulation indicated a significant positive effect on the positive emotional well-being (b_2 path). Lastly,the indirect effect of prospective mental time travel through cognitive flexibility and self-regulation on positive emotional well-being was found to be significantly positive (C' path). These findings indicate that the cognitive flexibility alone does not mediate the relationship between PMTT and PEW, SR plays a crucial mediating role both directly and in combination with cognitive flexibility.

Table 4.19

Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Positive Emotional Well-being through Working Memory and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Working Memory)				
Predictor (Retrospective Mental Time Travel)	.462	.040	.000	.385	.540
	Mediator (Self-regulation)				
Predictors (Retrospective Mental Time Travel)	.440	.096	.000	.251	.628
Working Memory	.807	.095	.000	.620	.993
	DV (Positive Emotional Well-being)				
Predictors (Retrospective Mental Time Travel)	.066	.046	.149	-.024	.156
Working Memory	-.027	.047	.575	-.119	.066
Self-regulation	.151	.021	.000	.110	.191
Total Effect (Retrospective Mental Time Travel)	.176	.042	.000	.094	.258

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
RMTT→WM→PEW	-.012	.027	-.060	.045
RMTT→SR→PEW	.069	.018	.033	.107
RMTT→WM→SR→PEW	.059	.013	.034	.086

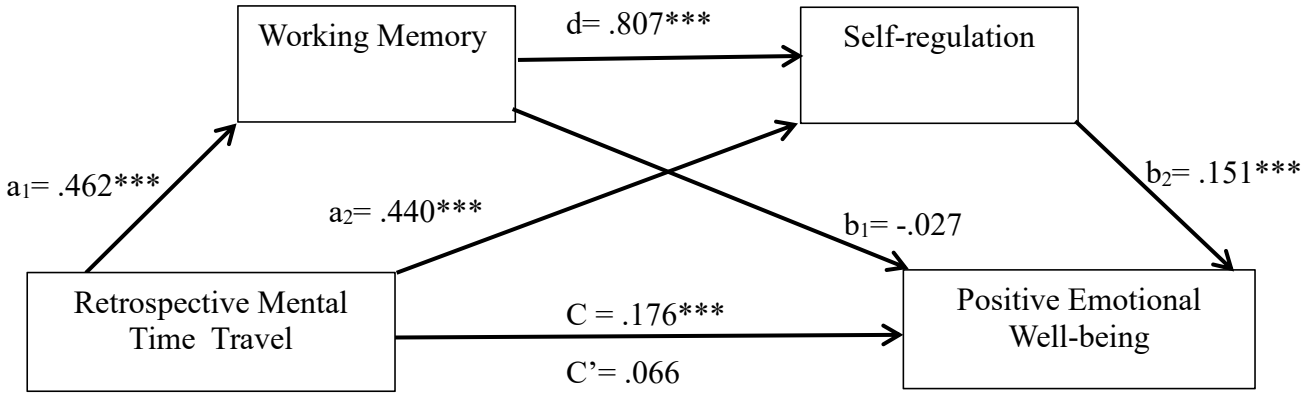

Figure 4.4: *Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Positive Emotional Well-being through Working Memory and Self-regulation.*

Table shows the sequential mediation analysis for the mediating roles of working memory (WM) and self-regulation (SR) between retrospective mental time travel (RMTT) and positive emotional well-being (PEW). The results show a significant positive effect of retrospective mental time travel on working memory (a1 path). This suggests that the higher levels of RMTT would reflect higher levels of WM. Similarly, RMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher RMTT is linked to better self-regulation abilities. Additionally, WM positively predicts SR (d path) implying that better WM is associated with higher SR. For positive emotional well-being (PEW), there is a non-significant negative effect of working memory directly on the positive emotional well-being (b1 path) whereas, self-regulation indicated a significant positive effect on the positive emotional well-being (b_2 path). Lastly, the indirect effect of retrospective mental time travel through working memory and self-regulation on positive emotional well-being was found to be significantly positive (C' path). These findings indicate that the working memory alone does not mediate the relationship between RMTT and PEW, SR plays a crucial mediating role both directly and in combination with WM.

Table 4.20

Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Positive Emotional Well-being through Inhibitory Control and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Inhibitory Control)				
Predictor (Retrospective Mental Time Travel)	.137	.031	.000	-.198	-.077
	Mediator (Self-regulation)				
Predictors (Retrospective Mental Time Travel	.722	.091	.000	.544	.899
Inhibitory Control	.664	.128	.000	.413	.914
	DV (Positive Emotional Well-being)				
Predictors (Retrospective Mental Time Travel)	.058	.043	.178	-.027	.142
Inhibitory Control	-.013	.059	.826	-.128	.102
Self-regulation	.147	.020	.000	.109	.187
Total Effect (Retrospective Mental Time Travel)	.176	.042	.000	.094	.258

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
RMTT→IC→PEW	-.002	.009	-.020	.019
RMTT→SR→PEW	.106	.019	.071	.154
RMTT→IC→SR→PEW	.013	.005	.005	.025

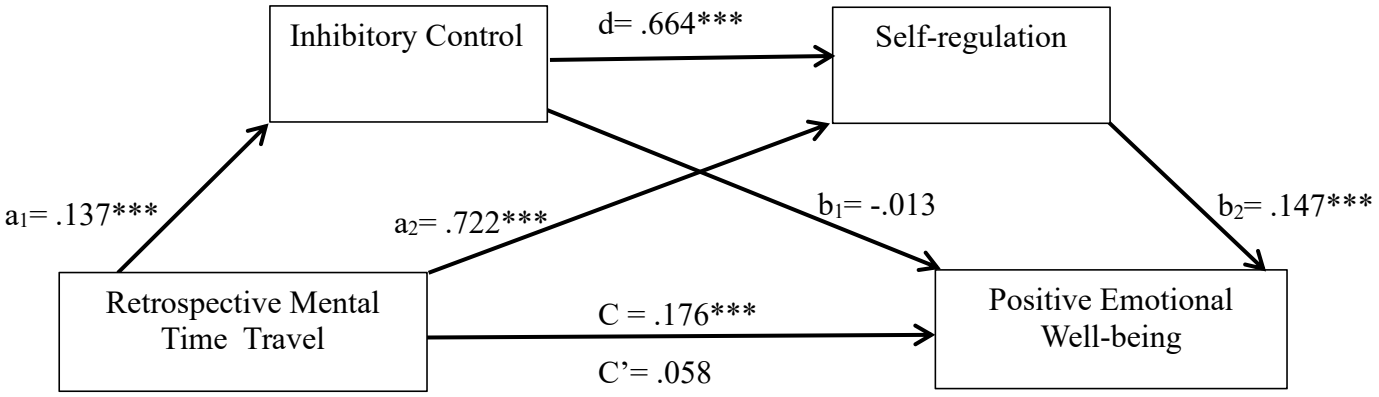

Figure 4.5: *Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Positive Emotional Well-being through Inhibitory Control and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of inhibitory control (IC) and self-regulation (SR) between retrospective mental time travel (RMTT) and positive emotional well-being (PEW). The results show a significant positive effect of retrospective mental time travel (RMTT) on inhibitory control (a1 path). This suggests that the higher levels of PMTT would reflect lower levels of inhibitory control. Conversely, RMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher RMTT is linked to better self-regulation abilities. Additionally, IC negatively predicts self-regulation negatively (d path) implying that lower inhibitory control is associated with higher SR. For Positive Emotional Well-being (PEW), there is a non-significant effect of inhibitory control directly on the positive emotional well-being (b1 path) whereas, self-regulation indicated a significant positive effect on the positive emotional well-being (b_2 path). Lastly, the indirect effect of retrospective mental time travel through inhibitory control and self-regulation on positive emotional well-being was found to be significantly positive (C' path). These findings indicate that the inhibitory control alone does not mediate the relationship between RMTT and PEW; SR plays a crucial mediating role both directly and in combination with inhibitory control.

Table 4.21

Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Positive Emotional Well-being through Cognitive Flexibility and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Cognitive Flexibility)				
Predictor (Retrospective Mental Time Travel)	.217	.060	.000	.100	.334
	Mediator (Self-regulation)				
Predictors (Retrospective Mental Time Travel	.713	.088	.000	.540	.885
Cognitive Flexibility	.561	.065	.000	.334	.588
	DV (Positive Emotional Well-being)				
Predictors (Retrospective Mental Time Travel)	.056	.043	.191	-.028	.150
Cognitive Flexibility	.018	.031	.571	-.043	.078
Self-regulation	.143	.020	.000	.103	.183
Total Effect (Retrospective Mental Time Travel)	.176	.042	.000	.094	.258

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
RMTT→CF→PEW	.004	.009	-.012	.024
RMTT→SR→PEW	.102	.019	.067	.142
RMTT→CF→SR→PEW	.014	.005	.004	.026

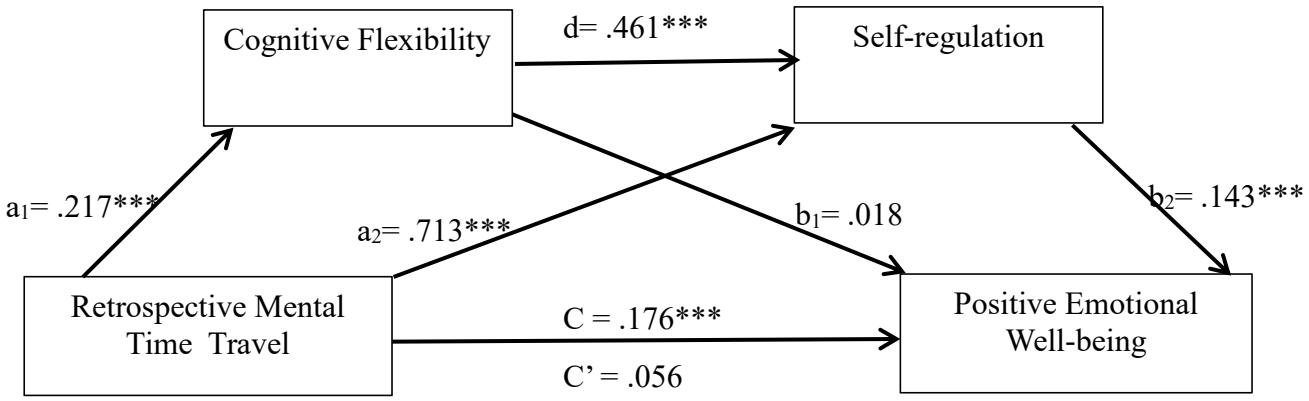

Figure 4.6: *Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Positive Emotional Well-being through Cognitive Flexibility and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of cognitive flexibility (CF) and self-regulation (SR) between retrospective mental time travel (RMTT) and positive emotional well-being (PEW). The results show a significant positive effect of retrospective mental time travel (RMTT) on cognitive flexibility (a1 path). This suggests that the higher levels of PMTT would reflect higher levels of cognitive flexibility. Conversely, RMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher RMTT is linked to better self-regulation abilities. Additionally, CF positively predicts self-regulation negatively (d path) implying that lower cognitive flexibility is associated with lower SR. For positive emotional ell-being, there is a non-significant effect of cognitive flexibility directly on the positive emotional well-being (b1 path) whereas, self-regulation indicated a significant positive effect on the positive emotional well-being (b_2 path). Lastly, the indirect effect of retrospective mental time travel through cognitive flexibility and self-regulation on positive emotional well-being was found to be significantly positive (C' path). These findings indicate that the cognitive flexibility alone does not mediate the relationship between RMTT and PEW; SR plays a crucial mediating role both directly and in combination with cognitive flexibility.

