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The psychological antecedents of personal financial management behaviour: A meta-analysis

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Abstract
Purpose- The intent of this study is to aggregate, in a measurable form, the results of previous studies on the association between personal financial management behavior (PFMB) and six psychological factors, which are financial attitude, financial self-efficacy, self-control, materialism, internal locus of control, and external locus of control.

Design/methodology/approach- A stack of 32 research documents that investigated 52 relationships between various psychological variables and PFMB was analysed using the meta-analysis technique. Along with the overall meta-analysis, a comprehensive subgroup analysis was also undertaken counselled to determine whether the results contrast on account of the age group of the sample and the economy of the country to which the sample belongs.

Findings- The overall meta-analysis findings do not support the association between PFMB and the various explanatory variables except for the significant positive association with self-control. In contrast, a subgroup study revealed that self-control (positively) and materialism (negatively) were found to be significantly associated with PFMB among adults. The association between internal Locus of Control (LOC) and PFMB is significant and positive among the young. Interestingly, self-control appeared to be significantly and positively associated with PFMB in developed countries. In developing countries, financial attitude, financial self-efficacy, and internal LOC are significantly and positively associated with PFMB.

Originality/value- Distinct from other review papers, this meta-analysis quantitatively cumulates and reconciles the conflicting findings on the linkage between psychological predictors and PFMB. To the best of the authors' knowledge, this is the first meta-analysis on the topic.

Keywords Meta-analysis, Personal financial management behavior, Financial behavior, Financial planning, Psychology

Paper type: Research paper
1. Introduction

Lately, the management of personal finances of individuals has gained paramount importance due to the complexities in financial choices, liberal credit policies, and the onus of planning one's own social security (Xu and Zia, 2012; Estelami, 2014). Robust financial management practices would help individuals achieve sound financial health (Hilgert et al., 2003; Schuchardt et al., 2007). “Personal Financial Management Behavior (PFMB) is a process which assimilates all components of individuals’ financial interest. These include cash flow management, investments, risk management, retirement planning, tax planning, and estate planning” (Altfest, 2004, p. 54).

Desirable financial behavior should improve consumer financial wellbeing, while undesirable financial behaviors hurt economic wellbeing. Although lack of financial literacy is predominantly contemplated to be the cause of unsuccessful financial behavior (Lusardi and Mitchell, 2007; Lusardi et al., 2020; Goyal and Kumar, 2021), it may not necessarily be its sole determinant (Huston, 2010; Copur and Gutter, 2019; Amagir et al. 2020). Furthermore, the variation in demographics and personal income offer almost negligible reasons to explain disparities in managing personal finances (Allgood and Walstad, 2013).

The nature of personal finance is multidisciplinary, having presence in psychology, sociology, finance, and economics (Schuchardt et al., 2007). Several disciplines have approached the study of financial behaviors through their respective theoretical lenses (Copur and Gutter, 2019). Professionals, educators, and policymakers primarily aim to develop programs that focus on providing financial knowledge to individuals who are expected to be involved in rational financial decision-making. Notwithstanding, in reality, many psychological attributes influence one's personal financial behavior (Hilgert et al., 2003; Perry and Morris, 2005; Grable et al., 2009; McNair et al., 2016). Thus, it is crucial to understand the behavioral biases that go against the standard economic theory, moving individuals from
rational agents (those who make rational decision-making) to behavioral agents (those whose decisions are affected by behavioral biases) (Schuchardt et al., 2007).

PFMB is undoubtedly one of the most prolific areas of research in behavioral finance, yet Copur and Gutter (2019) and Bapat (2020) state that not much is known about the determinants of PFMB. Previous evidence sheds light on many psychological antecedents of PFMB and their relationship with it, but the empirical evidence is somewhat mixed (Goyal et al., 2021). Such incongruities in the results make our understanding of the influence of various psychological determinants on PFMB blurry. Yet, while these determinants may indeed explain selection into desirable financial behaviors and choices, they are unlikely to be all influencing PFMB. Moreover, it is difficult to identify empirically whether such antecedents are the only determinants of PFMB.

A large number of primary studies have addressed the diverse factors related to PFMB (Perry and Morris, 2005; Grable et al., 2009; Nye and Hillyard, 2013; Miotto and Parente, 2015; McNair et al., 2016; Amagir et al., 2018; Arofah et al., 2018; Asandimitra and Kautsar, 2019; Helm et al., 2019; Barbić et al., 2019; Zulfaris et al., 2020). Notwithstanding the preponderance of studies on the determinants of PFMB, there are still some issues which constitute entry points for revisiting the conflicting results of these studies. In the literature, there is conflicting empirical evidence on association of various psychological factors and PFMB due to factors including size of the sample, proxy measures for variables under study, different methodological approaches (Hedges and Olkin, 1985), age-group of the sample and economic development of the country from which the sample is drawn. Due to these contradictory findings, it is very difficult to generalize the relationship between psychological antecedents and PFMB. An intriguing but unexplored nuance in the PFMB literature regards what the relative magnitudes of distinctive psychological determinants are and how they are related with PFMB. While extant studies offer an in-depth examination of a specific
psychological antecedent, as a whole they are inconclusive and constitute barriers that avoid the possibility of reaching a more definitive conclusion about the role of specific psychological characteristics and behavioral biases in PFMB.

