Fear of Missing out and its Relationship to Executive Functions among University Students

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Abstract

Although fear of missing out (FoMO) has attracted a lot of attention recently, little is known about its relationships to gender and executive function (EF). The aim of this research was to investigate the level and gender differences in FoMO and EF, and the correlation between FoMO and EF. 265 undergraduate students (M_{age}= 20.35 years; SD=.74) completed the 10-item FoMO scale and The Behavior Rating Inventory of Executive Function. The results showed that the level of the total score for the FoMO scale was moderate, the level of the total score for the EF battery was low, and the level of the sub-dimensions: planning, working memory, inhibition, emotional control, initiation, and organizing things was also low, while the level of the sub-dimensions: shifting, self-monitoring, and task-monitoring was high. The research also showed that there were no gender differences in experiencing FoMO, in the total score of the EF and in sub-dimensions: planning, inhibition, initiation, self-monitoring, task-monitoring and organizing things. The differences were in the sub-dimensions: working memory and emotional control between the average scores of males and females for females, and the differences in the shift for males. We also found no significant correlation between FoMO and the functions of inhibition, shifting, emotional control, self-monitoring, task-monitoring, and the total score, but the correlation between FoMO and the EF of planning, working memory, initiation, and organizing things was statistically significant. Such data contribute to the field by outlining the level and gender differences in FoMO and in EF and their correlation as well as by providing useful information for clinical practice to develop targeted interventions and prevention programs.

Keywords. *Fear of missing out (FoMO); Executive Functions (EF); University students.*

Introduction and Theoretical Background

Because of the increasing usage of digital technology during the past ten years, research on the phenomenon known as Fear of Missing Out (FoMO) has become increasingly significant (Holte, 2023). FoMO is being excluded from fulfilling experiences that other people have (Przybylski et al., 2013). FoMO is defined as a persistent concern that one is missing out on the fulfilling experiences of others. FoMO is conceptualized as a persistent concern that one is not present in the gratifying experiences of other people and is characterized by the desire to remain in contact in order to keep up with what other people are doing (Tandon et al., 2021).

FoMO is associated with negative emotion and involves both cognitive and affective processes (Elhai et al., 2021). According to Schmidt et al. (2018), FoMO can also lead to excessive phone

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use and anxiety over being alone when one's phone isn't there, which can impair executive functioning (EF) (Troll et al., 2021)—a group of higher-order cognitive control processes essential for goal achievement (Miyake et al., 2000). However, this effect was not found in all studies (Linares & Sellier, 2021).

FoMO is typically regarded as an essential subtype of anxiety and is also correlated with the severity of anxiety (Chai et al., 2018; Dempsey et al., 2019, Przybylski et al., 2013). Crucially, studies indicate that executive functioning deficits are linked to anxiety disorders (Castaneda et al., 2008). However, inconsistent results have also been reported (Majeed et al., 2023).

Executive functions involve two processes; (1) basic cognitive processes such as working memory, cognitive flexibility, cognitive inhibition, attention control, (2) higher-order executive functions which require the concurrent use of several basic executive functions, such as planning and reasoning (Diamond, 2013). These functions have predictive value for significant outcomes including academic success, job performance, social behavior, and family functioning (Majeed et al., 2023), so clarifying the link between FoMO and EF can further open up scope for correlation of FoMO with the concept of self and personality which may lead to significant implications for the diagnosis, and treatment of FoMO. Of relevance, studies have demonstrated some gender differences in FoMO with females scoring higher (Elhai et al., 2018); yet findings are mixed (Rozgonjuk et al., 2021). Understanding gender differences may be helpful for studies on FoMO and EF in connection to digital technology use, where it may be beneficial to adjust for potential gender effects in the analysis.