Table 4.2

Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Negative Emotional Well-being through Working Memory and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Working Memory)				
Predictor (Prospective Mental Time Travel)	.455	.038	.000	.380	.530
	Mediator (Self-regulation)				
Predictors (Prospective Mental Time Travel	.397	.094	.000	.212	.580
Working Memory	.818	.096	.000	.630	.001
	DV (Negative Emotional Well-being)				
Predictors (Prospective Mental Time Travel)	-.096	.049	.051	-.192	.001
Working Memory	-.222	.052	.000	-.325	-.119
Self-regulation	-.152	.023	.000	-.197	-.108
Total Effect (Prospective Mental Time Travel)	-.314	.046	.000	-.405	-.223
Indirect Effect	B	Boot SE		Boot 95% CL	
				LL	UL
PMTT→WM→NEW	-.101	.028		-.152	-.044
PMTT→SR→NEW	-.060	.017		-.095	-.026
PMTT→WM→SR→NEW	-.052	.013		-.081	-.031

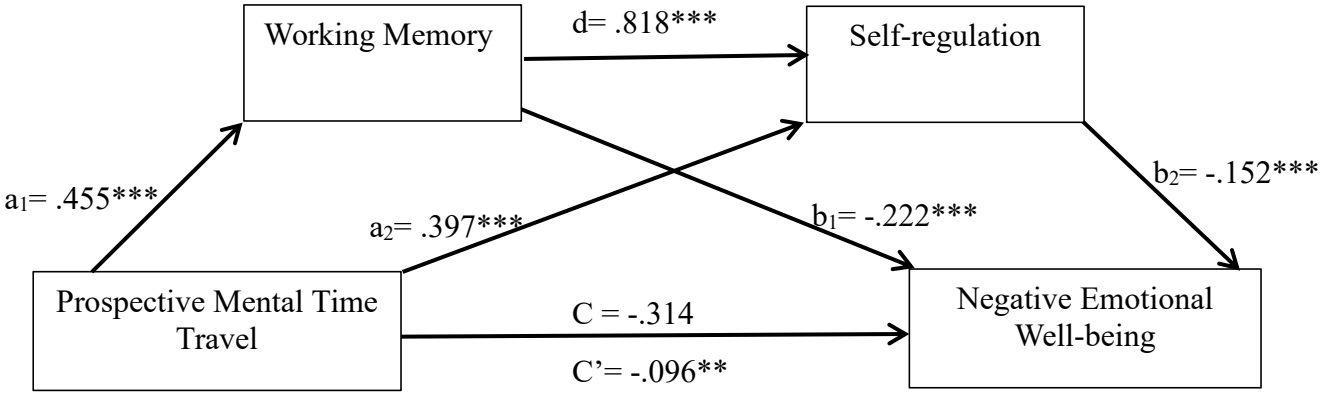

Figure 4.7: *Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Negative Emotional Well-being through Working Memory and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of working memory (WM) and self-regulation (SR) between prospective mental time travel (PMTT) and negative emotional well-being (NEW). The results show a significant postive effect of prospective mental time travel on working memory (a1 path). This suggests that the higher levels of PMTT would reflect greater levels of WM. Also, PMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher PMTT is linked to better self-regulation abilities. Additionally, WM negatively predicts SR (d path) implying that higher WM is associated with poorer SR. For negative emotional well-being (NEW), there is a significant positive effect of working memory directly on the negative emotional well-being (b1 path) whereas, self-regulation indicated a significant negative effect on the negative emotional well-being (b_2 path). Lastly, the indirect effect of prospective mental time travel through working memory and self-regulation on negative emotional well-being was found to be significantly negative (C' path). These results suggest that PMTT indirectly affects NEW via both mediators, working memory and self-regulation; highlighting the complex interplay of cognitive and regulatory processes in negative emotional well-being.

Table 4.23

Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Negative Emotional Well-being through Inhibitory Control and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Inhibitory Control)				
Predictor (Prospective Mental Time Travel)	.167	.030	.000	.109	.225
	Mediator (Self-regulation)				
Predictors (Prospective Mental Time Travel	.664	.090	.000	.488	.840
Inhibitory Control	.627	.130	.000	/372	.883
	DV (Negative Emotional Well-being)				
Predictors (Prospective Mental Time Travel)	-.149	.047	.002	-.241	-.057
Inhibitory Control	-.191	.066	.004	-.320	-.624
Self-regulation	-.173	.022	.000	-.216	-.130
Total Effect (Prospective Mental Time Travel)	-.314	.046	.000	-.405	-.223

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
PMTT→IC→NEW	-.032	.013	-.059	-.007
PMTT→SR→NEW	-.115	.019	-.156	-.078
PMTT→IC→SR→NEW	-.018	.006	-.032	-.008

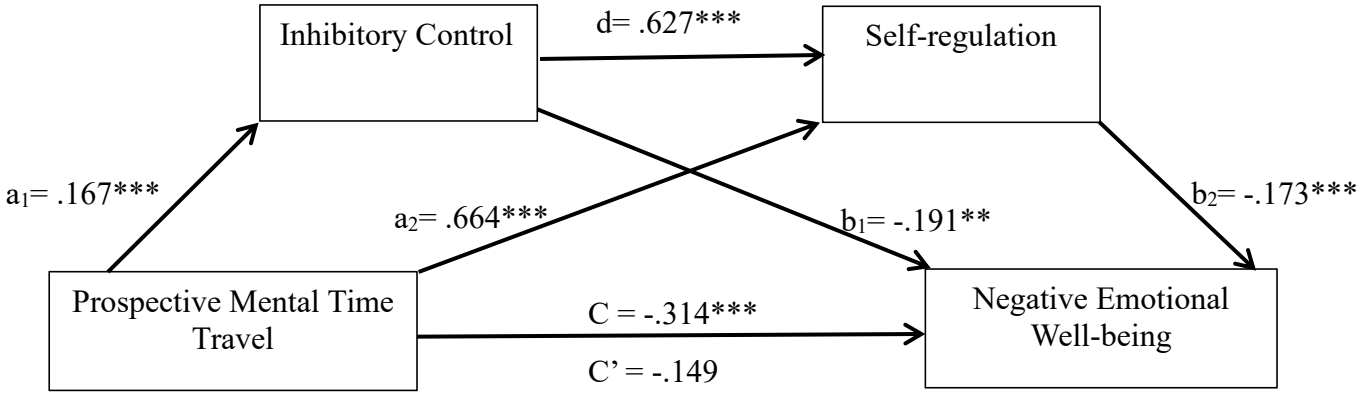

Figure 4.8: *Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Negative Emotional Well-being through Inhibitory Control and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of inhibitory control (IC) and self-regulation (SR) between prospective mental time travel (PMTT) and negative emotional well-being (NEW). The results show a significant negative effect of prospective mental time travel on inhibitory control (a1 path). This suggests that the higher levels of PMTT would reflect lower levels of IC. Conversely, PMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher PMTT is linked to better self-regulation abilities. Additionally, IC negatively predicts SR (d path) implying that higher IC is associated with poorer SR. For negative emotional well-being (NEW), there is a significant positive effect of inhibitory control directly on the negative emotional well-being (b1 path) whereas, self-regulation indicated a significant negative effect on the negative emotional well-being (b_2 path). Lastly, the indirect effect of prospective mental time travel through inhibitory control and self-regulation on negative emotional well-being was found to be significantly negative (C' path). These results suggest that PMTT indirectly affects NEW via both mediators, inhibitory control and self-regulation.

Table 4.24

Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Negative Emotional Well-being through Cognitive Flexibility and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Cognitive Flexibility)				
Predictor (Prospective Mental Time Travel)	.174	.058	.003	.060	.288
	Mediator (Self-regulation)				
Predictors (Prospective Mental Time Travel	.686	.085	.000	.519	.853
Cognitive Flexibility	.476	.064	.000	.350	.602
	DV (Negative Emotional Well-being)				
Predictors (Prospective Mental Time Travel)	-.174	.045	.000	-.263	-.085
Cognitive Flexibility	.182	.034	.000	.115	.248
Self-regulation	-.223	.022	.000	-.267	-.180
Total Effect (Prospective Mental Time Travel)	-.314	.046	.000	-.405	-.223

Indirect Effect	B	Boot SE	Boot 95% CL	
			LL	UL
PMTT→CF→NEW	.032	.018	.003	.073
PMTT→SR→NEW	-.153	.023	-.200	-.111
PMTT→CF→SR→NEW	-.019	.009	-.036	-.002

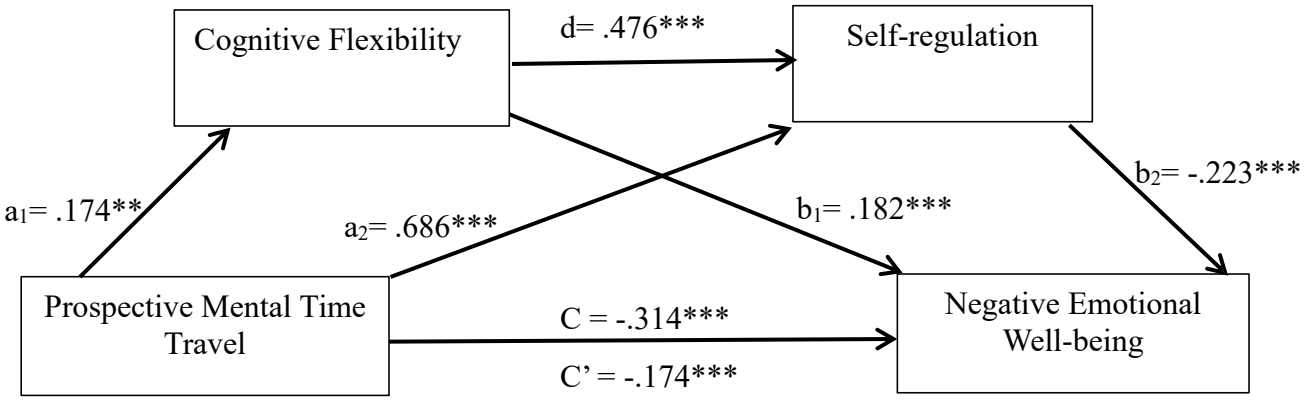

Figure 4.9: *Sequential Mediation Analysis of Indirect effect of Prospective Mental Time Travel on the Negative Emotional Well-being through Cognitive Flexibility and Self-regulation*

This table shows the sequential mediation analysis for the mediating roles of cognitive flexibility (CF)) and self-regulation (SR) between prospective mental time travel (PMTT) and negative emotional well-being (NEW). The results show a significant positive effect of prospective mental time travel on cognitive flexibility (a1 path). This suggests that the higher levels of PMTT would reflect lower levels of CF. Additionally, PMTT significantly predicts self-regulation (SR) also with a positive effect (a2 path) indicating that higher PMTT is linked to better self-regulation abilities. Additionally, CF positively predicts SR (d path) implying that higher CF is associated with poorer SR. For negative emotional well-being (NEW), there is a significant positive effect of cognitive flexibility directly on the negative emotional well-being (b1 path) whereas, self-regulation indicated a significant negative effect on the negative emotional well-being (b_2 path). Lastly, the indirect effect of prospective mental time travel through cognitive flexibility and self-regulation on negative emotional well-being was found to be significantly negative (C' path). These results suggest that PMTT indirectly affects NEW via both mediators.