Therefore, we sensed that it was fundamentally desirable to conduct a meta-analysis so that the findings of previous studies can be consolidated and reconciled by quantitively aggregating the effects of such determinants on PFMB. It involves pooling of data from different studies to test for significance in the enlarged sample of observations it creates. The meta-analysis technique is preferable over descriptive and narrative reviews to draw coherent conclusions, synthesize empirical results, and establish relationships across studies (Wolf, 1986, Rosenthal, 1995). The authors of a typical qualitative literature review may use a convenience selection of studies, and the rules for inclusion and treatment are sometimes unclear. There is a lot of leeway for interpretation, and shortcomings in studies are typically overlooked (Fernandes et al., 2014). Meta-analysis, on the other hand, makes the guidelines for study inclusion and exclusion, as well as the coding processes for characterising similarities and differences between research, explicit. In addition, meta-analysis looks at the same independent variable-dependent variable relationships. An effect size that varies continually is the key statistic used to describe the findings.

To date, there is a paucity of studies reviewing the literature on PFMB and, more specifically, through the meta-analysis approach, despite its extensive use in the social sciences (Goyal et al., 2021). Defensibly, this meta-analysis technique can make a sizable contribution to the accession of knowledge on the significant psychological influencers of one's financial decision-making. Prior literature exists on a few meta-analyses of financial literacy. Miller et al. (2015) and Kaiser and Menkhoff (2017) used meta-analysis to throw light on the impact of financial education interventions on financial literacy and financial behavior. The same technique has been used by Santini et al. (2019) to identify the antecedents and
consequences of financial literacy. Similarly, Fernandes et al. (2014) aggregated the effect of financial education interventions on financial behavior through meta-analysis. We failed to see a meta-analysis accumulating the effect of psychological elements on PFMB. The profession of personal finance is interdisciplinary, and professionals must have adequate knowledge of its scholarship from the psychological lens (Schuchardt et al. 2007) because behavioral biases overshadow any other aspect in an individual’s decision making (Sadi et al. 2011). This careful analysis also allows the policymakers, financial counsellors and practitioners classify interventions among key psychological characteristics, thus yielding more nuanced results in terms of the desirable PFMB. Investigating the details of the influence of various psychological determinants on PFMB in this way additionally allows us to present important stylized facts about financial literacy programs, financial coaching, and other psychological interventions.

Pursuing this rationale, the present study aims to identify the overall degree of association of six major psychological factors on PFMB. This study can be considered an extension of Goyal et al.’s (2021) work which synthesized the antecedents and consequences of PFMB with the help of a systematic literature review. In addition, the present meta-analysis study attempts to highlight the impact of age-group differences and country’s economy-wise differences in the study sample in the sub-group analysis. There is a difference between financial behavior and the psychological dispositions of the young group of the population (Helm et al., 2019; Bapat, 2020; Lučić et al., 2021). Similarly, differences are also found in the way people behave in their financial matters according to the economy in which they live, due to the cultural differences and the psychological interpretations (Weber and Hsee, 1998; Sachittra et al., 2019; Lai and Tan, 2009). The effect of behavioral factors and practical experience on financial management behavior leads financial education to shift emphasis from financial literacy to financial capability (Kempson et al., 2004; Kebede and Kuar, 2015). Many researchers consider financial literacy a cognitive, attitudinal, and behavioural factor (Copur
Financial literacy is mainly driven by cognitive abilities of an individual, and numerical abilities in particular (Christelis et al., 2010). It could be intrinsically linked with some cognitive characteristics related with intelligence or abstract thought. Some economists and sociologists argue that non-cognitive attributes, which are different from cognitive characteristics, can also influence financial behaviour (Ameriks et al., 2003; Roa et al., 2019). So, our focus in this study is only on the non-cognitive factors.

In this paper, we used the meta-analysis technique developed by Hunter et al. (1982) to evaluate a sample of 32 studies comprising 52 relationships between PFMB and six explanatory psychological variables: financial attitude, financial self-efficacy, internal LOC and external LOC, materialism, and self-control. This general meta-analysis does not support the association between PFMB and the various explanatory variables except for self-control. The empirical findings show a significant positive association between self-control and PFMB. In contrast, a subgroup study revealed that self-control (positively) and materialism (negatively) were found to be significantly associated with PFMB among adults. In contrast, the association between internal Locus of Control (LOC) and PFMB is significant and positive among the young. Interestingly, self-control appeared to be significantly and positively associated with PFMB in developed countries. In developing countries, financial attitude, financial self-efficacy, and internal LOC are significantly and positively associated with PFMB. This study was done with the goal of merging the findings of previous PFMB studies in order to arrive at a more uniform understanding of its psychological antecedents. The findings reveal a new way of thinking about the relationship between a number of psychological factors and PFMB. If it can be discovered which traits actually influence an individual's financial behavior, as well as the amount to which those variables influence money-related prosperity, meaningful treatments to improve customers’ financial behavior can
be designed. Attitudes and beliefs of the individuals about money which they make through age and background may have a significant impact on their daily financial behaviors like purchasing, spending etc. This study will help all the stakeholders understand the intricacies involved in making financial decisions.

The remainder of this paper is structured as follows: Section 2 elucidates the theoretical background on the relationship between PFMB and various explanatory variables. Section 3 describes the meta-analysis methodology and the sample characteristics. Section 4 discusses the empirical results. Finally, Section 5 concludes the study.