Thus, the purpose of the current research was to investigate the relationship between fear of missing out and executive functions among college students in the New Valley in Egypt. As there are few studies that compare FoMO in terms of their relationships with specific EF domains, current findings can shed light on inconsistencies in previous studies and provide novel insights into the characteristics of EF in FoMO. The specific aims were: 1. To determine the level of fear of missing out among college students in the New Valley in Egypt. 2. To assess the level of executive functions among college students. 3. To study gender differences in FoMO. 4. To study gender differences in executive functions. 5. To examine the relationship between fear of missing out and executive functions among college students in the New Valley in Egypt.

Research Hypotheses

There is a low level of fear of missing out among university students.
There is a low level of executive functions among university students.
There are no statistically significant differences in fear of missing out attributable to gender.
There are no statistically significant differences in executive functions attributable to gender.
There is a statistically significant correlation between fear of loss and executive functions in the research sample.

Research Objectives

The current research aims to the following:

Investigate the level and gender differences in FoMO and EF.
Explore the correlation between FoMO and EF.

Research Importance

4.1. Understanding Modern Societal Phenomenon: Fear of Missing Out (FOMO) is a contemporary societal phenomenon, particularly prevalent in the age of social media. Investigating its relationship with executive functions provides insights into how this fear, fueled by digital connectivity, may impact cognitive processes.

4.2. Exploring Psychological Well-being: FOMO has been linked to psychological well-being, and understanding its connection to executive functions can shed light on the psychological mechanisms involved. Examining how FOMO relates to cognitive processes provides a more comprehensive view of its implications for individuals' mental health.

4.3. Relevance to University Students: University students often face high levels of academic and social stress. Exploring the relationship between FOMO and executive functions in this demographic is pertinent, as it may impact academic performance, decision-making, and overall well-being during a critical period of personal and academic development.

4.4. Informing Interventions and Support: If a significant relationship is identified, it can inform the development of interventions and support systems for university students. Understanding how FOMO may influence executive functions can guide strategies to enhance cognitive skills and promote healthier psychological functioning.

4.5. Contributing to Academic Literature: Investigating the relationship between FOMO and executive functions contributes to the academic literature on both phenomena. It adds empirical evidence to the growing body of knowledge in psychology, offering researchers and practitioners valuable insights into the intricacies of these constructs.

4.6. Studying the relation between Fear of Missing Out and executive functions among university students provides a broader understanding of the psychological impact of contemporary social phenomena and provides practical implications for supporting the well-being and cognitive functioning of this demographic.

Methods

Design

The researchers used the descriptive approach in its both correlational and comparative to verify the research hypotheses.

Sample and Participants

A total of 265 undergraduate students (113 males and 152 females) were recruited from faculty of education in the New Valley university; their ages range from 19 to 21 years (M_{age}= 20.35 years; SD =.74) completed the measures outlined below.

Measures

The Fear of Missing Out (FoMO) Scale

Description of the Scale in Its Foreign Form and Its Psychometric Properties

The *Fear of Missing Out (FoMO) scale* (Przybylski et al., 2013; Arbian version, adapted by the researchers) is a 10-item scale that reflects fear of missing out enjoyable events with friends. The scale is uni-dimensional and item ratings vary from 1 = not at all true of me to 5 = extremely true of me. A higher level of FoMO was indicated by a higher score.. The scale has been translated and adapted to many different cultures, including for example: the Chinese

language (Li et al., 2020), and the Italian language (Casale & Fioravant, (2020), the Turkish language (Can & Satici, 2019), and the New Zealand language (Riordan, et al, 2018), and all of these studies indicated that the scale in its original form enjoyed high degrees of validity and reliability, as the factorial validity of the scale was verified, and the value of Cronbach's alpha coefficient (.87), which is a high value indicating that the scale has a high degree of reliability.