Table 4.25

Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Negative Emotional Well-being through Working Memory and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Working Memory)				
Predictor (Retrospective Mental Time Travel)	.463	.040	.000	.385	.540
	Mediator (Self-regulation)				
Predictors (Retrospective Mental Time Travel	.440	.096	.000	.251	.628
Working Memory	.807	.095	.000	.620	.993
	DV (Negative Emotional Well-being)				
Predictors (Retrospective Mental Time Travel)	-.088	.050	.082	-.187	.011
Working Memory	-.228	.052	.000	-.330	-.125
Self-regulation	-.153	.023	.000	-.197	-.108
Total Effect (Retrospective Mental Time Travel)	-.317	.048	.000	-.411	-.223
Indirect Effect	B	Boot SE		Boot 95% CL	
				LL	UL
RMTT→WM→NEW	-.105	.028		-.159	-.047
RMTT→SR→NEW	-.067	.017		-.104	-.035
RMTT→WM→SR→NEW	-.057	.015		-.089	-.032

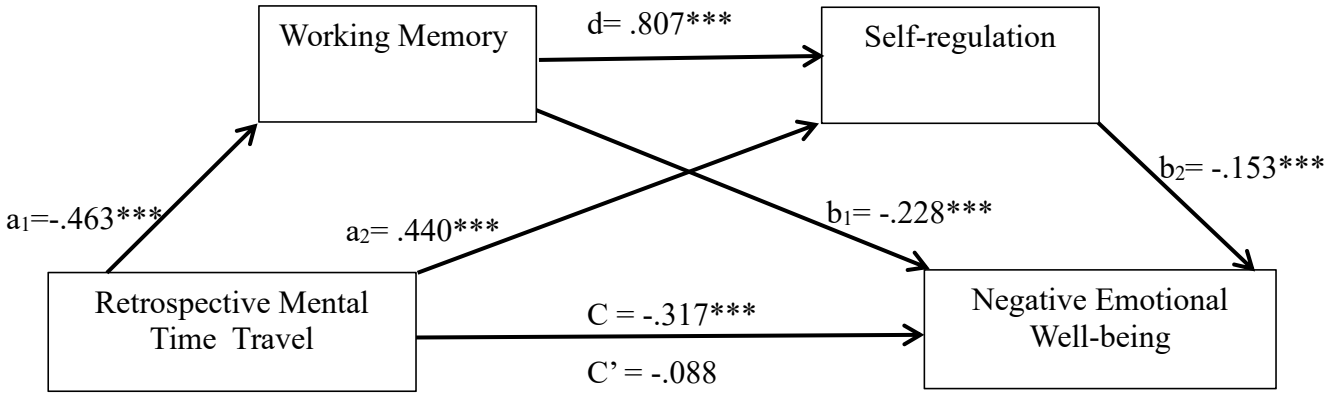

Figure 4.10: *Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Negative Emotional Well-being through Working Memory and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of working memory (WM) and self-regulation (SR) between retrospective mental time travel (RMTT) and negative emotional well-being (NEW). The results show a significant positive effect of prospective mental time travel on working memory (a1 path). This suggests that the higher levels of RMTT would reflect higher levels of WM.. RMTT also significantly predicts self-regulation with a positive effect (a2 path) indicating that higher RMTT is linked to better self-regulation abilities. Additionally, WM positively predicts SR (d path) implying that higher WM is associated with better SR. For negative emotional well-being (NEW), there is a significant negative effect of working memory directly on the negative emotional well-being (b1 path) whereas, self-regulation indicated a significant negative effect on the negative emotional well-being (b_2 path). Lastly, the indirect effect of retrospective mental time travel through working memory and self-regulation on negative emotional well-being was found to be significantly negative (C' path). These results suggest that RMTT indirectly affects NEW via both mediators, working memory and self-regulation; highlighting the complex interplay of cognitive and regulatory processes in negative emotional well-being.

Table 4.26

Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Negative Emotional Well-being through Inhibitory Control and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Inhibitory Control)				
Predictor (Retrospective Mental Time Travel)	.137	.031	.000	.077	.197
	Mediator (Self-regulation)				
Predictors (Retrospective Mental Time Travel	.722	.091	.000	.544	.899
Inhibitory Control	.664	.128	.000	.413	.914
	DV (Negative Emotional Well-being)				
Predictors (Retrospective Mental Time Travel)	-.149	.048	.002	-.243	-.055
Inhibitory Control	-.203	.065	.002	-.332	-.749
Self-regulation	-.172	.022	.000	-.215	-.129
Total Effect (Retrospective Mental Time Travel)	-.317	.048	.000	-.411	-.223
Indirect Effect	B	Boot SE		Boot 95% CL	
				LL	UL
RMTT→IC→NEW	-.028	.012		-.053	-.009
RMTT→SR→NEW	-.124	.021		-.167	-.086
RMTT→IC→SR→NEW	-.016	.006		-.029	-.006

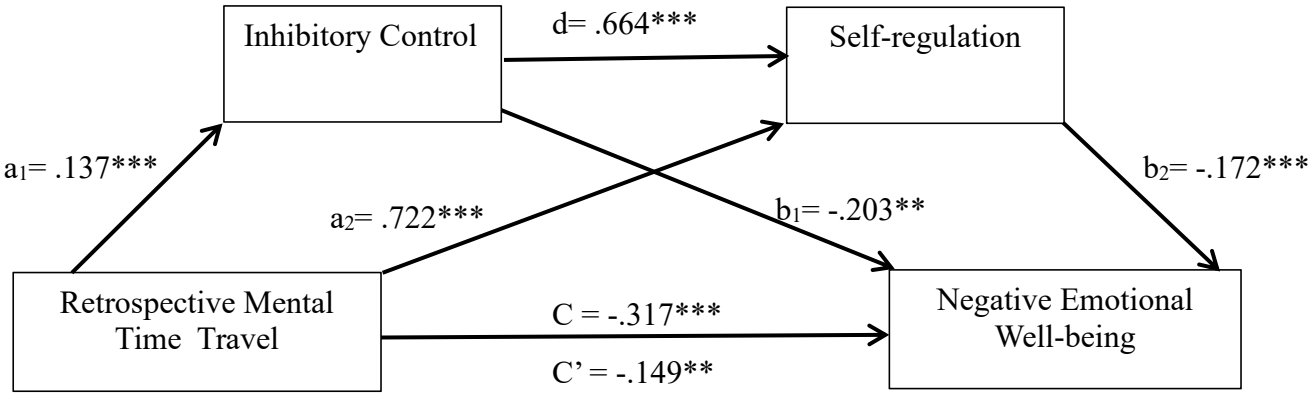

Figure 4.11: *Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Negative Emotional Well-being through Inhibitory Control and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of inhibitory control (IC) and self-regulation (SR) between retrospective mental time travel (RMTT) and negative emotional well-being (NEW). The results show a significant positive effect of retrospective mental time travel on inhibitory control (a1 path). This suggests that the higher levels of RMTT would reflect greater levels of IC. Similarly, RMTT significantly predicts self-regulation (SR) with a positive effect (a2 path) indicating that higher RMTT is linked to better self-regulation abilities. Additionally, IC positively predicts SR (d path) implying that higher IC is associated with better SR. For negative emotional well-being (NEW), there is a significant negative effect of inhibitory control directly on the negative emotional well-being (b1 path) and also, self-regulation indicated a significant negative effect on the negative emotional well-being (b_2 path). Lastly, the indirect effect of retrospective mental time travel through inhibitory control and self-regulation on negative emotional well-being was found to be significantly negative (C' path).

Table 4.27

Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Negative Emotional Well-being through Cognitive Flexibility and Self-regulation (N=515)

	B	*SE*	*P*	95% CL	
				LL	UL
	Mediator (Cognitive Flexibility)				
Predictor (Retrospective Mental Time Travel)	.217	.060	.000	.100	.334
	Mediator (Self-regulation)				
Predictors (Retrospective Mental Time Travel	.713	.088	.000	.540	.886
Cognitive Flexibility	.461	.065	.000	.334	.588
	DV (Negative Emotional Well-being)				
Predictors (Retrospective Mental Time Travel)	-.175	.047	.000	-.267	-.083
Cognitive Flexibility	.185	.034	.000	.119	.252
Self-regulation	-.224	.022	.000	-.267	-.180
Total Effect (Retrospective Mental Time Travel)	-.317	.048	.000	-.411	-.223
Indirect Effect	B	Boot SE		Boot 95% CL	
				LL	UL
RMTT→CF→NEW	.040	.019		.010	.083
RMTT→SR→NEW	-.160	.023		-.207	-.115
RMTT→CF→SR→NEW	-.022	.009		-.040	-.007

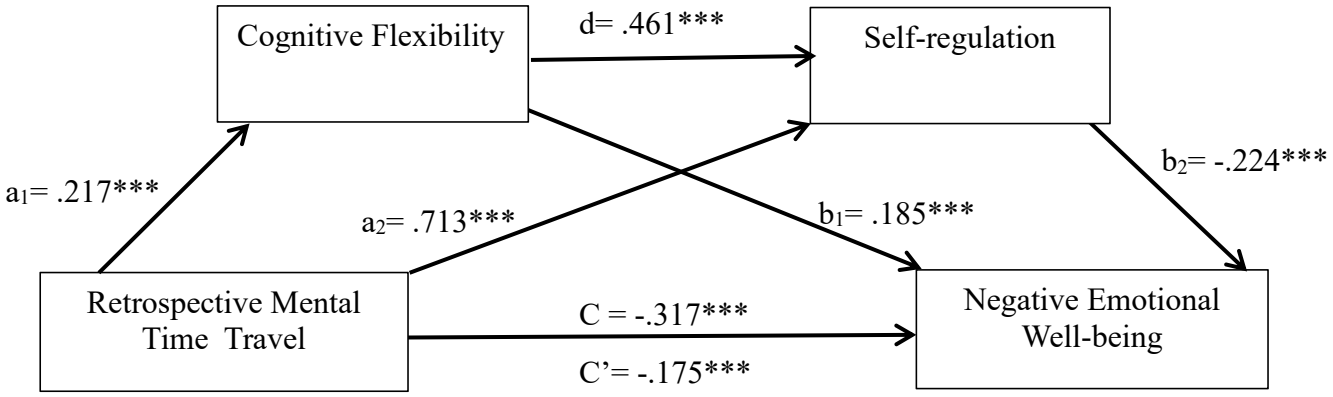

Figure 4.12: *Sequential Mediation Analysis of Indirect effect of Retrospective Mental Time Travel on the Negative Emotional Well-being through Cognitive Flexibility and Self-regulation*