2. Theoretical background
Dew and Xiao (2011) consider PFMB to be a combination of consumption, cash flow management, savings and investment, credit management, and insurance. The income organisation or money management strategy among couples is conceptualised as PFMB in couples' or family finances. As a financial management behavior scale, several researchers measured PFMB by incorporating various components. Consumption, asset management, wealth accumulation, mortgage repayment, tax planning, estate planning, fintech, and charitable giving are all emerging components that have been identified in the literature (Goyal et al., 2021). Thus, there are too many conceptualizations of PFMB and it is generally regarded as a multi-dimensional construct (Dew and Xiao, 2011). For conceptual and operational definitions of PFMB, refer Goyal et al. (2021). Financial behavior refers to human behaviors relevant to money management (Xiao, 2008). Common financial behaviors include behaviors related to earning, spending, borrowing, saving, and protecting (Xiao, 2016).

In the literature, researchers have used different names for PFMB such as best practice financial behavior, optimal financial behavior, desirable financial behavior, rational financial behavior, sound financial behavior, good financial behavior, responsible financial consumption
behavior, money management, proactive financial behavior, etc. (Robb and Woodyard, 2011; Barbić et al. 2019). For the rest of the paper, financial behaviors will be used as a generic term, and for the purpose of this meta-analysis, the term personal financial management behavior (PFMB) will be used as a combined measure of all types of financial behaviors.

Previous literature suggests that multitudinous psychological factors influence PFMB. The most prominent psychological factors that have been investigated in the extant literature in the context of PFMB are financial attitude, financial self-efficacy, internal LOC, external LOC, materialism, and self-control. Apart from these, other psychological factors (see Table I) are less explored in the literature. These factors primarily include coping styles such as acceptance or active coping, decision-making styles such as analytical or intuitive decision making, personality traits (extraversion, neuroticism, agreeableness, openness to experience, and conscientiousness), emotional intelligence, time orientation, and procrastination, among others.

(Insert Table I about here)

2.1 Financial attitude

Financial attitude is a psychological tendency that is expressed when evaluating financial behavior (Arifin, 2018). It is defined as a state of mind, opinion, and judgment about finance (Pankow, 2012). The most closely related and sometimes synonymously used psychological attribute to the financial attitude is money (Norvilitis et al., 2006; Sundarasen and Rahman, 2017). Attitude towards money is defined as an individual's predisposition towards being financially prepared for the future, reflecting the tendency to save money and manage expenses. Based on social learning theory, an individual's behavioral actions are influenced by inner events, environment, and perception (Bandura, 1986). The perceptions and actions are the financial attitudes and PFMB, respectively. Existing research has explored the connection
between financial attitudes and good PFMB (Kidwell et al., 2003; Kidwell and Turrisi, 2004; Lee et al., 2019; Bapat, 2020). Young adults with a positive attitude towards money have desirable expected PFMB (Norvilitis, 2014). Mien and Thao (2015) found a positive influence of financial attitude toward PFMB. Similarly, McNair et al. (2016) found a significant association between financial attitude and PFMB. In contrast, Asandimitra and Kautsar's (2019) research argues that the financial attitude has no impact on PFMB.

2.2 Financial self-efficacy

Self-efficacy is the belief that people have about their capabilities to produce levels of performance (Bandura, 1994). While self-efficacy does reflect ability, it also impacts motivation as those with lower levels are more likely to quit or reduce their effort when encountering challenges or obstacles. This can create a self-fulfilling prophecy because failure to try creates failure itself. Self-efficacy theory relates to human behavior in general and financial self-efficacy pertains to financial behavior in particular. Hence, individuals who doubt their capability to handle finances are more likely to reduce effort, making them more susceptible to unhealthy financial behaviors like impulse purchases (Gamst-Klaussen et al., 2019). Bandura (1986) claims that knowledge, skill, and past accomplishments are poor predictors of future attainment in the absence of self-efficacy. If confidence in one's ability is needed to undertake challenging tasks, self-efficacy may be a psychological trait that enables ambition (Chatterjee et al., 2011). In PFMB, studies have found that an individual’s confidence in managing his or her finance is a key factor for driving change in his or her financial behavior (Nyugen, 2019). Lown (2011) developed and tested a six-item financial self-efficacy scale for researchers, educators, counsellors, and advisors. Most of the studies have used this scale to test the hypothesis on the relationship between financial self-efficacy and PFMB.

Despite the relation between this personality trait and financial status, little is known about how financial self-efficacy impacts PFMB. One study finds that self-efficacy is indeed a
predictor of investment in financial assets and wealth creation across time (Chatterjee et al., 2011). Another interesting finding is that financial self-efficacy mediates the relationship between procrastination and negative PFMB (Gamst-Klaussen et al., 2019). Few studies have examined the impact of financial self-efficacy on PFMB (Herawati et al., 2018; Ismail et al., 2017). Asandimitra and Kautsar (2019) found a positive association between financial self-efficacy and PFMB. However, Amagir et al. (2018) showed no relation between the two variables.