Translating The Scale into The Arab Environment and Its Properties

In order to present the scale to the Arab environment, it went through several steps, which were translated from the English version into the Arabic language by the researchers, and verification of the validity of the translation by three specialists in the English language. It was also linguistically audited by one of the Arabic language specialists, and the scale was applied to the study sample. The initial number is (250) male and female students. The data extracted from it were used to verify the psychometric properties of the scale as follows:

Internal Consistency of The Scale

Correlation coefficients were calculated between the scores of each individual item and the total score of the scale. The values of the correlation coefficients reached (.415, .747, .664, .704, .600, .725, .779, .627, .552, .383), respectively. It is noted that all the values of the correlation coefficients are statistically significant at level (0,01); This demonstrates that the scale has a high degree of internal consistency.

Scale Stability

The reliability of the scale was calculated using the Cronbach's alpha method, and its value was (.853), as well as using half-splits, using the Guttman method, and its value was (.879), all of which are high values. This demonstrates that the scale has a high degree of reliability.

Validity of The Scale

The validity of the scale was verified by means of confirmatory factor validity using the maximum likelihood method, which resulted in the saturation of all items in the scale on one factor. The value of chi-square reached (156.54) with degrees of freedom (35), which is a value that is not statistically significant, which confirms the quality of data matching. With the proposed model, figure (1) shows the schematic path of the confirmatory factor analysis model for the items that are loaded with the latent factor on the fear of missing out scale.
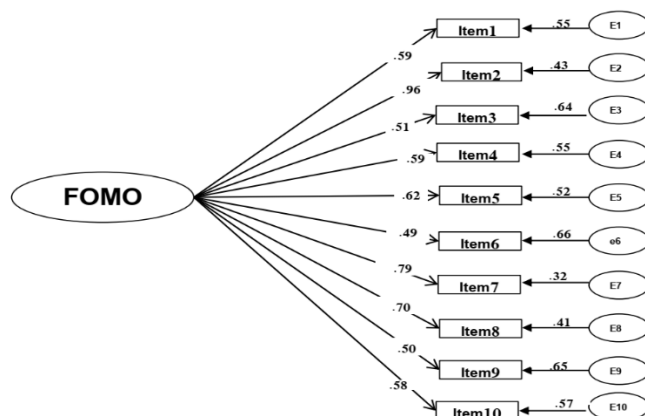

Figure (1): The schematic path of the confirmatory factor analysis model for the Fear of Missing Out Scale, where E = standard error.

It is clear from Figure (1) that all values of the goodness-of-fit indicators were in the corresponding range. The RMSEA value reached (.118), the GFI value (.891), and the AGFI value (.829). These values indicate good matching of the data with the proposed model. It is also clear that the loading values ranged between (.49 - .79), and the standard error ranged between (.32 - .66), and the "t" values ranged between (7.76 - 14.25), all of which are statistically significant at the level of (.01), which confirms the validity of the scale.

In general, the previous results indicate that the fear of missing out scale has good psychometric properties in terms of internal consistency, reliability, and validity, on the sample of the current research.

The Behavior Rating Inventory of Executive Function — Adult Version (BRIEF-A) (Roth et al., 2005), (Translated and adapted by Shuwaikh, 2022).

The BRIEF-A originally developed in Roth et al., (2005) and adapted to Arabic (*Shuwaikh,* 2022) on a sample of Egyptian adults of (1,026) participants. The BRIEF-A is a standardized measure that gathers data on an adult's own perception of their own executive function or self-regulation in their daily environment. It consists of 75 items that form nine clinical scales that measure various aspects of executive functioning; Inhibit, Self-Monitor, Plan/Organise, Shift, Initiate, Task Monitor, Emotional Control, Working Memory, Organization of Materials. These clinical scales form two broader indexes: Behavioral Regulation (BRI) and Metacognition (MI), and these indexes form the Global Executive Composite (GEC). Three validity scales (Negativity, Inconsistency, and Infrequency) are also included in the BRIEFA. Completing the BRIEF-A takes 10-15 minutes. Respondents select one of three options: "never (0)," "sometimes (1)," or "often (2)" to indicate how frequently each item has caused them problems over the last month. Higher scores signify more difficulties with executive function.

