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# The Relationship between Executive Functions, Risk-taking Behaviour, and Behavioural Activation Inhibition Systems in Kuwaiti Secondary Schools

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## Abstract

This study examines the correlation between executive functions (EF) and risk-taking behaviour (RTB), as well as the behaviour inhibition system (BIS) and behaviour activation system (BAS), among secondary school students in the State of Kuwait. 450 Kuwaiti students participated in the study and completed three scales: EF, RTB, and BIS/BAS. The results showed a clear inverse connection between EF and RTB, while indicating a positive association between EF and BIS/BAS. In addition, there are notable variations between males and females in terms of EF, with males showing a slight advantage. Similarly, when it comes to BIS and BAS, girls tend to have a slight edge. Ultimately, RTB and BIS/BAS possess the ability to make valuable contributions towards shaping the future of EF.

**Keywords:** Executive Functions, Risk - Taking Behaviour, and Behaviour Inhibition System/ Behaviour Activation System.

## Introduction

The cognitive approach to interpreting human behaviour is widely regarded as a highly effective modern approach for comprehending various aspects of cognitive mental activity associated with behaviour. As research in the field of psychology continues to advance and cognitive psychology gains prominence, there is a growing interest in studying the variations among individuals, particularly students, in how they perceive, categorise, remember, and analyse information. This is a description of the methods used to carry out mental processes, with the aim of gaining insights into behaviour and enhancing our understanding and interpretation (Ebrahim, 2018).

Numerous studies in the fields of psychology and education have recently delved into examining different cognitive variables that have a significant impact on students' achievement in school and their enthusiasm and drive for learning. There is ongoing research into ways to enhance these factors and influences, which will have a positive impact on their performance in school. Consequently, the curricula, programmes, and educational activities utilised in educational settings have expanded to cultivate and bolster these elements (Gadalah, 2023).

One relatively recent variable that has gained attention is the executive functions EF. This variable is widely recognised as a fundamental concept in the field of cognitive psychology (Baggetta & Alexander, 2016).

EF is commonly described as a broad term that covers a variety of cognitive abilities focused on achieving present and future objectives. These abilities include organising, strategizing, adapting based on feedback, and being mentally flexible (Ambrosini et al., 2019).

EF is often described as a broad concept that encompasses various cognitive abilities linked to the frontal lobe of the brain. These abilities include risk-taking, work ing memory, and inhibiting impulsive responses (Robertson et al., 2020). Researchers have also incorporated additional skills, such as strategic planning and self-monitoring, to help individuals achieve their future goals and engage in purposeful behaviour using their own abilities (Abdulla & Albaz, 2022). Additionally, the ability to regulate individual cognitive and social behaviour is essential for adapting to potential changes in any situation (Jiménez et al., 2014). Additional elements have been incorporated into EF, including emotional regulation and initiation, by some researchers (Alfoqy, 2021; Diamond, 2012; Mayhob, 2022; Pellicano, 2010).

From this analysis, it becomes clear that the concept of EF encompasses a wide range of cognitive abilities that interact and overlap with different thinking styles, including creative thinking, critical thinking, analytical thinking, probabilistic thinking, interpretive thinking, future thinking, and more. Therefore, by prioritising the development and support of EF components, we can achieve cognitive, academic, and scientific outputs that are characterised by sophistication and high levels.

Numerous facets of our social and educational lives highly value EF. Several studies have suggested that EF plays a role in task performance in decision-making situations involving objective risks, as well as in moments of hesitation when making accurate decisions. This serves as a central indicator and supporter of beneficial choices among multiple options, as mentioned by Figner et al. (2009) and Schiebener and Brand (2015). Previous research has demonstrated that EF possesses the capacity to effectively categorise various options and make informed decisions based on the feedback associated with those options (Mueller & Brand, 2018). Moreover, multiple studies have demonstrated that EF improves academic achievement and mental health (Dias & Seabra, 2015), enhances academic skills and language comprehension (Follmer, 2018), coordinates mental processes, information processing, and strategy generation (Mason, Marshall, & Morgan, 2021), and aids in thought organisation and concentration maintenance (Bombonato et al., 2023). This ability is crucial for mental, physical health, and cognitive development (Johann & Karbach, 2022).