2.3 LOC

The LOC construct is defined as a general, relatively stable propensity to see the world in a particular way, capturing general beliefs about the causes of rewards and punishments (Rotter, 1966). In order to fully appreciate the potential role of LOC in shaping behavioral outcomes, both directly and indirectly, it is helpful to understand the theoretical underpinnings of the LOC construct. According to Phares (1976), the concept of LOC emerged from tests of Social Learning Theory. LOC is typically measured on a continuum, with two extremes. On one end is an internal LOC perspective. External LOC falls on the other end of the continuum. Some studies have examined the relationship between internal LOC and PFMB, while others have focused on external LOC and PFMB. In the literature, internal LOC has been found to be positively related to PFMB (Bapat, 2020), while external LOC was found to be negatively associated with PFMB (Perry and Morris, 2005). LOC appears to significantly impact PFMB directly and indirectly, although this impact is negligible in most cases (Perry and Morris, 2005).

2.3.1 Internal LOC

Those with internal LOC associate life outcomes with their own skills, abilities, and actions. They assume that outcomes are predictably based on personal efforts, skills, and motivations.
In other words, those with an internal LOC perspective are apt to be goal-driven, and more often than not, they exhibit responsible financial decision-making skills (Grable et al., 2015). Mutlu and Özer (2021) showed a positive association between internal LOC and PFMB, whereas Wahyudi et al. (2020) found no significant relationship between internal LOC and PFMB.

2.3.2 External LOC

Those who believe that financial outcomes are due to chance or powerful others, i.e., externals, will be slightly less likely to take steps to manage their finances (Zimmerman, 1995). A study reveals that external LOC seems to mediate the relationship between financial knowledge and PFMB, but no direct effects were found (Grable et al., 2009). In their study, Davies and Lea (1995) noted that external LOC was related to debt accumulation. In contrast, Perry and Morris (2005) found a negative association between external LOC and a person's ability to save, budget, and control spending.

2.4 Materialism

Materialism can be defined as the centrality of possession and acquisition in consumers’ lives (Richins and Dawson, 1992) and material goods' possession to achieve primary life goals (Richins, 2004). Materialists can be defined as consumers who are constantly looking for their next unnecessary purchase (Richins and Dawson, 1992). Several studies examine the relationship between materialism and financial management behavior (Donnelly et al., 2012; Nye and Hillyard, 2013; Adzis et al., 2017). The findings of McNair et al. (2016) revealed an insignificant association between materialism and PFMB, contrasting the findings of Arofah et al. (2018) which showed a significant positive association between materialism and PFMB. Such findings also contrast with the negative association between materialism and PFMB.
usually found in the literature (Nye and Hillyard, 2013; Helm et al., 2019). Watson (1998) concluded that highly materialistic people have more favourable attitudes toward spending and more favourable attitudes toward debt than people with low levels of materialism.

Similarly, Watson (2003) examined how people with differing levels of materialism vary in their propensity to spend and save and their attitudes and behaviors toward borrowing money. Thus, materialism has been associated more with a specific behavior such as spending or borrowing rather than overall PFMB.

2.5 Self-control

Self-control is typically manifested as our ability to break bad habits, resist temptations, and overcome first impulses (Baumeister, 2002; Fujita et al., 2006). One way to define self-control is that it constitutes the ability of our future selves to control our current self (Strömbäck et al., 2017). When self-control failure occurs, people act in a non-optimal way, and they might, for example, procrastinate doing work even though they know that they would be better off spreading the workload over time (Ariely and Wertenbroch, 2002; Fudenberg and Levine, 2006). Such explanations of self-control failure align with the behavioral life-cycle (BLC) hypothesis formalized by Shefrin and Thaler (1988). According to the BLC hypothesis, people act as if there is an ongoing conflict within every person between a "planner," who thinks about the long run, and a "doer" who is more concerned about the current situation. The BLC hypothesis further states that people's financial behavior throughout life is determined by their ability to control impulses and the costs of exercising such self-control.

Studies that have explored the link between self-control and financial behavior have primarily focused on specific financial decisions, such as retirement planning, savings, or credit use (Gathergood, 2012; Achtziger et al., 2015). Few studies have explored the link between self-control and broader, more general measures of financial behavior. One of the few studies
investigating a broader set of financial behaviors is Miotto and Parente (2015). They used qualitative and quantitative methods to investigate how personal characteristics, including self-control and propensity to plan for the future, affect low-middle class households' financial management. According to their study, individuals with higher self-control and a tendency to plan for the future also better manage their finances. Also, there are conflicting findings on the relationship between self-control and PFMB. Miotto and Parente (2015) and Barbić et al. (2019) found a significant positive association between self-control and PFMB, whereas Zulfaris et al. (2020) found a negative association.

3. Research methodology

3.1 Data and sample

To perform a meta-analysis, an essential primary step consists of constructing one's meta-data. For this purpose, we followed a two-step search methodology. First, we retrieved data from the two most extensive databases of indexed articles: Web of Science by Clarivate Analytics and Scopus. These two multidisciplinary databases are acknowledged to provide extensive results and advanced search options (Goyal et al., 2021). The search was conducted in December 2021. We avoided limiting the search to a specific period in order to retrieve all relevant papers to date. A comprehensive long string of appropriate search terms was used to run the search in the titles, abstracts, and keywords. The search string used was "personal financ* management" OR "personal financ* behavi?r*" OR "personal financ* planning" OR "personal financ* management behavi?r*" OR "financ* management behavi?r*" OR "manag* personal financ*" OR "personal financ* decision*" OR "personal financ* outcome*" OR "household financ* management" OR "household financ* behavi?r*" OR "household financ* planning" OR "famil* financ* management" OR "famil* financ* planning" OR "famil* financ* behavi?r*" OR "individual financ* management" OR "individual financ* planning" OR "individual
financ* behavi?r*" OR "consumer financ* behavi?r*" OR "consumer financ* planning" OR "consumer financ* management" OR "money management". The search in Scopus and Web of Science databases yielded 1,168 and 515 results, respectively. Limiting the search results to English resulted in 1,122 and 507 items, respectively, totalling 1,629. Subsequently, duplicates \((n=446)\) were removed, which left 1,183 items.