The Arabic version reached results similar to the foreign version in terms of validity and reliability. The internal consistency coefficients for the nine dimensions ranged between (.76 - .90), all of which were statistically significant at the level of (.01), and the value of the Cronbach's alpha coefficient for the battery as a whole was (.97) and ranged between (.75 - .91) for the sub-dimensions. This was also confirmed through factor analysis of battery dimensions.

In the current research, the battery was applied to the primary research sample, and the data extracted from it were used to verify the psychometric properties of the battery as follows:

Internal Consistency of The Battery

Correlation coefficients were calculated between the scores of each item and the total score of the dimension to which it belongs. The values of the correlation coefficients for the items in the planning dimension ranged between (.411 - .720), for the items in the working memory dimension between (.397 - .708), and for the items in the inhibition dimension between (.268 - .625), for items on the shifting dimension between (.164 - .820), for items on the emotional control dimension between (.246 - .803), for items on the self-monitoring dimension between (.447 - .733), for items on the initiation dimension between (.447 - .688), and for items on the task monitor dimension between (.449 - .707), and the items on organization of materials dimension are between (.226 - .734). The values of the correlation coefficients between the total score for each dimension and the total score of the battery were (.777, .723, .712, .702, .674, .519, .774, .749, .661), respectively. It is noted that all values of the correlation coefficients are statistically significant at the level of (.01); This demonstrates that the battery has a high degree of internal consistency.

Battery Stability

The stability of the battery was calculated using the Cronbach's alpha method, and the values of the reliability coefficients for the battery dimensions ranged between (.648 - .751). The stability of the battery was also verified by dividing it in half using the Guttman method, and the reliability coefficients ranged between (.672 - .916). The reliability coefficient of the battery as a whole was also estimated using the Cronbach's Alpha method (.917) and the Guttman method (.915), all of which are high values. Which demonstrates that the battery has a high degree of stability.

Validity of the BRIEF-A

The validity of the battery was verified by means of confirmatory factor validity using the maximum likelihood method, which resulted in the saturation of all nine dimensions of the battery on one factor. The value of chi-square reached (145.85) with degrees of freedom (31), which is a value that is not statistically significant, which confirms the quality of matching. Data with the proposed model, and Figure (2) show the schematic path of the confirmatory factor analysis model for the dimensions that are loaded with the latent factor on the behavioral assessment battery of executive functions.

Figure (2): The schematic path of the confirmatory factor analysis model for BRIEF-A, where: D= subdimension, E= standard error.
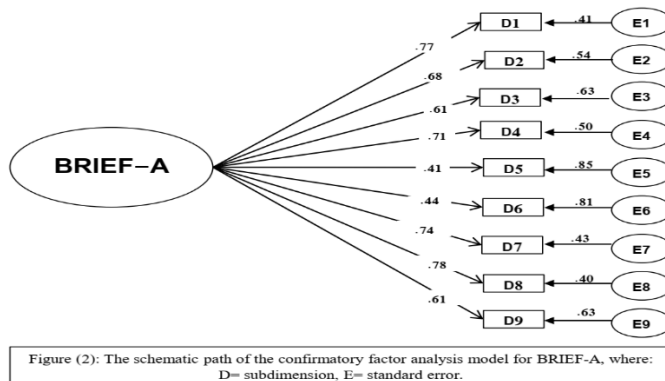
It is clear from figure (2) that all values of the goodness-of-fit indicators were in the corresponding range. The RMSEA value reached (.149), the GFI value (.882), and the AGFI value (.804). These values indicate good matching of the data with the proposed model. It is also clear that the loaded values ranged between (.41 - .78), and the standard error ranged between (.40 - .85), and the "t" values ranged between (4.68 - 13.97), all of which are statistically significant at the level of (.01), which confirms the validity of the battery.

In general, the previous results indicate that the behavior rating battery for executive functions has good psychometric properties in terms of internal consistency, reliability, and validity, on the sample of the current research.

Data Analysis

The collected data were analyzed using SPSS ver.22.