## Literature Review

There are numerous theoretical and practical implications that can be explored when utilising the strategies of EF components and abilities in different life situations. Thus, EF is regarded as crucial for navigating difficult, enigmatic, or contradictory situations in our everyday experiences.

Several studies have shown a positive correlation between EF and the social and economic status of students in their adolescent years (Theodoraki et al., 2020). According to a study conducted by researchers, it was found that the student's surrounding environment has a significant impact on 18% of the executive function's components in this segment of society. The study focused on psychological maltreatment (Sara & Manesh, 2023). Therefore, the connection between parents and children is crucial in the development of self-regulation skills in children, which will ultimately support their executive functioning abilities. Thus, the support of parents becomes essential, particularly during the early stages of childhood and when confronted with various challenges or issues within the family (Feldman, 2015). In addition, certain studies have presented evidence of potential physiological connections to how they impact people's executive functions, either in a negative or positive way (Rudd et al., 2021).

It is evident that various factors, such as social, psychological, educational, familial, and physiological aspects, have an impact on students' EF abilities and components, whether it be in a positive or negative manner. Hence, it is crucial for every individual in society to possess a strong educational background and a deep understanding of the significance of executive function dimensions in shaping the cognition and conduct of teenage learners. Therefore, it is crucial for families and school administrations to create engaging educational settings, enabling students to enhance and cultivate their diverse executive function skills, leading to academic success and seamless social integration within their school and community.

Undoubtedly, It is essential to consider various factors related to shaping the general framework of adolescent personality in order to fully understand, comprehend, diagnose, and predict the behaviour of teenage students. Solely focusing on EF is insufficient in this regard. Hence, behaviour is not simply a robotic reaction to social cues, but rather a complex interplay of cognitive processes that facilitate the perception of stimuli and the generation of suitable responses.

Gaining insight into student behaviour is crucial for their well-being, as it helps prevent them from engaging in dangerous activities that could potentially have fatal consequences if taken to the extreme. The scope of risk-taking behaviours has broadened, encompassing not only antisocial actions like fighting, theft, and property destruction, but also more perilous behaviours such as alcohol consumption, substance abuse, reckless driving, and disregarding social norms (Dyke, 2005). Thus, RTB holds significant importance as a variable that necessitates thorough examination. It is crucial to comprehend its correlation with EF and explore the predictive connection between RTB and EF in adolescent students. Additionally, there is another variable that warrants investigation in order to comprehend its correlation with EF and RTB: the behavioural inhibition system BIS, and behavioural activation system BAS. Arab researchers have yet to scientifically and thoroughly investigate the BIS/BAS variable, despite its significant role in determining various behaviours and its potential to explain and diagnose human behaviour in different life situations and in response to external stimuli. Understanding the BIS/BAS systems is crucial for comprehending how individuals interact with their environment. These systems play a vital role in shaping behaviour, influencing responses to punishment and reward, and motivating approach or avoidance behaviour (Avila & Parcet, 2002).

To gain a comprehensive understanding of the reciprocal relationships between the RTB and BIS/BAS variables and their correlation or predictive nature with EF, I will provide a thorough explanation of these variables. This will include a discussion on their relationships, dimensions, and how they mutually influence EF.

## Risk-Taking Behavior RTB

Engaging in risk-taking behaviour is often seen as captivating and intriguing. Researchers have focused their efforts on perceiving, understanding, and studying the strong relationship between this subject and various issues in different fields, such as mental health, personality, and cognitive psychology. RTB plays a crucial role in shaping individual behaviour and is widely recognised as a significant element in an individual's pursuit of personal growth and fulfilment (Saleh, 2020). Among teenage students, there is a concerning trend of engaging in behaviours that can have negative impacts on their health and well-being. These behaviours include drug use, alcohol addiction, smoking, risky sexual practices, violence, and reckless driving (Hindelang, Dwyer, & Leeming, 2001).