For the meta-analysis, we screened these items based on the scope of the paper. Upon reading the abstracts, inclusion and exclusion criteria were put in place to limit the articles according to the scope of the review. Out of 1183 papers on PFMB, 62 studies focused on the psychological antecedents of PFMB. However, some papers focused on a specific financial behavior such as savings, investment, retirement, or credit. To avoid bias in this meta-analysis, we considered only the studies whose dependent variable was the overall PFMB rather than a single financial behavior.

Further, the references of the full papers were also scanned, and relevant records were identified, which were added manually to the list after reading abstracts. Finally, we selected a set of 32 research papers that directly studied the relationship between psychological factors and PFMB and reported the correlation coefficient. These 32 research papers include 52 independent relationships because many papers had analysed more than one relationship using different independent variables. Table II summarizes the description of the 32 studies by year of publication, country, economy, sample, sample size, independent variable, dependent variable, and Pearson’s \(r\) coefficient. We have different proxies for dependent variable PFMB (i.e., responsible financial management behavior, financial behavior, money management behaviors, responsible financial consumption behavior, etc.). These proxies are expected by the primary researchers to be related to the construct of interest i.e., PFMB. But, the use of proxy variables has contributed extensively to contradictory findings. Such proxies differ in terms of their measures (financial behavior components) used in the studies. The measures
used for dependent variables are also mentioned in Table II. One of the issues with existing financial management behavior measures is that many of them aren't thorough (Dew and Xiao, 2011). Although other scales exist, the majority of them lack evaluation of several aspects of financial management behavior (Xiao, 2008). There is a difference in the components of PFMB used in the various scales as many scales measure only one or two dimensions of financial behavior. For e.g. Perry and Morris (2005) include controlling spending, paying bills on time, planning for one's financial future, saving money, and providing for one's self and family in their financial behavior scale. Dew and Xiao (2011) include savings and investment, cash management, credit management, and insurance in the financial behavior scale proposed by them. On the other hand, Garðarsdóttir and Dittmar (2012) also include compulsive buying behavior in their study. This leaves questions as to the generalizability of the results. Therefore, we seek to synthesise the findings of several investigations in order to arrive at more generalizable conclusions through meta-analysis.

(Insert Table II about here)

3.2 Meta-analysis technique

Meta-analysis is instrumental in integrating quantitative research findings generated by previous studies addressing the same question: what are the psychological factors (e.g., the independent variables) that affect PFMB (e.g., the dependent variable)? Therefore, the meta-analysis determines whether a scholarly work has found significant results related to the topic of interest. Meta-analysis seemed pertinent given that most studies comprising the sample identified PFMB measures as the dependent variable and assessed many of the independent psychological variables. Since the findings of these studies were sometimes contradictory or inconclusive, meta-analyses could help summarize and clarify the inconsistent findings. The
The present study followed the same procedures used by Hunter et al. (1982), Rosenthal (1995), Ahmed and Courtis (1999), and Khlif and Souissi (2010).

The methodology in this meta-analysis used effect size to calculate the magnitude and direction of the relationship between a dependent variable (PFMB) and various independent variables (psychological factors, i.e., financial attitude, financial self-efficacy, internal LOC, external LOC, materialism, and self-control). The impact of internal LOC on PFMB differs from the impact of external LOC in the literature. Therefore, we conducted a separate meta-analysis of internal and external LOC rather than considering LOC as a single construct. The coefficient of correlation between the dependent and independent variables of each study is used to measure effect size ($\bar{r}$). Once the $r$ statistic is calculated for each study, the three-step methodology, suggested by Hunter et al. (1982), is followed to calculate mean correlation and variance. The population mean correlation coefficient ($\bar{r}$) is calculated in the first step. This is the weighted average of the studies under review's correlation coefficient ($\bar{r}$). The mean correlation is computed as follows:

$$\bar{r} = \frac{\sum (N_i r_i)}{\sum N_i}$$

where $N_i$ is the sample size for study $i$, and $r_i$ is the Pearson correlation coefficient for study $i$.