Results

The Level of Fear of Missing Out Among University Students

This hypothesis stated: "There is a low level of fear of missing out among university students." To test the validity of this hypothesis, the means and standard deviations of the students' scores on the

total score of the fear of missing out scale were calculated. The hypothesized mean was calculated on the scale; The hypothetical average of the scale was calculated by summing the five scale alternatives, dividing them by their number, then multiplying the result by the number of items. Therefore, the weights of the alternatives are (5, 4, 3, 2, 1), their sum being (15), and their number being (5). When divided, the average weights of the alternatives become (3), and when multiplied by the number of scale items (10), the hypothetical average of the scale's total score becomes (30).

A one-sample t-test was used to verify the significance of the differences between the hypothetical mean and the experimental mean on the fear of missing out scale. Table 1 shows the results of this.

Table 1: Results Of a One-Sample T-Test for The Differences Between the Experimental Mean Score and The Hypothetical Mean Score on Fear of Missing Out Among University Students (N= 265).

Variable	Experimental Mean	St.d	Hypothetic Mean	(T) Value	Sig.	Level
FoMO	30.24	8.40	30	.461	Non significance	moderate

It is clear from the results presented in Table 1 that the level of the total score for the Fear of missing out Scale was moderate, as the results indicated that there were no statistically significant differences between the hypothetical average and the experimental average of the students' scores on the Fear of missing out Scale.

The Level of Executive Functions Among University Students

This hypothesis stated: "There is a low level of executive functions among university students." To test the validity of this hypothesis, the means and standard deviations of the students' scores in the sub-dimensions and the total score of the Executive Functions Battery were calculated. The hypothetical average was calculated on the battery and its dimensions. The hypothetical average of the scale was calculated by summing the three battery alternatives, dividing them by their number, then multiplying the result by the number of items. Thus, the weights of the alternatives are (3, 2, 1), their sum is (6), and their number is (3), and when divided, the average weights of the alternatives become (2), and when multiplying the number of scale items (75), the hypothetical average of the scale's total score becomes (150), and so on for the sub-dimensions.

A one-sample t-test was used to verify the significance of the differences between the hypothesized mean and the experimental mean in the executive functions battery. Table 2 shows the results of this.

Table 2: Results of a One-Sample T-Test for The Differences Between The Experimental Mean Score and The Hypothetical Mean Score in Executive Functions Among University Students (N= 265).

Variable	Experimental Mean	St.d	Hypothetic Mean	(T) Value	Sig.	Level
Planning	19.48	4.04	20	-2.085	.05	Low
Working Memory	11.01	2.77	16	-29.381	.01	Low
Inhibition	12.77	3.65	16	-14.419	.01	Low
Shifting	14.75	3.94	12	11.37	.01	High
Emotional Control	13.83	3.66	20	-27.415	.01	Low
Self-Monitoring	14.12	3.15	12	10.975	.01	High
Initiation	10.76	2.58	16	33.136	.01	Low
Task-Monitoring	18.13	4.55	12	22.584	.01	High
Organizing Things	10.28	2.79	16	-33.328	.01	Low
Total Score	125.31	21.35	140	-11.203	.01	Low

It is clear from the results presented in Table 2 that the level of the total score for the executive functions battery was low, and the level of the sub-dimensions: planning, working memory, inhibition, emotional control, Initiation, and organizing things was also low. The results indicated that there were statistically significant differences between the experimental mean and the hypothesized mean for the hypothesized mean, while the level of the sub-dimensions: shifting, self-monitoring, and task-monitoring was high. The results indicated that there were statistically significant differences between the experimental mean and the hypothetical mean for the experimental mean.

Differences Between Males and Females in Fear of Losing

This hypothesis stated: "There are no statistically significant differences in fear of missing out attributable to gender".

To test the validity of this hypothesis, a t-test for independent samples was used to calculate the significance of the differences between the average scores of males and females on fear of missing out. Table 3 shows the results of this.

Table 3: T-Test Results for The Significance of The Differences Between the Average Scores of Males and Females on Fear of Missing Out.