RTB, or Risk-Taking Behaviour, refers to voluntary actions that expose individuals to various dangers, including the risk of death (Mahmoud, 2019). Furthermore, RTB has been associated with various social and health issues, including diseases and physical disabilities. Adolescence is a period when this behaviour is most prevalent due to factors such as academic difficulties, academic stress, curiosity, exploration, and affiliation with delinquent peers (Ajisuksmo, 2021). In today's society, the decline in educational values among teenagers can have a significant impact on their ability to maintain their identity and personality. This, in turn, leaves them vulnerable to negative social influences and behaviours. (Ali, 2024). In addition, economic factors play a role in the pursuit of material gains, such as theft, risky car racing, and mountain climbing. Family factors also contribute to reinforcing this behaviour. In addition, the way individuals are raised by their families can have an impact on their risk behaviour. Factors such as neglect, parental dominance, excessive protection, indulgence, cruelty, violence, and parental punishment can all play a role (Albadayneh, 2019; Jabar & Flej, 2019).

In a study conducted by Sara and Manesh (2023), it was found that EF has a significant impact on risk-laden behaviours in children and adolescents. This suggests the need for psychological interventions to address this issue. Additional research has indicated that the presence of motivational and control functions, which are part of executive functioning, greatly influences the connection between peer pressure and engaging in risky behaviours (Kopetz et al., 2019).

Haebich et al. (2022) found that the study sample's low levels of EF had a significant effect on attention deficit and social skills. This, in turn, caused individuals to deviate from social values and engage in risky behaviours. The absence or reduction of social values acted as a compass, guiding individuals away from socially acceptable behaviours. When the efficiency and level of executive functioning decrease in children and adolescents, it will inevitably result in a decline in their social effectiveness. Therefore, the probability of their involvement in risky behaviours can result in physical, cognitive, and behavioural outcomes, ultimately resulting in a rise in students' dropout rates from school, accompanied by an escalation in their psychological disorders (Ronk, Hund, & Landau, 2011; Sara & Manesh, 2023).

After examining the theoretical review, it is evident that there is a strong correlation between EF and RTB. Thus, in order to safeguard teenage students from the dimensions and effects of RTB, it is crucial to take into account the diagnosis of EF levels when identifying its causes and factors.

**Behavioural Activation System BIS/ Behavioural Inhibition System BAS**

The significance of BIS/BAS stems from the concept of reinforcement sensitivity (RS), which is highly valued in the field of personality psychology. By utilising this method, we can gain insights into students' individual characteristics by observing their reactions to the stimuli in their environment (Aljabory & Alshammery, 2018).

The Reinforcement Sensitivity Theory (RST_, developed by Gray (1981), started as a neurobiological explanation of activation and inhibition behaviors in animal research. However, it was only applied to human personality after a long period as a theoretical framework for assessing motivational and emotional processes (Gray,

1981). RST is composed of two primary components: the BIS and the BAS. At times, it is known as the BAS. The BIS system is linked to being sensitive to signals of threat and punishment. It focuses on constantly evaluating performance, avoiding risks, and steering clear of negative consequences. However, BAS focuses on stimuli that are challenging and rewarding, and is linked to a tendency for approaching behaviours and hopeful feelings towards achieving goals. It is activated through contingencies that involve positive reinforcement. Thus, BIS/BAS serves as a measure of an individual's sensations, emotions, and motivations, as outlined by Grey as a fundamental process for personality dimensions (Gray, 1991).

In 2000, Grey and McNaughton suggested a re-evaluation of RST, but the BAS component remained largely the same. Nevertheless, the BIS component underwent a thorough examination and was reimagined as a conflict detector with the task of managing conflicting or unfamiliar stimuli. The main focus of its responsibility is to minimise or eliminate conflicts by involving the flighty-fight-freeze system. FFFS (Gray & McNaughton, 2003).

It is important to note that the BIS/BAS scales introduced by Carver and White are widely used to assess levels and degrees of RST. These measurements can be seen as a complementary way to assess BIS and BAS, respectively (Carver & White, 1994).

The unique educational aspect in RST is characterised by the motivational element, which gives rise to a different kind of prediction called Behavioural Inhibition, resulting from the activation of the BIS system (Dawe & Loxton, 2004). In addition, active behaviour can arise from the activation of the BAS system, which stimulates motivation and the desire to obtain rewards (Pickering & Gray, 2001). Both BIS and BAS systems are linked to motivating behaviour towards its objective without considering the outcomes (Dawe & Loxton, 2004).