The table shows the sequential mediation analysis for the mediating roles of cognitive flexibility (CF) and self-regulation (SR) between retrospective mental time travel (RMTT) and negative emotional well-being (NEW). The results show a significant positive effect of retrospective mental time travel on cognitive flexibility (a1 path). This suggests that the higher levels of RMTT would reflect lower levels of CF. Additionally, RMTT significantly predicts self-regulation (SR) also with a positive effect (a2 path) indicating that higher RMTT is linked to better self-regulation abilities. Additionally, CF positively predicts SR (d path) implying that higher CF is associated with better SR. For negative emotional well-being, there is a significant positive effect of cognitive flexibility directly on the negative emotional well-being (b1 path) whereas, self-regulation indicated a significant negative effect on the negative emotional well-being (b_2 path). Lastly, the indirect effect of retrospective mental time travel through cognitive flexibility and self-regulation on negative emotional well-being was found to be significantly negative (C' path).

CHAPTER 5

SUMMARY, DISCUSSIONS, CONCLUSIONS AND SUGGESTIONS

5.1 Summary

The purpose of this study was to investigate how prospective and retrospective mental time travel, working memory, inhibitory control, and cognitive flexibility; and self regulation could predict positive and negative emotional well-being among university students. The aim was to find out if these cognitive and regulatory functions are indeed the mediators between mental time travel and emotional well-being. Additionally, the study investigated the gender based and other demographic based differences in these constructs in order to explore which one of these affects the emotional well-being of university students. The research also employed a sequential mediation analysis of executive functioning and self-regulation to understand the interactive processes driving emotional consequences with the effect of mental time travel.

5.2 Discussions

5.2.1 Mental Time Travel and Emotional Well-being

The present study intended to investigate the correlation between MTT and emotional well-being of university students. The hypotheses formulated assumed that both future and past mental time travel would correlate with the positive and negative facet of emotional well-being. More specifically, it was predicted that prospective MTT would correlate positively with positive emotional well-being (H1a), and correlate inversely with negative emotional well-being (H1b). In addition, retrospective MTT should correlate inversely with positive emotional well-being (H1c) and should correlate positively with negative emotional well-being (H1d). However, some of these expectations were not supported and the results

showed that both prospective and retrospective MTT had a positive correlation with positive emotional well-being and a negative correlation with negative emotional well-being indicating partial support for the hypotheses.

Both prospective and retrospective MTT are correlated with positive emotional well-being supports the idea of a relation of mental time travel to positive emotional hedonistic adaptation. The results that are found in this research support the findings explaining the various adaptive functions of MTT. According to Suddendorf and Corballis (2007) and D'Argembeau and Van der Linden (2008) self-prospective MTT enables an individual to come up with a favorable future hence, hope and optimism. As with other types of MTT, retrospective MTT may also help to improve well-being by allowing people to take constructive lessons from one's past (Bluck & Alea, 2002).

The negative correlations between both forms of MTT and negative emotional well-being imply that the extent to which individuals can flexibly engage in adaptive forms of mental time travel may protect against negative emotions. Potential retrospective MTT can further decrease negative emotional well-being as they have been shown to help people prepare for stressor events to eliminate or minimize their impact on health, in concordance with the stress-buffering hypothesis by Taylor and Stanton (2007). When applied flexibly, retrospective MTT results in the ability to help an individual to recline a previously viewed negative event in a more positive light, as has been postulated in cognitive reappraisal literature (Gross and John, 2003).

5.2.2 Mental Time Travel and Executive Functioning

The current research examined the correlation between mental time travel (MTT) and executive functioning (EF) among university students. The hypothesis posited a significant positive correlation between MTT, both prospective and retrospective, and the sub-

components of EF. In particular, the research in the given area focuses on the factors such as working memory, inhibitory control, and cognitive flexibility. The results of this study therefore supported the hypothesis in regard to MTT and the given components of EF.

The significant positive associations of MTT with EF support theoretical propositions and findings emphasizing the interaction of temporal insight and executive functioning. To mentally be at another time people need to utilize more processing resources which are highly correlated with EF. More specifically, although working memory supports the storage and manipulation of temporal information and inhibitory control helps to block out distracting information to result in specified past or future episodes in mind (Addis et al., 2007; Spreng et al., 2009). There is the ability to move back and forth across the time perspectives; this flexibility is useful when adopting contextualized approaches, thinking and action (Miyake et al., 2000).

The high positive relationship between MTT and WM supports the notion that people with larger working memory can perform a detailed and rich mental imagery of future and past events. This finding is supported by the dual-process theory as espoused by Baddeley (2003) whereby working memory is argued to play and important role in the execution of complex cognitive functions including temporal simulations.

This study substantiates an important factor related to temporal cognition, the selective attention or the inhibitory control of MTT. Having specifically discussed inhibitory control within the context of MTT, it becomes clear that greater flexibility in mind and thought results from having the ability to ignore distractions; this is achieved through inhibitory control to increase the fidelity of the imagined environment. This result supports the contention by Anderson and Green (2001) for inhibitory mechanisms in the retrieval of memory.

The strong relationship between MTT and cognitive flexibility shows that temporal cognition is adaptive in nature. Cognitive flexibility is the capability of an individual to switch from one temporal frame (past, future) and also the crossing of information form different domains in order to make coherent stories. Cognitive flexibility, as pointed out by Diamond (2013) is a key sub-function of higher order executive abilities associated with planning and problem solving.

These findings also relate with previous studies that have pointed to the relationship between MTT & EF as closely related. For example, Schacter et al. (2012) assumed that there is a direct connection between episodic future thinking and the necessary components of EF that use the prefrontal cortex. Moreover, other meta-analysis research by Spreng et al. (2009) has now shown that MTT and EF share connections that are the same, agreeing with the findings of the present study. The correlations also expand the findings published by (Addis et al., 2007) and underscore the role of the episodic simulation, which requires executive processes.

5.2.3 Executive Functioning and Emotional Well-being

The current research aimed at understanding the correlation between EF and emotional well-being (EWB) of university students considering the positive as well as the negative aspects of the emotional well-being. Based on the model, the hypothesis for the analysis of the relationship between EF and emotional well-being was formulated as H3; EF will show a positive and significant relationship with positive aspects of EWB (H3a) and a negative and significant correlation with the negative aspects of EWB (H3b). The outcomes were generally consistent with the predicted assumptions, indicating moderate to high relationships among the EF components (working memory, inhibitory control, and cognitive

shifting) and emotional well-being. Though self- regulation did not have a significant correlation with negative emotional well-being ; correlation coefficient =0.05.

The positive association found for EF with positive emotional well-being corroborates the theoretical model that posits that optimal cognitive control enhances positive emotional well-being and healthy coping styles. Working memory, inhibitory control and cognitive flexibility, are responsible for regulating positive emotional well-being by allowing people to attend rewards and long-term incentives (Diamond, 2013). For example, working memory represents and integrates positive concepts, and cognitive flexibility replusterizes aversive stimuli as benefits (Gross & John, 2003).

This coincides with the findings that there is a negative correlation between the EF and negative affective well-being because having high executive control will reduce vulnerability to negative emotions. Working memory updating is important in the prevention of overthinking in the form of rumination which relates unhealthy or ill mental state where negative affect is involved (Joormann & Gotlib, 2010). Likewise, cognitive flexibility allows persons to change their focus away from uncomfortable stimuli, thus decreasing both the strength and persistence of bad feelings, such as negative affect (Cohen et al., 2016).

It was unanticipated not to find a significant correlation between cognitive flexibility and negative emotional well-being. The absence of change in cognitive flexibility could also help to explain it, because, although cognitive flexibility is a component of EF, it does not appear to impact negative emotional well-being in quite the same way as the other elements of EF do. Tangney et al. (2004) for example postulated that cognitive flexibility has a variation of effects on the emotional health based on situational dimensions or on the coping variable. Moreover, the non-significant result may be due to the measures' imperfections or sample characteristics that require additional research.

The results stress the importance of EF for emotional states and show that EF boosts positive emotional well-being and reduces negative emotional well-being. Such findings support the dual-process theory of affect regulation stipulating that cognitive executive processes account for constructive emotional regulation (Ochsner Gross, 2005). The given patterns pay a certain emphasis to the relationship between cognitive and affective mobilization, which supports the idea of EF targetted improvement of emotional well-being in university students.

The findings of this study can be explained by the evidence of the relationship between EF and emotional well-being. For instance, Schmeichel and Tang (2015) showed that the higher the EF, people cope with emotions better, and they have less psychological and emotional illness. In addition, the correlation between EF and positive emotional well-being complements with other studies by Calkins and Marcovitch (2010) in as far as cognitive regulation is concerned with emotional competence.

5.2.4 Mental Time Travel and Self-regulation

Consistent with the objectives of this research, the study aimed at establishing what role MTT plays in the self-regulation of university students. According to the hypothesis (H4), there was a positive correlation between MTT (both prospective and retrospective) and self-regulation. This hypothesis was further confirmed since the results suggested that participants reporting higher MTT had better self-regulation skills.

The relationship between MTT and self-regulation, hence, shows that both MTT and self-regulation require cognitive and motivational elements. Phenomenon of mental time travel which means that a person can mentally transport himself or herself into the future or past involves and enables self-regulation. Another valuable characteristic of prospective MTT is that it allows considering goals related to a specific time period in order to prepare for them

during this time, which is one of the major components of self-regulating activity (Baumeister et al., 1998). As it is the case with retrospective MTT earning and a chance to change behaviour which is a key to successful self-regulation are possible only when individuals are exposed to stimuli coming from the environment (Schacter et al. , 2012).

The prospective MTT in personal self-regulation skills helps as to setting goals and the ability for looking ahead. It helps a person to develop mental images of how things should be, and this creates a way of seeing how things might get in the way of achieving the goal (Taylor et al., 1998). These findings expounded by D'Argembeau and Van der Linden (2008) mean that future-thinking is highly correlated to self-regulation strategies for example, an individual will be able to avoid impulsiveness and give attention to the goals found in the distant future.

The retrospective MTT promotes self-regulation because individuals are able to review previous performance and the results that can be used in decision making. This reflective process is supportive of Bandura (1986) social cognition whereby personality involves self-regulation of thoughts and behaviors. Bluck and Alea (2002) described about the functional value of autobiographical memory in regulating behavior and maintaining self-regulatory processes.