Variable	Male (n=113)		Female (n=152)		T-value
	M	SD	M	SD	
Fear of Missing Out	-29.46	9.84	30.82	7.13	1.300

It is clear from the results presented in Table 3 that there are no statistically significant differences between the average scores of males and females in fear of missing out.

Differences Between Males and Females in Executive Functions

This hypothesis stated: "There are no statistically significant differences in executive functions attributable to gender".

To test the validity of this hypothesis, an independent samples t-test was used to calculate the significance of the differences between the average scores of males and females in the total score of the executive function's battery and its sub-dimensions. Table 4 shows the results of this.

Table 4: T-Test Results for The Significance of The Differences Between the Average Scores of Males and Females in Executive Functions.

Variable	Male (n=113)		Female (n=152)		T-value
	M	SD	M	SD	
Planning	19.17	4.56	19.71	3.59	-1.095
Working Memory	10.53	3.22	11.36	2.33	-2.441*
Inhibition	13	3.92	12.60	3.44	.886
Shifting	15.40	4.99	14.26	2.84	2.342*
Emotional Control	13.27	4.46	14.25	2.88	-2.179*
Self-Monitoring	14.01	3.39	14.20	2.96	-.499
Initiation	10.79	2.53	10.74	2.62	.158
Task-Monitoring	18.60	5.23	18.1	3.98	.890
Organizing Things	10.42	3.12	10.18	2.53	.686
Total Score	125.18	.56	125.41	18.57	-.087

(*) significance at the .05 level.

It is clear from the results presented in Table 4 that there were statistically significant differences at the level of (.05) in the sub-dimensions: working memory and emotional control between the average scores of males and females for females, while there were statistically significant differences at the level of (.05) in the shift for males, while there were no statistically significant differences between the average scores of males and females, whether in the rest of the sub-dimensions or the total score of the Executive Functions Battery.

The Correlation Between Fear of Loss and Executive Functions

This hypothesis stated: "There is a statistically significant correlation between fear of loss and executive functions in the study sample". To test the validity of this hypothesis, the correlation coefficient (Pearson method) was calculated between the raw scores of the study sample members of university students on the fear of missing out scale and the executive functions battery (total score - sub-dimensions). Table 5 shows the results of this.

Table 5: Correlation Coefficients Between the Scores of The Study Sample Members on The Fear of Missing Out Scale and The Executive Functions Battery (Total Score - Sub-Dimensions) (N=265).

	Executive Functions				
	Planning	Working Memory	Inhibition	Shifting,	Emotional Control
FoMO	.258**	.158-*	.111 -	-.074	-.073 -
	Self-Monitoring	Initiation	Task-Monitoring	Organizing Things	Total Score
	-.012	.169**	.046	.138*	.030

(*) *significance* at level (.05), (**) *significance* at level (.01). FoMO = Fear of Missing Out.

The Pearson's correlations in Table 5 show that the correlation between FoMO and the functions of planning, working memory, initiation, and organizing things was statistically significant, but there was no significant correlation between FoMO and the functions of inhibition, shifiting, emotional control, self-monitoring, and Task-monitoring and the total score.

Discussion

In the current research, we investigated the level of FoMO among Faculty of Education Students in the New Valley University. The level of the total score for the Fear of Missing out Scale was moderate. This finding is consistent with the study of Milyavskaya et al., (2018) which found that young people and university students are reported to be more at risk of FoMO than older individuals due to their frequent use of smartphones, Internet and social media for various purposes. This result appears also to be in line with other studies (Alt, 2015; Przybylski et al., 2013) which also revealed that fear of missing out an opportunity for social interaction enabled by the Internet may be the driving force for increased usage of social media tools.

Although students' level of FoMO is moderate in our research, it is evident that their characteristics are mainly university students who evaluate information, think critically and permanently keep knowledge as opposed to simply memorizing it. Instead of using social networking sites on their smartphones, it is believed that this particular group of students often uses them for other educational purposes.