People who work within the academic field often display a strong inclination to avoid behaviours that may lead to conflict or contradict their goals, even if they are incentivized to engage in those behaviours. Nevertheless, participating in such conduct could result in disciplinary action. Thus, individuals in this category rely on this system to make decisions, ensuring they avoid conflicting behaviour and potential punishment (Aiken, 2002).

Conversely, People in the BAS are driven to engage in such behaviour to achieve their goals and obtain rewards without any hesitation or internal conflict (Gray & McNaughton, 2003).

There is a notable connection between EF and BIS/BAS, and this connection has a significant impact on an individual's personality. The elements of EF and BIS/BAS rely on interconnected processes linked to seeking out and avoiding certain outcomes. This connection becomes apparent when considering the preferred attribute chosen by an individual's personality, whether it is something rewarding (with positive value) or punishing (with negative value). The individual's current personality has been influenced by their sensitivity to punishment or reward. Meanwhile, their future personality reflects how their approach-avoidance tendencies have contributed to achieving goals and developing effective self-regulation (Nigg, 2017).

The stability, success, and excellence of an individual's personality are influenced by the direction and source of sensitivity to reinforcement within the BIS/BAS system. They are connected to the level of self-control and the degree to which EF components are used and invested in appropriately based on the stimuli in various situations. People establish specific standards for their conduct and react to their actions through techniques such as rewards or consequences (Alkaisy, 2016).

Individuals with high levels and degrees of BAS may experience difficulties with EF components due to impulsivity, feelings of sadness, frustration, and a lack of control at a heightened level of consultation. It seems that negative emotions can unintentionally steer goals in a different direction, which may conflict with the desired outcome (Gray, 1970).

Excessive levels of behavioural avoidance systems can lead to a strong fixation and concentration on the cause of anxiety or fear, which can disrupt the ability to regulate oneself effectively. This source also takes up a considerable amount of mental focus, which can hinder the cognitive effort needed to reach the intended objective (Sharab, 2008).

It is evident that there is a dynamic relationship between the elements of EF and BIS/BAS in influencing individuals' personalities. Furthermore, the outcomes of this will have an impact on individuals when confronted with different behavioural situations and stimuli.

The issue addressed in this study has arisen from the researcher's observation of a noticeable disregard for the variables under investigation in different curricula, classroom settings, and extracurricular activities in secondary schools in Kuwait. However, given the limited research on the variables of this study, particularly in the area of EF, and the lack of any previous study that has examined these variables together, especially within the context of Eastern heritage in psychology and education, the researcher found it imperative to undertake this study. This study aims to address the research and analytical gaps surrounding the problem at hand. It seeks to provide insights and concentrate on the correlation between EF, RTB, and BIS/BAS.

Therefore, the present study seeks to examine the correlation between EF and both RTB and BIS/BAS in a group of secondary school students in Kuwait. In addition, it aims to explore the statistical differences between male and female students in the three study variables. Ultimately, the study seeks to assess how the independent variables, specifically RTB and BIS/BAS, can be used to predict the dependent variable, EF, within the group of participants involved.

**Hypotheses**

This study involves multiple statistical hypotheses that the researcher aims to validate and establish through the statistical methods utilised and the study's methodology. These hypotheses are:

**RH1:** There is a statistically significant negative correlation between EF and RTB in the total study sample of both genders.

**RH2:** There is a statistically significant positive correlation between EF and BIS/BAS in the total study sample of both genders.

**RH3:** There are statistically significant differences between the gender of students (males/females) in all study variables, which are: EF, RTB, and BIS/BAS.

**RH4:** Both RTB and BIS/BAS contribute to the influence and prediction of EF in the total study sample of both genders.

## Method

In the current study, the researcher will utilise the descriptive-correlational approach to examine the problem in schools. This approach involves providing a detailed description of the problem to gain a better understanding. This approach can be easily understood by gaining knowledge about the steps involved in research and the different methods used to collect data.