These findings are coherent with the existing literature that captures the interaction between temporal perception and self-control. For instance, MTT has been applied in research on brain activity and has been revealed that MTT activates the regions of the brain linked to self-regulation particularly the prefrontal cortex (Spreng et al., 2009).

5.2.5 Executive Functioning and Self-regulation

In the current study, the executive functioning (EF) components; working memory, inhibitory control, and cognitive flexibility were hypothesized to correlate significantly with

with self-regulation in university students. It was hypothesized that all the EF components were positively related with self-regulation in the study. The findings partially supported the hypothesis; meaning cognitive flexibility and inhibitory control significantly predicted self-regulation. However, self regulation and working memory are negatively linked according to the results of present study.

The positive correlations are consistent with research on the fundamental aspects of the executive functioning, including inhibitory control and cognitive flexibility. Inhibitory control, allowing a person to override an impulsive response and engage in goal-directed behavior that are characteristic of efficient self-regulation (Diamond, 2013). This result supports the work of Hofmann et al. (2012) that examined the relationship between self-regulation of desires in the present and staying on track toward distant goals. Also, cognitive flexibility helps improve adjustability of strategies by individuals toward obtaining the intended goals to result from given situations. Cognitive flexibility involvement in relational understanding and issue solving facilitate individual tailored control via adaptability to various adversities and difficulties (Eslinger & Grattan, 1993). These results correspond with the theoretical work by Zelazo et al. (2000; 2003), where cognitive flexibility has been postulated as one of the crucial aspects governing effective goal pursuit and emotional self-regulation.

The findings of negative associations between working memory and self-regulation for the current study were somewhat not predicted. One possible reason for such an effect could be that it is cognitively easier, when WM is high, to get stuck with particular aspects of a task, or over focus on them, thus failing at self-regulation. This is in correspondence with Unsworth and McMillan, (2014) who observed that when there is too much demand on WM or if there is interruption, it hinders self-regulation strategies.

It is also possible that those with better working memory, will differentially allocate their resources, by engaging in activities that do not relate to short-term self-regulation. For instance, data presented by Kane and Engle (2003) shows that the responsibility of working memory for holding relevant information makes this resource not always compatible with the overall self-regulation function at the task or in more stressful conditions.

The findings are consistent with preexisting literature concerning self-regulation and self-control that point to the significance of inhibitory control and cognitive flexibility (Hofmann et al., 2012; Zelazo et al., 2003). In contrast, the present findings indicate that WM was negatively correlated to self-regulation, although this result seems to stand in opposition to the overall pattern of positive relationships found for WM in the literature. This divergence may therefore be due to differences in the measurement techniques that were used in the studies, or sample characteristics. For example, Schmeichel et al (2008) have commented that the extent to which working memory supports self-regulation may be predicated upon factors thought to be task difficulty as well as the specificity of the surrounding environment.

5.2.6 Self-regulation and Emotional Well-being

In this study, self-regulation was hypothesized as being positively associated with positive emotional well-being, and negatively associated with negative emotional well-being among university students. The findings provided empirical support to the hypothesis.

The findings of a relationship between self-regulation and positive emotional well-being support the part played by self-regulatory skills in promoting beneficial emotional states. Self-regulation leads to positive goal achieving, cognitions, positive emotional experience and enhances positive affect that leads to an overall life satisfaction (Baumeister et al, 1998). These findings are in line with Gross and John (2003) who found that the higher use intensity of effective self-regulation strategies namely, cognitive reappraisal is linked with

enhanced well being. Self regulation helps a person to keep an eye on the desired goals and undertake behavior that leads to positive affect. For example, Zimmerman and Schunk (2011) highlight the value of self-regulation in academic and personal domains where it can lead to fulfillment of goals as well as satisfaction and in turn, promotion of emotional well-being.

The negative significant correlation between self-regulation and negative emotional well-being supports the noteworthy function of self-regulatory competencies for negative feelings regulation. Through regulating impulse responses and stress, self-regulation cannot allow for long duration negative affect. These findings support the concept found in Hofmann et al. (2012) which pointed that self regulation enables a person to avoid the dangers of developing unhealthy emotional response pattern like rumination and anxiety.

Self-regulation facilitates the regulation of daily hassles which do not affect one's emotional health. The author of this notion is Bandura (1986) in his social cognitive theory where personal factors such as eager control for thoughts and emotions hence promote emotional regulation. In the study conducted by Schmeichel and Tang (2015), it was found that self-regulation encourages positive affect and decreases emotional suffering.

5.2.7 Mediating role of Executive Functioning and Self-regulation

In this study, an attempt was made to examine the combined mediation of executive functioning (working memory, inhibitory control, and cognitive flexibility) and self-regulation on mental time travel (prospective and retrospective) and emotional well-being (positive and negative). The results bring into focus the interdependency of cognitive and regulatory operations that underpin the processes of emotional well-being.

5.2.7.1 Mediating role of Executive Functioning and Self-regulation between Prospective Mental Time Travel and Positive Emotional Well-being

The results showed that the components of executive functions, namely work memory, inhibitory control and cognitive flexibility did not show significant mediation between PMTT and PEW. However, self-regulation was found as a significant mediator both overall and in conjunction with these cognitive processes.

Self-regulation is inherently intertwined with the capacity to initiate, implement and survey future related behaviors which, corresponds with prospective mental time travel as proposed by Baumeister et al., (2007). Thus, higher-order cognitive control over goal-directed thinking, as provided by executive functioning, is relevant not only to the decrements in cognitive control, but self-regulation is relevant to the enhancement of a positive emotional outcome as well. For example, working memory and inhibitory control may support the cognitive processes that occur during mental time travel, but their contribution to emotions and actions regulation makes sense only when supported by the ability to regulate one's emotions and actions (Hofmann et al., 2012).

Similarly, cognitive flexibility, a capacity of the people for altering cognitive operations depending on the current requirements, affected positive emotional well-being (PEW) only indirectly through the cognitive flexibility x self-regulation interaction. This has implications for the idea that those who can skillfully engage with the person-situational activity structures and regulate their own responses in terms of the temporal orientation, would tend to have positive emotional experiences. The results of the present study can complement the existing literature regarding the inter-dependencies between cognitive and self-regulatory factors in supporting adaptive outcomes and mental health (Vohs & Baumeister, 2016).

5.2.7.2 Mediating role of Executive Functioning and Self-regulation between Retrospective Mental Time Travel and Positive Emotional Well-being

The results indicate that self-regulation has a substantial mediating effect on the relationship between RMTT and PEW, but neither the WM, IC, or CF components of EF do so. This underscore the integration of self regulation as a way of bridging the gap between mental time travel and emotional well-being.

RMTT improves rational mood through identity and meaning, coherence, although modulated by self-regulation, responsible for emotions and behaviours (Addis et al., 2007; Gross & John, 2003). The EF components might contribute to self-regulation so far such as working memory focus and adaptability are offered, but apart from this, EF does not have an immediate impact on positive emotional well-being. (Diamond, 2013; Hofmann et al., 2012).

In integrating EF and self-regulation, it is seen that the two work in a mutually facilitated but reciprocal relation, such that EF indirectly supports self-regulation for better emotional consequences. This is in concordance with models that Baumeister et al (2007) suggest that self regulation is a key component in the sustenance of emotional stability.

5.2.7.3 Mediating role of Executive Functioning and Self-regulation between Prospective Mental Time Travel and Positive Emotional Well-being

The results for this sequential mediation analysis explicate that the manner in which people evaluate future-related cognition and affect greatly influences the affective consequences they experience. The components of EF substantially mediate this relationship as a result of their role in cognitive regulation of PMTT. The working memory helps people categorize and concentrate on constructive potential events letting go of the feeling of having to deal with negative or unpredictable outcomes (Baddeley, 2003). It was found that inhibitory control is helpful in monitoring and preventing the cognitive intrusions regarding

the future and their emotional consequences (Hofmann et al., 2012). Cognitive flexibility empowers people to alter the ways they think about demanding possible events so that they may better cope and elicit fewer adverse emotional reactions (Diamond, 2013).

Self regulation also appeared as a mediator, when analyzed individually and interaction with EF. It helps people to regulate the feelings postured by potential- thinking cognitions through displacing, transformative or distracting techniques that lower compared discomfort (Gross and John, 2003). This result shows self-regulation as a mediated pathway linking PMTT to emotional health.

It was proposed that EF and self-regulation can be mediated jointly, and their suggested interaction is hierarchical in nature. These EF components called cognitive resources enhance self-regulative operations that change the impact of NEW. This accords with other theoretical viewpoints such as Hofmann et al, (2012) that argued that EF enhances the regulation of emotions towards achievement of specific goals.

New insights from the present investigation consequently support the need for interventions aimed at both EF and self-regulation in order to decrease NEW. Strengthening training in cognitive processes that emphasize approach to and management of future-oriented thoughts, including flexibility, inhibitory control, and self-regulation based on mindfulness methods could be useful

5.2.7.4 Mediating role of Executive Functioning and Self-regulation between Retrospective Mental Time Travel and Negative Emotional Well-being

.The sequential mediation results show that self-regulation and EF factors including working memory, inhibitory control and cognitive flexibility mediate the link between RMTT and NEW. RMTT exhorts the retrieval of episodic information of often a distressing kind, and its use could either sustain, appease or increase negative feelings depending on how the

information is managed. The work of the working memory is to hold capacity of storages of earlier memorized data and prepare for organizing the new incoming affective information (Baddeley, 2003). Inhibitory control enables an evaluator to prevent disruptive information, arising from personal histories, influencing their feelings in the present (Hofmann et al., 2012). Cognitive flexibility helps individuals to change the meaning of the adverse memories in such a way that also helps to decrease their subjective weight (Diamond, 2012).

Self-regulation also has the same mediating function on the same dimension. It recruits cognitive resources from EF to promote adaptive emotional and behavioural regulation so that a person may modify distress and decrease negative emotional events (Gross & John 2003). Self-regulation allows for the use of strategies like reappraisal, distraction and emotional suppression because such strategies aquiring NEW (Baumeister et al., 2007).

Through incorporating EF and self-regulation, it is asserted that they have a relationship that implies a direct hierarchy where EF offers the set of apex cognitive abilities that are essential for efficient self-regulation. This double mediation is in accordance with theoretical models specifying the dynamics of the control and regulation of emotions of the self. For instance, Hofmann et al. (2012) suggested that EF facilitates goal-execution processes, whilst self-regulation guarantees emotional responses to these goals.

5.2.8 Effects of Demographics on study variables

The study aimed to explore gender-based and other demographic variables based differences in the study variables.The study revealed innovative information on how these variables differ in different groups.