One hypothetical explanation to this result could be that increased levels of FoMO were associated with greater influence of social media on daily-life and work efficiency. Accordingly,

people who experience FOMO overuse social media in an attempt to be continuously connected, educated, and aware of others' activities (Beyens et al., 2016). Furthermore, social networks platforms use a variety of features, like notifications and real-time information, to feed and provoke FOMO, keeping users hooked to their smartphones and continuously engaged (Alutaybi et al., 2019). Cultural differences can be used to explain the moderate level of FoMO among students at the New Valley University. People in collectivist cultures prioritize social relationships and place greater emphasis on maintaining harmony and interdependence within their communities, where there is strong concern about others' opinions and how one's actions and social media posts are perceived (Alshakhsi et al., 2023).

It is clear from the results presented in Table 2 that the level of the total score for the executive functions battery was low, and the level of the sub-dimensions: planning, working memory, inhibition, emotional control, Initiation, and organizing things was also low, while the level of the sub-dimensions: shifting, self-monitoring, and task-monitoring was high. This finding can be explained according to state self-control which is defined as the active regulation of thoughts, feelings, and behaviors when faced with decisions that force people to choose between goals that are important to them and goals that would only provide temporary satisfaction (Liu et al., 2023). In this case, state self-control seems to be associated with intense internal conflict that gives rise to unpleasant emotional sensations.. According to the strength model of self-control proposed by Baumeister et al. (2007), self-control is viewed as a finite resource that is rapidly depleted by all types of self-control. The person may experience "ego depletion" when their present self-control exhausts them, and any further attempts at self-control are likely to fail as their supply of resources grows. Few research, nevertheless, use empirical methodologies and an academic framework to examine "ego depletion." Everyday life is full of varied-intensity desires and temptations, particularly in the academic setting. Conflicts and resistance (self-control acts) as a result are common and transient (Hofmann et al.,2012). Students in this situation experience severe internal tensions and must use a lot of energy to manage them, which leads to a condition known as "ego depletion." According to several studies (Milyavskaya & Inzlicht, 2017; Liu et al., 2023), state self-control invariably results in unfavorable effects like intense inner conflict, low wellbeing, and unpleasant emotional experiences. So, it could be that high self-monitoring, task-monitoring, and shifting depletes ego leading to some deficits and reduction in the functions of planning, working memory inhibition, emotional control, initiative, and organizing things.

The results also showed that, in contrast to some other findings (Beyens et al., 2016; Stead & Bibby, 2017), there were no gender differences in experiencing FoMO, suggesting that males and females may be equally inclined to this trait. This finding is in accordance with prior research (Blackwell et al., 2017; Elhai et al., 2018; Rozgonjuk et al., 2021). The replicability of no gender differences in experiencing FoMO may depend on developmental stage and that FoMO is identified as an emotional drive that stems from unmet psychological requirements among millennial customers (Anggraini, 2014). So, FoMO phenomenon can be considered as self-regulatory limbo resulting from situational or severe impairments in satisfying psychological need (Przybylski et al., 2013).

The differences in the sub-dimensions: working memory and emotional control between the average scores of males and females for females, and the differences in the shift for males can be explained according to vast evidence provided by psychological studies that men and women think differently (Johnson and Whisman, 2013) ; for instance,, previous studies suggest that females are more risk averse (Hrazdil et al. 2022), more conservative (Zeng and Wang, 2015),

and more ethically sensitive to different situations (Ye et al., 2010) , than males. Males, on the other hand, tend to be more task-oriented, more aggressive in their pursuit of measurable performance outcomes, and more ambitious overall (Burke and Collins, 2001). Such differences can significantly affect functions of working memory and emotional control for females, and the function of shift for males. This finding supports the notion that males and females depend on various brain networks to carry out the same function (Hill et al., 2014). This finding is consistent with prior research showing that females exhibit better verbal (Lewin et al., 2001)) and writing skills than males (Bae et al., 2000).