## Participants

The study sample consists of students from the secondary stage in the Hawally educational district in Kuwait. These students are enrolled in government secondary schools in the eleventh and twelfth grades, in both scientific and literary streams, and come from diverse backgrounds. A total of 450 students took part in this study, with 192 being male and 258 being female. There are Kuwaiti citizens and individuals from other countries living in Kuwait.

## Instruments

The EF scale was developed by Dawson and Guare (2021). This scale is composed of 24 items, each offering five choices on a five-point Likert scale from 1 to 5. The test has a minimum score of 24 and a maximum score of 120. This scale assesses various aspects of executive functioning, such as memory, task performance, planning, organisation, time management, metacognition, perseverance, and stress tolerance.

In order to establish the psychometric properties of this scale in terms of its reliability and validity, a pilot sample of 72 high school students of both genders was initially given the scale. The scale's reliability was evaluated using Cronbach's Alpha method, resulting in a value of ($\alpha = 0.45$). The scale's validity was confirmed through the concurrent validity method. Student scores on this scale were divided into quartiles, and a t-test was conducted between the highest and lowest quartiles. The t-test value showed statistical significance, suggesting significant statistical differences between the highest and lowest quartiles. This indicates that the scale demonstrates the necessary validity.

The RTB scale was developed by Skaar (2009). This scale includes 20 items, and for each item, there are four choices available using a four-point Likert scale. Students are required to select a single answer, and their scores can vary from 1 to 4. The minimum scores a student can obtain on this scale is 20, while the maximum score is 80. In order to ensure the reliability and validity of the scale's psychometric properties, the measurement was administered to a pilot sample, as previously mentioned. The scale's reliability coefficient was determined using Cronbach's Alpha method, yielding a value of ($\alpha = 0.80$). In terms of the scale's validity, we evaluated it by calculating the correlation coefficient between each item's score and the overall score of the scale. The correlation coefficients ranged from ($r = 0.71$ to 0.78), which are statistically significant values at the ($\alpha = 0.05$) level.

The BIS/BAS scale was developed by Xu et al. (2021). This scale includes 18 items, with four options for each item utilising a four-point Likert scale. The scores for these items span from 1 to 4. The minimum scores a student can obtain on this scale is 18, while the maximum score is 72.

In terms of the scale's reliability, it underwent testing on a pilot sample, as outlined in the procedures for assessing reliability and validity in the initial scale. The value of Cronbach's Alpha was calculated to be ($\alpha = 0.42$).

In terms of the scale's validity, we evaluated it using the concurrent validity method by calculating the t-test value between the lower quartile and the upper quartile. The findings revealed notable statistical disparities between the lower and upper quartiles.

**Procedures**

Letters were prepared and sent to school principals to streamline our procedures for implementing the three study measures. We explained the importance and objectives of the study to them. After implementing these measures, the scores were recorded and entered into the SPSS statistical programme for analysis and extraction of results.

**Statistical Analysis**

Various statistical methods and analyses were employed in this study to validate and substantiate the hypotheses, ensuring a thorough examination of the

relationships between the study variables: EF, RTB, and BIS/BAS. The study variables were analysed using Pearson's correlation coefficient to establish their correlational relationships. In the study sample, mean differences between males and females across the three study variables were detected using t-tests. Ultimately, regression analysis was performed to assess the role and significance of RTB and BIS/BAS in forecasting EF within the entire study population.

## Results

One of the main findings of the study suggests that there is a noteworthy inverse relationship between EF and RTB in the entire sample population. In order to confirm this hypothesis, the Pearson's correlation coefficient was employed. Table 1 below displays the correlation coefficient value between these two variables, based on the calculated values in this table.

Table 1: Result of Correlation Coefficient Between EF and RTB.

| Variable | EF |
|---|---|
| RTB | -.224** |

N=450, **P ≤.01

Source: All study tables, numbers, and values included in the article were obtained by applying the study scale to the students on February 15, 2024. Then the students' scores were entered into a statistical program known as SPSS. After that, the scores were analysed, and those numbers were obtained as follows: It is apparent in all tables of the current study.

According to the data in Table 1, the correlation coefficient value between EF and RTB in the total study sample was estimated at (r = -.224). This value is considered acceptable and statistically significant at the required significance level (P=.01). There is a negative correlation between the mentioned variables. This suggests that as one variable increases by one unit, the other decreases by an equivalent amount, and vice versa.