No gender differences were found in the current study across the study variables through the independent sample t-test; they comprised mental time travel, executive

functioning, self-regulation, and emotional well-being along wit their sub-scales. This finding supports prior literature that cognitive and emotional transformation could be much more subtle between male and female because of the sociocultural as well as organic impact, but such variations might be moderated by context (Hyde, 2005). For instance, Hyde identified that the Gender Similarities Hypothesis claims that in gender differences, male and female students are generally same in most of the psychological variables such as the cognitive, feelings and emotions. This result also confirms that the mental time travel and the executive function are general cognitive features, and thus, the suggested tasks are not highly sensitive to gender differences.

In light of emotional well-being and self regulation, the gender roles that are imposed by society can take its toll on how such constructs may manifest themselves but given that no significant differences have emerged, so it can bbe assumed that university students may in fact have access to comparable emotional well-being and self-regulation capabilities irrespective of gender. This was expected because male and female students are subjected to similar academic and social challenges which make their feelings and thinking identical (Hofmann et al., 2012).

Likewise the employment status of mothers did not exonerate significant differences in the study variables in the study. As such, this finding might be due to the shifting exploits of family and roles, as well as the growing acceptance of working mothers in most societies. Earlier literature also demonstrates that impacts of maternal employment on child development are indirect through other channels, including socio-economic advantages, and parental role modeling, parenting behaviors, family cultural support may play a role (Lucas-Thompson et al., 2010). The ages of the university participants may afford them some level of personal independence and might not significantly feel the effects of their mother working through their self-regulation and executive functioning, or emotional health.

People with a paid job enjoyed better positive emotional states and self-regulation than the unemployed ones. Employment can promote one's autonomy, competence, and relatedness which are major aspects of the self-actualization constituted in positive emotional health by Ryan and Deci (2000). Employment scheduling and obligations may also provide a boost to self-regulation as people master survival skills and have to organize their time, meet schedules and deal with people in the workplace (Baumeister et al., 2007).

The applicability of current results with Erik Erikson's psychosocial theory is plausible given that the main development tasks of young adulthood involve identity as well as competency. Employment enables university students to attain full control/mastery and independence, thereby fitting into the Identity vs. Role Confusion and Industry vs. Inferiority stages. The above roles help the individuals assume self-discipline and responsibility in their lifestyles while at the same time improves their joy, accomplishment and sense of competence and fulfillment. This concurs with Erikson's theory that meaningful work fosters followers' emotional and social growth, supporting the results on why employed students have higher scores on positive emotional well-being as compared to the un-employed university students.

These results are in line with the theory of Self-Determination, according to which need for autonomy and competence leads to positive outcomes for the individual. Excel in these psychological requirements receives better course of employment, and certainly emotional and regulatory jobs. In addition, Human employment yields them the financial independence which has likely to reduce the stress levels and has positive effect on the emotional health.

Nuclear family participants had higher positive affect than the participants from joint family systems. Nuclear families maybe more adaptive in the sense that they can offer the ability for close contact with relatives without as much contention or potential for

interference and independence for the people that comprise the new household. However, joint family also have some disadvantage, because many relations and division of work may put more stress on the family members and personal space (Singh, 2018). Such a discovery is in agreement with the Family Systems Theory in terms of tenets that relate to the manner in which the structure of families berates the strength of the well-being of the people. Nuclear families may enhance interaction quality, increase positive emotions, and availability of support that all leads to better emotional well-being (Bowen, 1978). Moreover, there is less role strain plus there are lesser conflicts that would make the children and the single parent in nuclear families concentrate more on the attainment of their personal as well as academic goals.

The present outcomes offer more subtle perspectives on the impact of demographic factors on cognitive, affective, and regulatory phenomena. The observed data does not show large differences between women and men and proves the existence of the psychological universality of these constructs. In contrast with significant changes in employment status and the family structure, it could be suggested that the level of autonomy and environmental support most influence positive emotional and self-regulatory trajectories. These findings suggest recommendations for interventions and support structures that must respond to students' demographic characteristics.

5.3 Conclusion

In the present study the emphasis was made on the relationship between mental time travel (prospective and retrospective), executive functioning (working memory, inhibitory control, cognitive flexibility), self-regulation, and emotional well-being (positive and negative) of university students. The results of the study (mostly) are in line with the collected literature and expand the current understanding of cognitive and emotional

processes. The results established that mental time travel (prospective and retrospective) are positively correlated with the emotional well-being (positive) and negatively with the emotional well-being (negative). mental time travel positively predicts executive functioning in university students. Executive functioning (except working memory) and mental time travel (prospective and retrospective) showed positive relationship with self-regulation. Executive functioning (working memory, inhibitory control, cognitive flexibility) and self-regulation positively predict positive emotional well-being and negatively predicts negative emotional well-being.

Self-regulation plays the important role of the mediator between mental time travel and positive affective flourishing, generally as well as in conjunction with various aspects of executive functions, including working memory, inhibitory control, and cognitive flexibility. To negative emotional well-being, the findings showed that mental time travel affects negative affect indirectly, through the mediated variables of executive functioning and self-regulation. This reveals how cognitive and self regulating processes play out in emotion, hence underlines these constructs in maintaining emotion regulation.

Demographic statistic also showed that employed had higher mean on positive emotional well-being and self regulation than the unemployed. Also, the participants in nuclear families had slightly better positive affect scores as opposed to participants in nuclear families; thus, both employment and family structure have a strong influence on well-being.

These results highlighted the complexities of the interplay between cognitive, and regulatory factors on happiness. As a result, they emphasize the role of self-regulation as a variable, which mediates cognitive processes and affective consequences. The work also underscores the endorsement of demographic characteristics like employment status and

family characteristics in regulating emotional experiences and may serve as an asset to interventionists working with young adults who seek to enhance their emotional wellness.

5.4 Limitations and Suggestions

1. The pressure at the university is one of the major sources of stress that may affect the students' psychological and emotional status of well-being. It is important for future research to determine the predictors of and buffers against negative emotional adjustment in this population.
2. Further studies could explore the relationship between mental time travel, emotional well-being, executive functioning, and self-regulation in different populations beyond university students, such as working professionals, older adults, or individuals with mental health conditions. Future studies could examine the potential causal relationships between these constructs using experimental or longitudinal designs.
3. For future researches focus on resilience and mindfulness can also play significant role in unveiling the relationship. Understanding how mental time travel influences cognitive processes can lead to the development of interventions that enhance cognitive flexibility among students, equipping them with adaptive thinking skills crucial for academic success. By identifying how mental time travel experiences shape emotional responses, educators and mental health professionals can develop strategies to promote resilience, reduce anxiety and depression, and enhance overall well-being.

5.5 Future implications of present study

- This study provides a theoretically consistent view of self-regulating emotional processes in accordance with Bandura (1986) social cognition theory and Gross (1998) on the model of emotion regulation.
- The present study corroborates these models as ill-fitted are positively related with positive emotional experience, and negative ill-fitted is negatively related with negative emotional experience by also showing that self-regulation has direct influence on academic or other life difficulties in young adults.
- The results provide strong evidence on the complexity of positive affect, stressing the two-fold function of regulation in increasing pleasant state and decreasing adverse ones. These effects in combination broaden theoretical assumptions regarding psychological well-being by embracing the cognitive and emotive integration tasks.
- Interesting, although the present study targets university students, the concerns extend to developmental stage of emerging adulthood. It indicates that self-regulatory capabilities that may remain in the process of development during this period are highly significant for emotional well-being in support and enlargement of theories of self-regulation as essential for successful development and functioning of young adults.
- By uncovering the intricate interplay between mental time travel, cognitive flexibility, self-regulation, and emotional well-being, educational institutions can tailor interventions that optimize learning environments, foster a growth mindset, and promote student success. This comprehensive understanding of student well-being could pave the way for a more holistic approach to education that prioritizes not only academic achievement but also the emotional and psychological welfare of university students.
- It will be useful to evolve self-help aids based on the obtained outcome measures to help students improve their well-being, EF, and self-regulation without requiring the

professional's intervention. For example: An "Emotional Well-being Tracker" with, the integration of the Emotional Well-being Scale (Simsek, 2011) can assist user to track and signify their emotions. Other forms of journals can also be used such as an action plan journal for expected MTT activities or an emotional journal for use in re-purposing negative feelings.

- Clients can use habit tracking templates as printable cards and digital platforms that enhance self-regulating skills by visualizing progress and guidance. Using video demonstrations of guided exercise, self-regulation skills, mindfulness, and cognitive flexibility can all be taught alongside interesting storytelling. Web based instruction can be delivered through online modules or e-courses based on developing the working memory, inhibitory control, and cognitive flexibility by means of exercises, quizzes and case scenarios. Worksheets like EF & MTT , affirmation cards or stress management posters are ready-to-use tools.

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Appendix A

Informed Consent & Demographic Sheet

Informed Consent

I am an MPhil student in Applied Psychology at the National University of Modern Languages, Islamabad, I am currently undertaking a research aligned with the requirements of my MPhil program. This study aims to investigate the influence of memory and self-regulation on emotional well-being of university students. Your voluntary participation in this research is greatly appreciated. Rest assured that any information provided by you will be treated with confidentiality and used solely for research purposes. You are free to withdraw from the study at any point if you experience any discomfort, hesitation, or boredom. Your cooperation in this study is invaluable, and I sincerely thank you for your participation.

Thank You !

Demographic Sheet

Gender: 1) Male 2) Female

Age (in years): _____

BS Program: _____

Education (current semester): _____

Are you currently employed, either part-time or full-time? 1) Yes 2) No

Father's Education:

1) Below Matric	2) Matric
3) FA/FSC	4) BA/BSc
5) MA/MSc	6) MPhil & higher

Mother's Education:

1) Below Matric	2) Matric
3) FA/FSC	4) BA/BSc
5) MA/MSc	6) MPhil & higher

Working Status of Mother : 1) Housewife 2) Working Lady

Family Type: 1) Nuclear 2) Joint

Family Income (monthly): _____

Have you ever been diagnosed with or received treatment for any mental health conditions? Please specify: _____

Appendix B

Prospective-Retrospective Memory Questionnaire

Prospective-Retrospective Memory Questionnaire (PRMQ)

Q. No	Statement	Very Often	Quite Often	Sometimes	Rarely	Never
1.	Do you forget something that you were told a few minutes before?	1	2	3	4	5
2.	Do you forget appointments if you are not prompted by someone else or by a reminder such as a calendar or a diary?	1	2	3	4	5
3.	Do you fail to recognize a character in a radio or television show from scene to scene?	1	2	3	4	5
4.	Do you forget to buy something you planned to buy, like a birthday card, even when you see the shop?	1	2	3	4	5
5.	Do you fail to recall things that have happened to you in the last few days?	1	2	3	4	5
6.	Do you repeat the same story to the same person on different occasions?	1	2	3	4	5
7.	Do you intend to take something with you, before leaving a room or going out, but minutes later leave it behind, even though it's there in front of you?	1	2	3	4	5
8.	Do you mislay something that you have just put down, like a magazine or glasses?	1	2	3	4	5
9.	Do you fail to mention or give something to a visitor that you were asked to pass on?	1	2	3	4	5
10.	Do you look at something without realizing you have seen it moments before?	1	2	3	4	5
11.	If you tried to contact a friend or relative who was out, would you forget to try again later?	1	2	3	4	5
12.	Do you forget what you watched on television the previous day?	1	2	3	4	5
13.	Do you forget to tell someone something you had meant to mention a few minutes ago?	1	2	3	4	5
14.	Do you decide to do something in a few minutes' time and then forget to do it?	1	2	3	4	5

15.	Do you fail to recognize a place you have visited before?	1	2	3	4	5
16.	Do you fail to do something you were supposed to do a few minutes later even though it's there in front of you, like take a pill or turn off the candle?	1	2	3	4	5

Appendix C

Adult Executive Functioning Inventory

Adult Executive Functioning Inventory (ADEXI)

Below you will find a number of statements. Please circle a number to the right of each statement to indicate how well that statement describes how you are as a person. People that you know might feel differently about you – we want to know what you think about yourself. Try to respond as honestly as possible.