We found no evidence of gender differences in the rest of the sub-dimensions or the total score of the Executive Functions Battery. This finding may be clarified by various thought patterns and Egyptian educational systems. According to prior research learning in various disciplines impacts the efficiency of brain-related information processing, which in turn affects students' cognition and thought patterns (Parpala et al., 2010) regardless of their gender.

We also found no significant correlation between FoMO and the functions of inhibition, shifting, emotional control, self-monitoring, task-monitoring, and the total score. This result contrasts with other research that linked emotion dysregulation variables to increased levels of FoMO (Arrivillaga et al., 2023; Turkle, 2011).

Our result can be explained according to factors that university students are exposed to, such as fear of failure, competitive ideas and exposure to an abundance of information on social media platforms (Gezgin, & Kurtça, 2023). So, it is acceptable to presume that students in this stage apply technology when needed and avoid wasting time on social media in particular (Baker & White, 2011). As the executive functions of inhibition, shifting, emotional control, self-monitoring, task-monitoring, and the total score weren't affected by FoMO, so students in this age use their smartphones consciously, beneficially, and moderately. This finding provides some supporting evidence for H1, such that the level of FoMO was moderate.

But concerning the correlation between FoMO and the executive functions of planning, working memory, initiation, and organizing things was statistically significant. This result appears to be in line with previous studies (Alt, 2015; Barks et al., 2011; Hartanto & Yang, 2016; Limniou et al., 2020) which also found that using smartphones, even moderately, may have a long-term negative effects on the deep learning approach by making students less able to concentrate and will lessen their ability to remember information and increasing their chances of attention deficit. So, this action negatively affects students' capacity to plan, initiate, organize things and affects their working memory. This finding can also be explained according to self-determination theory (SDT; Ryan & Deci, 2000) which provides theoretical framework to clarify FOMO (Alt, 2015; Przybylski et al., 2013) as it distinguishes between intrinsic and extrinsic motives, highly individuals with FoMO depend on social relatedness and human connection as it is the pivotal driver of intrinsic motivation, but they experience unmet social relatedness needs which lead to negative affect (Rozgonjuka et al., 2019). This is in line with Turkle (2011) who explores a number of cases studies and highlights general conditions under which digital communication platforms might impede self-reflection and eventually worsen well-being. She contends that our constant use of communication devices can cause us to become "tethered," distracting our attention from significant social interactions in the present (Przybylski et al., 2013). We can also explain this hypothesis according to attentional control theory (Eysenck et al., 2007), that people with FoMO might employ more cognitive resources as inhibition, shifting, self-monitoring, task-monitoring to compensate for impairments in the executive functions of planning, working memory, initiation, and organizing things.

Therefore, since FoMO is associated with deficits in some EF, it is critical that clinicians take these deficits into account while developing treatment protocols to guarantee their efficacy.

Conclusion

In conclusion, our results showed that the level of the total score for the Fear of Missing out Scale was moderate, the level of the total score for the executive functions battery was low, and the level of the sub-dimensions: planning, working memory, inhibition, emotional control, initiation, and organizing things was also low, while the level of the sub-dimensions: shifting, self-monitoring, and task-monitoring was high. The research also showed that there were no gender differences in experiencing FoMO, in the total score of the EF and in sub-dimensions: planning, inhibition, initiation, self-monitoring, task-monitoring and organizing things. The differences were in the sub-dimensions: working memory and emotional control between the average scores of males and females for females, and the differences in the shift for males. We also found no significant correlation between FoMO and the functions of inhibition, shifting, emotional control, self-monitoring, task-monitoring, and the total score, but the correlation between FoMO and the executive functions of planning, working memory, initiation, and organizing things was statistically significant. Examining the level of FoMO and the level of EF, gender differences in FoMO and EF, and FoMO relationship with specific EF domains can help explain contradictions in previous research, provide novel perspectives into the nature of EF deficits in FoMO, and provide treatment guidelines to clinicians and researchers and open avenues for further research.

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