The study's second hypothesis suggests a strong and positive correlation between EF and BIS/BAS in the overall sample. In order to confirm this hypothesis, the Person's Correlation Coefficient was employed. Below is Table 2, which shows the correlation coefficient value between these two variables.

Table 2: Result of Correlation Coefficient Between EF and BIS/BAS.

| Variable | EF |
|---|---|
| (BIS/BA) | .471** |

N=450, **P≤.01

The correlation coefficient value between EF and BIS/BAS, as shown in Table 2, was estimated to be r = 0.471. This value is considered acceptable and statistically significant at the required significance level (P = 0.01). There is a positive and significant correlation between the mentioned variables.

The third hypothesis of this study posited statistically significant gender differences in all study variables. In order to test this hypothesis, t-tests were conducted. The results of these tests are presented in Table 3.

Table 3: Results of t. test for the Differences Between Both Gender in Study Variables.

| Variables | Male (N=192) | | Female (N=258) | | Df | t | Sig |
|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | | | |
| EF | 86.7 | 18.9 | 85.4 | 14.3 | 448 | .86 | .000 |
| RTB | 54.6 | 11.9 | 55.6 | 7.48 | 448 | 1.12 | .260 |
| BIS/BAS | 55.2 | 10.8 | 58.9 | 7.87 | 448 | 4.10 | .000 |

N=450

Table 3 indicates the results of the t. test values for the significance of differences between genders in the intended study sample in the three-study variables: EF, RTB, and BIS/BAS.

The results indicate statistically significant gender differences (males, females) in the study sample, particularly in EF and BIS/BAS. The t-test values for the variables were calculated as t = 0.86 and 4.10, respectively. The associated probability values (Sig = 0.000) were found to be lower than the significance levels of 0.01 and 0.05. This indicates statistical significance. However, the t-test value for the significance of differences between genders in the RTB variable was (t = 1.12), which was not statistically significant at the required significance level of (0.05).

Table 4 displays the main findings from the statistical analysis of Regression Analysis. The purpose of this analysis was to investigate the impact of both RTB and BIS/BAS on predicting EF, as stated in the fourth hypothesis of the study.

Table 4: Result of Regression Analysis for Contribution of Independent Variables in Predict of Dependent Variable.

| Variables | B | SE | Beta | T | Sig | R2 |
|---|---|---|---|---|---|---|
| RTB | .23 | 14.5 | .47 | 11.3 | .000 | .22 |
| BIS/BAS | .77 | 14.3 | .44 | 10.6 | .000 | .24 |
| Model: F= 71.4 R= .49 | | | | | | |

N=450: Independent variables: RTB, BIS/BAS. Dependent Variable: EF

The results of regression analysis in Table 4 demonstrate the contribution of the independent variables (RTB and BIS/BAS) in influencing and predicting the dependent variable (EF) in the entire study sample. The independent variables significantly predict the dependent variable, as indicated by the t-test values (t=11.3, 10.6) and their associated significance values (Sig=.000), which are below the significance level (.05) and (.01). Therefore, these values are deemed acceptable and statistically significant in predicting the dependent variable, EF. Table 4 shows the regression coefficient values for variable B. It is evident that the independent variable BIS/BAS has the highest predictive and influential capacity on the dependent variable, accounting for 77% of the contribution. The variable RTB follows with a contribution percentage of 23%.

## Discussion

The primary aim of this study is to investigate the correlation between EF and both RTB and BIS/BAS in a sample of high school students in Kuwait. Additionally, this study aims to examine gender differences and the predictive capacity of the independent variables on the dependent variable. In order to achieve these objectives, the researcher formulated four study hypotheses and employed various statistical methods for verification, as previously mentioned.

The first hypothesis of this study suggests a significant negative correlation between EF and RTB in the total study sample of both genders.

Multiple scientific studies have shown that individuals with higher levels of EF are better able to regulate their emotions, skills, and experiences, enabling them to approach various situations and risky stimuli with logic and wisdom. Consequently, individuals will engage in self-monitoring and self-regulation to avoid participating in different levels and types of risks (Patrick, Blair, & Maggs, 2008; Skagerlund et al., 2022).