Item No	Statement	Definitely not true	Not true	Partially True	True	Definitely true
1.	I have difficulty remembering lengthy instructions.	1	2	3	4	5
2.	I have difficulty remembering what I am doing in the middle of an activity.	1	2	3	4	5
3.	I have a tendency to do things without first thinking about what could happen.	1	2	3	4	5
4.	I have difficulty stopping myself from doing something that I like even though someone tells me that it is not allowed.	1	2	3	4	5
5.	When someone asks me to do several things, I remember only the first or last.	1	2	3	4	5
6.	I have difficulty refraining for smiling or laughing in situations where it is inappropriate.	1	2	3	4	5
7.	I have difficulty coming up with a different way of solving a problem when I get stuck.	1	2	3	4	5
8.	When someones asks me to fetch something, I forget what I am supposed to fetch.	1	2	3	4	5
9.	I have difficulty planning for an activity (e.g., remembering to bring everything necessary when going on a trip/to work/to school).	1	2	3	4	5
10.	I have difficulty stopping an activity that I like (e.g., I watch TV or sit in front of the computer in the evening even though it is time to go to bed).	1	2	3	4	5
11.	I have difficulty in understanding verbal instructions unless I am also shown how to do something.	1	2	3	4	5
12.	I have difficulties with tasks or activities that involve several steps.	1	2	3	4	5

13.	I have difficulty thinking ahead or learning from experience.	1	2	3	4	5
14.	People that I meet seem to think that I am more lively/wilder compared to other pople of my age.	1	2	3	4	5

Appendix C

Cognitive Flexibility Scale

Cognitive Flexibility Scale

The following statements deal with your beliefs and feelings about your own behaviour. Read each statement and respond by circling the number that best represents your agreement with each statement.

Item No	Statement	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	I can communicate an idea in many different ways.	1	2	3	4	5	6
2.	I avoid new and unusual situations.	1	2	3	4	5	6
3.	I feel like I never get to make decisions.	1	2	3	4	5	6
4.	I can find workable solutions to seemingly unsolvable problems.	1	2	3	4	5	6
5.	I seldom have choices when deciding how to behave.	1	2	3	4	5	6
6.	I am willing to work at creative solutions to problems.	1	2	3	4	5	6
7.	In any given situation, I am able to act appropriately.	1	2	3	4	5	6
8.	My behaviour is a result of conscious decisions that I make.	1	2	3	4	5	6
9.	I have many possible ways of behaving in any given situations.	1	2	3	4	5	6
10.	I have difficulty using my knowledge on a given topic in treat life situations.	1	2	3	4	5	6
11.	I am willing to listen and consider alternatives for handling a problem.	1	2	3	4	5	6
12.	I have the self-confidence necessary to try different ways of behaving.	1	2	3	4	5	6

Appendix D

Short Self-regulation Questionnaire

Short Self-regulation Questionnaire

Please respond to the following questions by circling the response that best describes how you are. If you **STRONGLY DISAGREE** with the statement, circle **1**. If you **DISAGREE**, circle **2**. If you are **UNCERTAIN** or **UNSURE**, circle **3.** If you **AGREE**, circle **4**. If you **STRONGLY AGREE**, circle **5**. There are no right or wrong answers. Work quickly and don't think too long about your answers.

Item No	Statement	Strongly Disagree	Disagree	Uncertain or unsure	Agree	Strongly Agree
1.	I usually keep track of my progress toward my goals.	1	2	3	4	5
2.	I have trouble making up my mind about things.	1	2	3	4	5
3.	I get easily distracted from my plans.	1	2	3	4	5
4.	I don't notice the effects of my actions until it's too late.	1	2	3	4	5
5.	I'm able to accomplish goals I set for myself.	1	2	3	4	5
6.	I put off making decisions.	1	2	3	4	5
7.	It's hard for me to notice when I've had enough (alcohol, food, sweets).	1	2	3	4	5
8.	If I wanted to change, I am confident that I could do it.	1	2	3	4	5
9.	When it comes to deciding about a change, I feel overwhelmed by the choices.	1	2	3	4	5
10.	I have trouble following through with things once I've made up my mind to do something.	1	2	3	4	5
11.	I don't seem to learn from my mistakes.	1	2	3	4	5
12.	I can stick to a plan that is working well.	1	2	3	4	5
13.	I usually only have to make a mistake one time in order to learn from it.	1	2	3	4	5
14.	I have personal standards, and try to live up to them.	1	2	3	4	5
15.	As soon as I see a problem or challenge, I start looking for possible solutions.	1	2	3	4	5
16.	I have a hard time setting goals for myself.	1	2	3	4	5
17.	I have a lot of willpower.	1	2	3	4	5

18.	When I'm trying to change something, I pay attention to how I'm doing.	1	2	3	4	5
19.	I have trouble making plans to help me reach goals	1	2	3	4	5
20.	I am able to resist temptation.	1	2	3	4	5
21.	I set goals for myself and keep track of my progress.	1	2	3	4	5
22.	Most of the time I don't pay attention to what I'm doing.	1	2	3	4	5
23.	I tend to keep doing the same thing, even when it doesn't work.	1	2	3	4	5
24.	I can usually find several different possibilities when I want to change something	1	2	3	4	5
25.	Once I have a goal, I can usually plan how to reach it.	1	2	3	4	5
26.	If I make a resolution to change something, I pay a lot of attention to how I'm doing.	1	2	3	4	5
27.	Often I don't notice what I'm doing until someone calls it to my attention.	1	2	3	4	5
28.	I usually think before I act.	1	2	3	4	5
29.	I learn from my mistakes.	1	2	3	4	5
30.	I know how I want to be.	1	2	3	4	5
31.	Before making a decision, I consider what is likely to happen if I do one thing or another.	1	2	3	4	5

Appendix E

Emotional Well-being Scale

Emotional Well-being Scale

Instructions: Listed below are a number of statements concerning your feelings about your life. Please read each statement and then indicate to what extent you feel this way IN GENERAL. Please respond by using the following scale from 1=Very slightly to 5=not at all to Extremely

Item No.	Statement	Very slightly or	Slightly	Moderately	Very	Extremely
1.	Life excites me	1	2	3	4	5
2.	I feel at peace with life	1	2	3	4	5
3.	The life I lead saddens me	1	2	3	4	5
4.	I worry about the life I lead	1	2	3	4	5
5.	I am content with life	1	2	3	4	5
6.	I completely accept life as it is	1	2	3	4	5
7.	Life gives me pleasure	1	2	3	4	5
8.	I feel upset about my life	1	2	3	4	5
9.	I feel pain about my life	1	2	3	4	5
10.	The life I lead frightens me	1	2	3	4	5
11.	I appreciate the life I lead	1	2	3	4	5
12.	The life I leads gets me down	1	2	3	4	5
13.	I feel I’m wasting my life	1	2	3	4	5
14.	I get satisfaction from life	1	2	3	4	5

Appendix G

Authors' Permissions

Prospective-Retrospective Memory Questionnaire

Terms and conditions

Please read before using the PRMQ in your research

The Prospective and Retrospective Memory Questionnaire (PRMQ) is available in a range of languages for free download from this site on the understanding that:

1. the questionnaire will only be used for non-profit research and,
2. any published reports that arise from using a version of the PRMQ will cite the original source article:

Smith, G., Della Sala, S., Logie, R.H. & Maylor, E.A. (2000). Prospective and Retrospective Memory in Normal Aging and Dementia: A Questionnaire Study. Memory, 8, 311-321.

and will also cite any additional source articles listed with specific translations that are chosen.

Please note that the PRMQ was developed for the purposes of research on self report and proxy report of healthy and impaired human memory. If it is used for clinical assessment, we offer no guarantees that it will be of clinical value and do not accept any responsibility for clinical decisions that are based on the results of using the self-report or proxy versions of the PRMQ.

We would greatly appreciate it if you could provide us with your email address so that we can keep you up-to-date with any new developments regarding the PRMQ.

Enter your email address here

Adult Executive Functioning Inventory

Gmail Iram Bhutto <iramalibhutto@gmail.com>

Permission to use your translated scale in my research

Lisa Thorell <lisa.thorell@ki.se> Mon, Feb 26, 2024 at 5:52 PM
To: Iram Bhutto <iramalibhutto@gmail.com>

Yes, you have my permission to use the ADEXI in your study. The self-report version in Urdu is available on the website (www.chexi.se). Is this the version that you plan to use?

Best regards,

Lisa

Lisa B Thorell | Professor in Developmental Psychology
Dept. of Clinical Neuroscience | Karolinska Institutet
Nobels väg 9 | 171 77 | Stockholm |Sweden
lisa.thorell@ki.se |+46 (0)73-808 60 90

www.ki.se |https://ki.se/en/cns/lisa-thorells-research-group

Från: Iram Bhutto <iramalibhutto@gmail.com>
Datum: måndag, 26 februari 2024 13:47
Till: Lisa Thorell <lisa.thorell@ki.se>
Ämne: Re: Permission to use your translated scale in my research

Thankyou so much for replying to my mail.

Yes, It is actually ADEXI that I have to take your permission for.

Apologies for the inconvenience.

Cognitive Flexibility Scale

Permission to use your translated scale in my research. Inbox

Iram Bhutto 12 May

Dear Sir, Hope this email finds you in good health. I am an M. Phil Scholar studying in the National University of

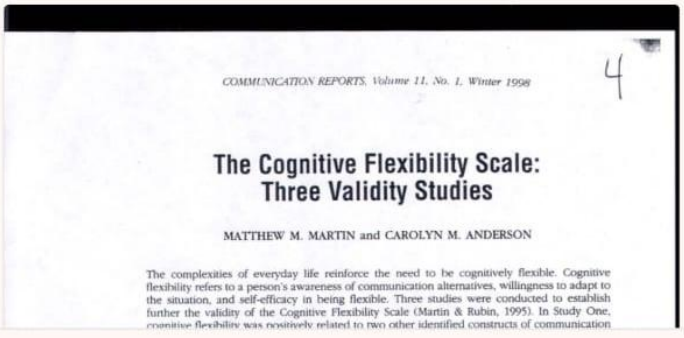
Matthew Martin 14 May

to me

Hello - attached is the original study (with the measure) along with several other studies where I used the measure. Good luck with your research - Matt Martin

From: Iram Bhutto <iramalibhutto@gmail.com>
Sent: Sunday, May 12, 2024 10:06 AM
To: Matthew Martin <Matt.Martin@mail.wvu.edu>
Subject: Permission to use your translated scale in my research.