This method provides a more robust aggregate estimate of the population mean correlation because studies with a large sample size are subject to minor sampling errors (Singh et al., 2017). Confidence interval estimates are normally used to assess the significance of the relationship of interests. Once the mean correlation is calculated, the second step is to calculate the observed variance ($S^2_r$) among all individual correlation coefficients across studies by using an average squared error weighted by sample size:
\[ S_r^2 = \sum N_i (r_i - \bar{r})^2 / \sum N_i \]

This statistic estimates the total observed variance \((S_r^2)\) in the individual correlations around the mean estimate \((\bar{r})\). The third step is to calculate the unbiased estimate of the population variance \((S_p^2)\). Glass (1976) equated the observed variance \((S_r^2)\) among individual correlations \((r)\) with population variance \((S_p^2)\). However, Hunter et al. (1982) argued that the observed variance \((S_r^2)\) consists of error variance \((S_e^2)\) due to statistical artifacts, particularly sampling error, along with the actual population variance \((S_p^2)\). Thus, the best estimate of population variance \((S_p^2)\) is not the observed variance \((S_r^2)\) but the observed variance less some estimated sampling error variance \((S_e^2)\). Accordingly, the third step is to calculate an estimate of the sampling-error variance \((S_e^2)\):

\[ S_e^2 = (1 - \bar{r})^2 K / \sum N_i \]

where \(K\) is the number of individual relationships included in the study. The estimated sampling-error variance is then subtracted from the observed variance, leaving the residual variance which provides an unbiased estimate of the population variance \((S_p^2)\):

\[ S_p^2 = S_r^2 - S_e^2 \]

The population mean \((\bar{r})\) and the standard deviation \((S_p^2)\) estimates are then used to construct a 95 percent confidence interval. Confidence intervals are constructed as follows:

\[ [\bar{r} - S_p Z 0.975, \bar{r} + S_p Z 0.975] = [\bar{r} - S_p (1.96), \bar{r} + S_p (1.96)] \]
Hunter *et al.* (1982) have also considered moderating effects in the relationships. The determination of moderating effects within a set of results is based on an assessment of estimated population variance. If the residual variance is sufficiently trivial, it may be concluded that the difference between correlations is due to statistical error and not to a function of some moderator variables. A robust statistical procedure to test whether the observed variance is trivial (i.e., homogeneous) or is significantly greater than expected (i.e., heterogeneous) involves the computation of the chi-square statistic (Ahmed and Courtis, 1999). The association investigated is unmoderated when this statistic is found to be trivial. Still, a high value, generally superior to $\chi^2_{(K-1, 0.05)}$, indicates the need to perform tests using subgroups meta-analysis, which represents the third and ultimate step of this approach:

$$
\chi^2_{K-1} = \frac{N S_r^2}{(1 - \bar{r}^2)^2} = K \frac{S_r^2}{S_e^2}
$$

Now, it is feasible to implement this procedure concerning empirical studies that do not report Pearson's coefficient $r$ but include other statistics such as $t$-statistics. The following expression allows for the conversion into $r$ statistics:

$$
r_{y,x} = \sqrt{\frac{t^2}{t^2 + df}} = |t| \sqrt{\frac{1}{t^2 + df}}
$$

However, judging from this equation, the sign of Pearson’s coefficient $r$, which can play an essential role in estimating the confidence interval, remains unknown. The sign of this coefficient can also affect the evidence on the validity and strength of the relationship between PFMB and its explanatory variables. There is no clear indication in the literature of the
appropriate procedure in the case of multivariate regression in the absence of information about the sign of these two statistics (t and r statistics).

The approach based on dummy variables is adopted to address this methodological issue. First, the dummy variable d equals one if both and \( r_{y,xi} \) is associated with the same sign and zero otherwise. Thus, d follows the Bernoulli rule as expressed below:

\[
P(D = d) = \begin{cases} 
  p^d (1 - p)^{1-d} & \text{if } d \in \{0,1\}; \\
  0 & \text{if not}
\end{cases}
\]

The mean and variance of this dummy variable can be expressed as \( E(D) = p \) and \( V(D) = p(1-p) \), respectively. Second, the following hypothesis is tested with the 95 percent confidence level:

- \( H_0. \ p = 0.9 \) against.
- \( H_1. \ p < 0.9. \)

where p is the proportion of cases in which the t-statistic is associated with the same sign as \( r(y, xi) \). The sample selection was performed randomly to obtain some studies from the literature, including 32 articles that report both the univariate correlation \( r(y, xi) \) statistics and multivariate correlation t-student statistics. The sample resulted in a total of 99 observations, 89 of which included cases where \( r(y, xi) \) statistics and t-student statistics were associated with the same sign. The frequency \( f \) of same-sign statistics amounts to \( \frac{89}{99} = 0.8989 \). Finally, based on the frequency level \( f \), it is possible to conclude at the 95 percent confidence level that there is a significant correspondence between these two statistics in 90 percent of the cases. We do not reject \( H_0 \) if the computed \( b \) is lower than \( f \), as indicated below:

\[
\frac{b - 0.9}{\sqrt{(0.9 \times 0.1)/99}} = -1.645 = Z_{0.05} \Rightarrow b = 0.9 - (1.645) \times \sqrt{\frac{0.9 \times 0.1}{99}}
\]
= 0.8503 < 0.8989

This value indicates that the same sign shared by the t-statistics and \( r(y, xi) \) statistics can be attributed to the converted statistics.

The subgroup meta-analysis is helpful in order to lessen heterogeneity and enhance the explanatory power of results. We have done a sub-group study based on the sample's age group (adults vs. young) and the country's economy (developed economy vs. developing economy). For subgroup analysis, we considered school students, college students, and young adults as young and all others as adults. The overall sample was divided into subgroups; after that, \( r \) and \( S_r^2 \) were calculated for each subgroup.

4. Empirical results

An overall meta-analysis was conducted for each psychological variable to examine its association with PFMB. Thirty-two studies, including 52 independent relationships, individually examined the association between the psychological factors and PFMB.