Undoubtedly, adolescents are particularly susceptible to risky behavior due to their inclinations towards seeking excitement, self-affirmation, impressing peers, and pursuing financial gain through illegal activities like gambling, car racing, and alcohol addiction. These behaviours will inevitably lead to a range of health, behavioural, psychological, and social risks. As a result, it is critical for families and school administrations to consistently assess and evaluate their children's EF abilities, as it serves as a safeguard for adolescents against involvement in hazardous behaviours.

According to Maslow's theory of motivation and needs, meeting individuals' needs necessitates a certain level of willingness to take risks. According to Housain (2018), there is a positive relationship between motivation to fulfil needs and the adoption of risky behaviour. Hence, the failure to meet these needs can result in a disruption in the regulation and management of teenagers' behaviours. This is because the process is connected to how they control their executive functioning capacities, which are influenced by both theoretical and biological factors. The failure to meet teenagers' needs can result in a loss of control over their behaviours as they strive to fulfil various needs, such as self-affirmation, regardless of the methods and consequences. The current study is supported and endorsed by several previous studies (Kim-Spoon et al., 2017; Piche et al., 2018; Shimp et al., 2015).

The first hypothesis of the study can be fully accepted based on this result, given its achievement.

The second hypothesis of the current study was supported by the findings in Table 2, which showed a significant positive correlation between EF and BIS/BAS in the total study sample. As the level of EF increases by one unit, the level of BIS/BAS also increases by the same amount.

The RST, as supported by Grey, explores the connection between personality and the way individuals respond to environmental stimuli. This statement demonstrates the manner in which individuals engage with their surroundings. The components of Executive Function (EF) encompass higher mental processes including planning, organisation, execution, monitoring of thoughts and behaviours, decision-making, regulation and management of emotional impulses, and memory. The connection between EF and RST, including BIS/BAS, enables EF to shape our reactions to external stimuli. For instance, the regulation of attention and concentration through EF can

impact our evaluation and response to stimuli. Just like how our behaviour and decision-making can impact how we demonstrate the principles of RST in our daily interactions. In general, the elements of EF have a significant impact on how we structure our reactions to stimuli and assess them, influencing our adherence to RST principles and the degree of sensitivity to reinforcement that we exhibit in our actions and experiences (Gray & McNaughton, 2003; Miyake et al., 2000).

So, there is a significant and interconnected relationship between EF and RST in terms of mental activity, as evidenced by the correlation between them in Table 2. Several previous studies have produced comparable findings to the current study, for example, (Ogilvie, Shum, & Stewart, 2020; Patrick et al., 2008; Schiebener et al., 2014). Based on the findings, the second hypothesis of the study can be confidently accepted, as it has been successfully fulfilled.

The study's third hypothesis found statistically significant differences between males and females in the study variables of EF, RTB, and BIS/BAS. The current study sample revealed a difference in EF between genders, with males (M=86.7) exhibiting a higher mean compared to females (M=85.0). Males often display a proclivity for adventure, exploration, and engagement with mysterious environmental stimuli, as well as an ability to interact with social stimuli. These traits have improved and stimulated the executive function capacities of males, leading to their superior performance compared to females. Some women in Kuwaiti society may face limitations on their behaviour due to social norms, customs, and traditions. Consequently, they have limited exposure to the external world, foreign cultures, and diverse stimuli compared to males, as they remain under familial supervision. This has been observed in their EF abilities, resulting in them being less adaptable compared to young males who have more freedom of movement and are further away from familial control and supervision.

In general, EF is widely recognised as a collection of cognitive functions that have a neural basis and are present in individuals from all walks of life, irrespective of gender. The variation among individuals is influenced by a range of factors, including social upbringing, parenting styles, and the individual's level of learning and training in performing various tasks (Alkharsity, 2017). Based on the findings of

previous studies, a number of them have produced similar results to the current study, providing support in this regard (Alholah, 2022; Pintzka et al., 2015; Shuwaikh, 2022).