Show quoted text



COMMUNICATION REPORTS, Volume 11, No. 1, Winter 1998

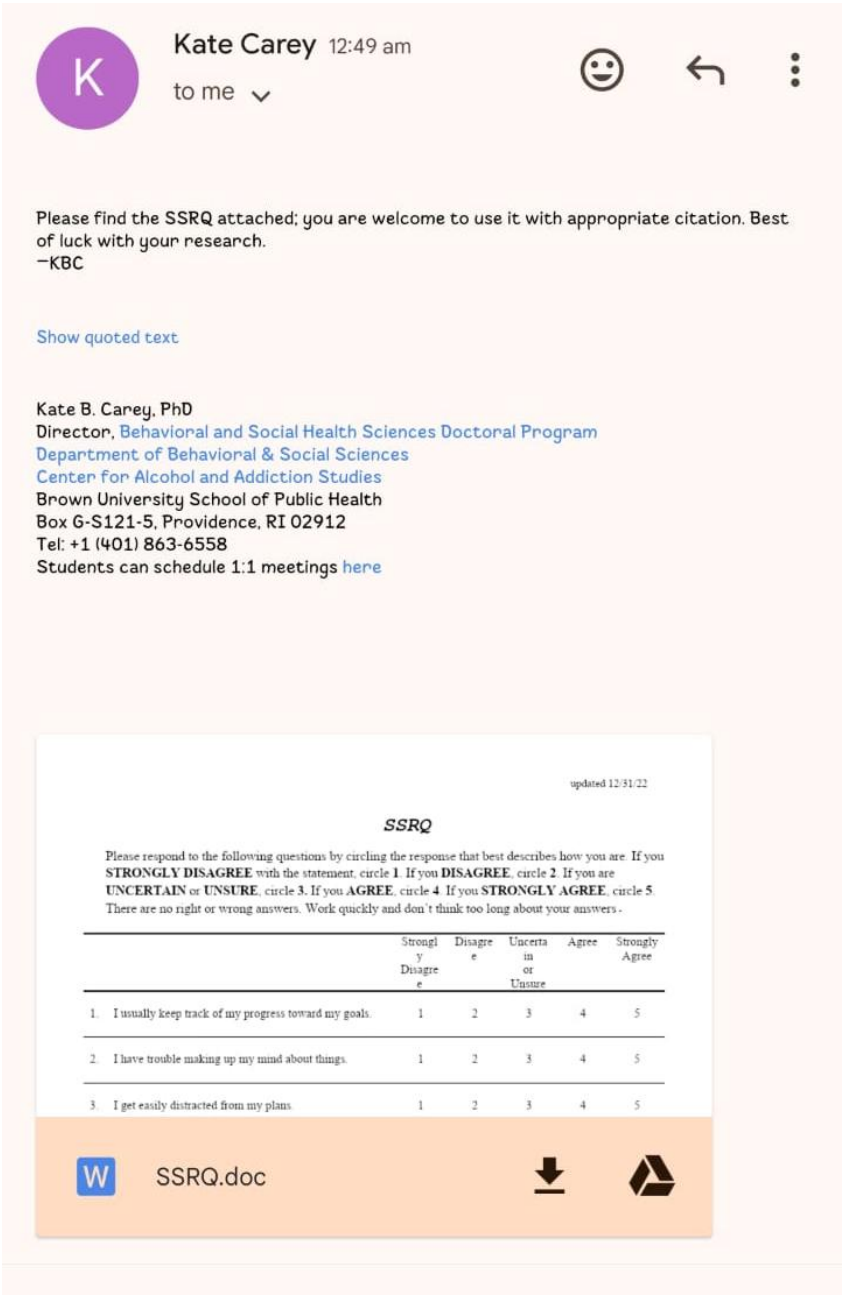
4

The Cognitive Flexibility Scale: Three Validity Studies

MATTHEW M. MARTIN and CAROLYN M. ANDERSON

The complexities of everyday life reinforce the need to be cognitively flexible. Cognitive flexibility refers to a person's awareness of communication alternatives, willingness to adapt to the situation, and self-efficacy in being flexible. Three studies were conducted to establish further the validity of the Cognitive Flexibility Scale (Martin & Rubin, 1995). In Study One, cognitive flexibility was positively related to two other identified constructs of communication

Short Self-regulation Questionnaire



Kate Carey 12:49 am
to me

Please find the SSRQ attached; you are welcome to use it with appropriate citation. Best of luck with your research.
–KBC

Show quoted text

Kate B. Carey, PhD
Director, Behavioral and Social Health Sciences Doctoral Program
Department of Behavioral & Social Sciences
Center for Alcohol and Addiction Studies
Brown University School of Public Health
Box G-S121-5, Providence, RI 02912
Tel: +1 (401) 863-6558
Students can schedule 1:1 meetings here

updated 12/31/22

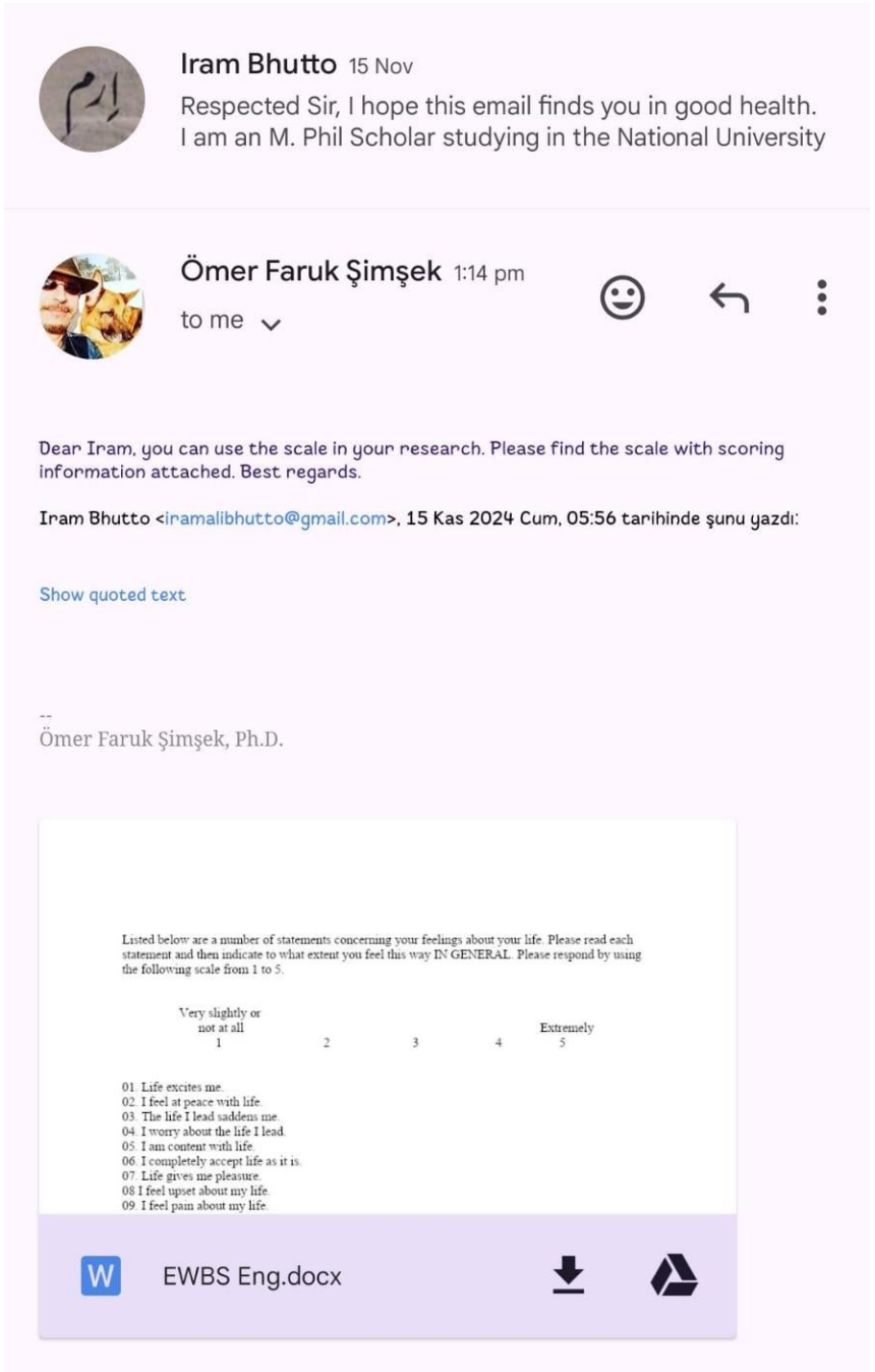
SSRQ

Please respond to the following questions by circling the response that best describes how you are. If you **STRONGLY DISAGREE** with the statement, circle **1**. If you **DISAGREE**, circle **2**. If you are **UNCERTAIN** or **UNSURE**, circle **3**. If you **AGREE**, circle **4**. If you **STRONGLY AGREE**, circle **5**. There are no right or wrong answers. Work quickly and don't think too long about your answers.

	Strongly Disagree	Disagree	Uncertain or Unsure	Agree	Strongly Agree
1. I usually keep track of my progress toward my goals.	1	2	3	4	5
2. I have trouble making up my mind about things.	1	2	3	4	5
3. I get easily distracted from my plans.	1	2	3	4	5

SSRQ.doc

Emotional Well-being Scale



Iram Bhutto 15 Nov

Respected Sir, I hope this email finds you in good health. I am an M. Phil Scholar studying in the National University

Ömer Faruk Şimşek 1:14 pm

to me

Dear Iram, you can use the scale in your research. Please find the scale with scoring information attached. Best regards.

Iram Bhutto <iramalibhutto@gmail.com>, 15 Kas 2024 Cum, 05:56 tarihinde şunu yazdı:

Show quoted text

--
Ömer Faruk Şimşek, Ph.D.

Listed below are a number of statements concerning your feelings about your life. Please read each statement and then indicate to what extent you feel this way IN GENERAL. Please respond by using the following scale from 1 to 5.

Very slightly or not at all				Extremely
1	2	3	4	5

01. Life excites me.
02. I feel at peace with life.
03. The life I lead saddens me.
04. I worry about the life I lead.
05. I am content with life.
06. I completely accept life as it is.
07. Life gives me pleasure.
08 I feel upset about my life.
09. I feel pain about my life.

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