4.1 Financial attitude

The evidence from the total sample meta-analysis suggests that there is no significant relationship between financial attitude and PFMB (Table III). The results of the general meta-analysis for this relationship exhibit a mean correlation (\( \bar{r} \)) of 0.2610 (Table III, column 4) with a confidence interval of \(-0.2584\) to \(0.7805\) (Table III, column 9). Although the mean correlation (\( \bar{r} \)) value with a positive sign confirms a positive relationship between the variables studied, this association is not statistically significant. This confirms that individuals with negative financial attitudes may still exhibit wise financial management behavior. Since the sampling variance is trivial, further analysis was undertaken to reduce heterogeneity and determine the elements that might have a more substantial impact on this association. When the sub-group
analysis was performed concerning the young and adult age groups, we did not find a significant relationship in either case because of the inclusion of zero within the confidence interval. In the case of adults, the mean correlation is found to be 0.2985 (Table III, Column 4, row 2) with a confidence interval of −0.3814 to 0.9784 (Table III, column 9-10, row 2). In the case of young, the mean correlation is 0.2550 (Table III, column 4, row 3) with a confidence interval of −0.2330 to 0.7431 (Table III, column 9-10, row 3). These results also indicate that age does not serve as a moderating variable in the relationship between financial attitude and PFMB. In the second subgroup meta-analysis, we divided the total sample into two groups, namely, developed economy and developing economy, based on the economic development in the country from which the sample was obtained. Out of 16 independent relationships, seven pertain to developed countries, and the remaining nine belong to developing economies. The mean correlation (\( \bar{r} \)) for developed countries is 0.0710 (Table III, column 4, row 4) with a confidence interval of −0.2853 to 0.4273 (Table III, column 9-10, row 4). The association is not significant in the case of developed countries. The mean correlation as calculated for developing countries is 0.4777 (Table III, column 4, row 5), which is higher than that for developed economies. Also, the association is statistically significant in this case because of the non-inclusion of zero within the confidence interval (0.1692 to 0.7863). These results also indicate that belonging to a developing economy is a moderating variable in the relationship between financial attitude and PFMB. Individuals from emerging countries are going through changes in their consumption patterns, and their needs for finances are also changing (Haq et al., 2018). As a result of this economic growth, the income of individuals has also increased (Dutta and Sahi, 2013), and this complicated the task of money management (Garg and Singh, 2018). This might be a plausible reason for their financial attitude influencing PFMB.

(Insert Table III about here)
4.2 Financial self-efficacy

The overall meta-analysis shows no significant relationship between financial self-efficacy and PFMB (Table IV). The mean correlation ($r$) for this relationship is 0.1438 (Table IV, column 4), with a confidence interval of $-0.1872$ to $0.4748$ (Table IV, Column 9-10). The mean correlation ($r$) with a positive sign shows a positive relationship between financial self-efficacy and PFMB. When the sub-group analysis was performed concerning the young and adult age groups, we did not find a significant relationship in either case. In the case of adults, the mean correlation was found to be 0.2697 (Table IV, Column 4, row 2) with a confidence interval of $-0.0068$ to $0.5462$ (Table IV, column 9-10, row 2). In the case of the young, the mean correlation was found to be 0.1157 (Table IV, column 4, row 3) with a confidence interval of $-0.2014$ to $0.4329$ (Table IV, column 9-10, row 3). The association is not statistically significant in either case because of the inclusion of zero within the confidence interval. Similar to the financial attitude, these results also indicate that age does not serve as a moderating variable in the relationship between financial self-efficacy and PFMB. Out of 7 independent relationships, three pertain to developed countries in the second subgroup meta-analysis, and the remaining four belong to developing economies. The mean correlation ($r$) for developed countries is 0.0961 (Table IV, column 4, row 4) with a confidence interval of $-0.2033$ to $0.3955$ (Table IV, column 9-10, row 4). The association is not significant in the case of developed countries. The mean correlation as calculated for developing countries is 0.2839 (Table IV, column 4, row 5), which is higher than that for developed economies. Also, the association is statistically significant in this case because of the non-inclusion of zero within the confidence interval (0.0223 to 0.5455). These results also show that in the case of individuals belonging to a developing country, financial self-efficacy significantly influences PFMB. Self-efficacy is a dynamic attribute that an individual may possess in various contexts, and hence it can be altered by specific individual behavior, biological events, and the environment within which
he or she interacts (Stajkovic and Luthans, 1998). As the developing economies face continuous changes in their financial markets, change in individuals' financial self-efficacy may influence the way they manage their finances.