However, the t-test revealed significant differences in BIS/BAS between females and males. Females had a higher average score (M=58.9) on this variable compared to males (M=55.2). This is due to the societal norms and expectations that prioritise and value males over females in various aspects of life. There may be a perception that girls are less capable and competent than boys. Therefore, in such cases, girls may work hard to prove this perception wrong by striving to achieve a prestigious status. Women's strong motivation and desire to compete with men in various domains contribute to their heightened drive and responsiveness to stimuli. Furthermore, females may exhibit heightened anxiety and fear in response to conflicting environmental stimuli due to a combination of environmental, cultural, familial, psychological, and social factors that have shaped their personalities. This may contribute to their superior performance in the BIS/BAS system. Prior research has produced comparable findings to the present study, providing support for it (Aljabory & Alshammery, 2018; Dalla-Costa, Passoni, & Perissinotto, 2021). The third hypothesis is partially accepted based on the result indicating no differences between males and females in the three study variables, specifically in RTB. Thus, this hypothesis was not fully supported.

The regression analysis confirmed the validity of the fourth hypothesis of the current study, which suggests that both RTB and BIS/BAS contribute to the influence and prediction of EF. The values obtained from the t-test in Table 4 (t=.000) were found to be statistically significant at the specified significance level of (Sig=.01). The indicator of RTB and BIS/BAS has a strong and predictive relationship with EF. Therefore, to enhance EF among students, it is crucial to incorporate these factors into curricula, activities, summer programmes, and extracurricular programmes. When students receive proper training and support in cognitive skills and strategies, they can better navigate challenges and adapt to different situations. This, in turn, enhances their cognitive abilities, decision-making skills, neural organisation, self-control, and their ability to make choices when confronted with uncertain stimuli in their surroundings (Schonberg, Fox, & Poldrack, 2011). Multiple prior studies have arrived at the same findings as the current study (Ogilvie et al., 2020; Pang, Schultheis, & Yeo, 2017).

Based on the findings, the fourth hypothesis of the study can be confirmed. The independent variables (RTB and BIS/BAS) have successfully predicted EF in the college student sample.

## Limitation

This study is considered exceptional because it combines three variables, EF, RTB, and BIS/BAS, in one study, based on the current researcher's knowledge. After conducting thorough research in various databases and literature, the researcher was unable to locate any studies that combined the variables of his study into a single research project. This could make his research feel fresh and scientifically important, given the context. Nevertheless, the researcher encountered various obstacles when establishing his study. Firstly, there is a lack of research on EF in Eastern heritage and a lack of any standardised scale for measuring EF in the Middle East. Therefore, he relied on an international scale. The second challenge was the limited sample size the researcher had to work with for the current study, due to various factors in the schools where the study measures were implemented. In spite of the difficulties faced, the researcher successfully finished this study, which will pave the way for future research on EF and its connection with RTB and BIS/BAS, offering unique perspectives and findings.

## Conclusion

The study primarily focused on exploring the correlation between executive function and both risk-taking behaviour and behavioural inhibition/approach system in a group of high school students in Kuwait. The study also aimed to determine if there were any notable distinctions between males and females in relation to the study variables. Additionally, it examined the extent to which the independent variables, RTB and BIS/BAS, could predict and influence EF.

The results consistently showed a strong inverse relationship between EF and RTB, as well as a positive relationship with BIS/BAS. In addition, there were notable variations in EF measures based on gender, with males scoring higher, as well as in BIS/BAS measures, where females scored higher. It is worth noting that RTB and BIS/BAS had a significant impact on predicting EF in the entire study sample.

It is crucial to highlight the significance of providing support for EF and utilising educational and psychological methods to explore, cultivate, and improve EF components and abilities in students. One way to accomplish this is by engaging students in a range of extracurricular and summer activities. Additionally, incorporating interactive lessons into the curriculum can provide students with opportunities to apply their knowledge and skills in both educational and non-educational contexts. This will empower students to navigate and confront diverse stimuli and situations in their family, school, and community environments. It is indeed important to strive for the production of educational outcomes that reflect modernity and development, in line with the latest educational and psychological trends, philosophies, and approaches.

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**Conflict of Interest**

The author has no conflicts of interests to declare.

**Ethic Approval**

The study was conducted in line with the ethical research guidelines. The data were collected and analyzed anonymously.

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