(Insert Table IV about here)

4.3 Internal LOC

The overall meta-analysis shows no significant relationship between internal LOC and PFMB (Table V). The mean correlation ($\bar{r}$) for this relationship is 0.3124 (Table V, column 4), with a confidence interval of –0.3505 to 0.9753 (Table V, Column 9-10). The mean correlation ($\bar{r}$) with a positive sign shows a positive relationship between internal LOC and PFMB. When the sub-group analysis was performed concerning the young and adult age groups, we did not find a significant relationship in the case of adults. The mean correlation was found to be 0.2903 (Table V, Column 4, row 2) with a confidence interval of –0.1658 to 0.7464 (Table V, column 9-10, row 2). In the case of the young, the mean correlation is 0.3940 (Table V, column 4, row 3) with a confidence interval of –0.4646 to 0.3235 (Table V, column 9-10, row 3). The association is statistically significant in this case because of the non-inclusion of zero within the confidence interval. These results indicate that age is a moderating variable in the relationship between internal LOC and PFMB). Individuals with an internal LOC generally expect that their actions will produce predictable outcomes. Thus, they are more action-oriented or motivated than externals (Hoffman et al., 2000), a tendency which is generally more prevalent in young individuals than in their older counterparts. The young population represents a unique transitional stage in development between near-total dependence on family in adolescence and near total independence as they move into young adulthood (Arnett 2001). Emerging adults report individualistic qualities as the most critical benchmarks in attaining full adulthood—specifically, qualities such as accepting responsibility for one's actions (Jorgensen et al., 2017). Out of 7 independent relationships, three pertain to developed countries in the
second subgroup meta-analysis, and the remaining four belong to developing economies. The mean correlation (\( \bar{r} \)) for developed countries is 0.2060 (Table V, column 4, row 4) with a confidence interval of \(-0.2354\) to 0.6474 (Table V, column 9-10, row 4). The association is not significant in the case of developed countries. The mean correlation as calculated for developing countries is 0.4511 (Table V, column 4, row 5), which is higher than that for developed economies. Also, the association is statistically significant in this case because of the non-inclusion of zero within the confidence interval (0.3685 to 0.5338). These results show that a country's economy also acts as a moderating variable in the relationship between internal LOC and PFMB.

(Insert Table V about here)

4.4. External LOC

The overall meta-analysis shows no significant relationship between external LOC and PFMB (Table VI). The mean correlation (\( \bar{r} \)) for this relationship is -0.0994 (Table VI, column 4), with a confidence interval of \(-0.2397\) to 0.0409 (Table VI, Column 9-10). The mean correlation (\( \bar{r} \)) with a negative sign shows a negative relationship between external LOC and PFMB. When the sub-group analysis was performed concerning the young and adult age groups, we did not find a significant relationship in either case. In the case of adults, the mean correlation was found to be 0.0947 (Table VI, Column 4, row 2), with a confidence interval of \(-0.2037\) to 0.1000 (Table VI, column 9-10, row 2). In the case of the young, the mean correlation is \(-0.0552\) (Table VI, column 4, row 3) with a confidence interval of \(-0.7005\) to 0.5900 (Table VI, column 9-10, row 3). The association is not statistically significant in either case because of the inclusion of zero within the confidence interval. Similar to the financial attitude and financial self-efficacy, these results also indicate that age does not serve as a moderating variable in the relationship between external LOC and PFMB. Out of 5 independent
relationships, three pertain to developed countries in the second subgroup meta-analysis, and
the remaining two belong to developing economies. The mean correlation ($\bar{r}$) for developed
countries is $-0.1014$ (Table VI, column 4, row 4) with a confidence interval of $-0.1268$ to
$-0.0760$ (Table VI, column 9-10, row 4). The association is significant in the case of developed
countries. Locus of control was found to be different among various ethnic backgrounds as
some cultures depict varying risk tolerance levels (Bapat, 2020). This might be the reason that
external LOC influences PFMB for individuals in developed countries. The mean correlation
as calculated for developing countries was found to be $-0.0552$ (Table VI, column 4, row 5).
But the association is not statistically significant in this case because of the inclusion of zero
within the confidence interval ($-0.7005$ to $0.5900$).

(Insert Table VI about here)

4.5. Materialism

The overall meta-analysis shows no significant relationship between materialism and PFMB
(Table VII). The mean correlation ($\bar{r}$) for this relationship is $0.0684$ (Table VII, column 4) with
a confidence interval of $-0.3662$ to $0.2295$ (Table VII, Column 9-10). The mean correlation ($\bar{r}$)
with a negative sign shows a negative relationship between materialism and PFMB. When the
sub-group analysis was performed concerning the young and adult age groups, we found a
significant relationship in the case of adults. The mean correlation was found to be $-0.2323$
(Table VII, Column 4, row 2) with a confidence interval of $-0.3522$ to $-0.1125$ (Table VII,
column 9-10, row 2). Generally, the effect of materialism on the responsible financial behavior
of the young lies in recognizing that they are more prone to it and are most likely to
immediately shift to self-gratification (Lučić et al., 2021). Therefore, these persons are also
prone to make ineffective financial decisions and vulnerable to irresponsible financial behavior
(Barbić et al., 2019). Surprisingly, the materialistic tendency of adults influences their PFMB
instead of young individuals. In the case of the young, the mean correlation is $-0.0083$ (Table
VII, column 4, row 3) with a confidence interval of $-0.0770$ to $0.0935$ (Table VII, column 9-10, row 3). The association is not statistically significant in this case because of the inclusion of zero within the confidence interval. These results indicate that age is a moderating variable in the relationship between materialism and PFMB. In the second subgroup meta-analysis, nine out of 11 independent relationships pertain to developed countries, and the remaining two belong to developing economies. The mean correlation ($\bar{r}$) for developed countries is $-0.1124$ (Table VII, column 4, row 4) with a confidence interval of $-0.3912$ to $0.1664$ (Table VII, column 9-10, row 4). The association is not significant in the case of developed and developing countries. The mean correlation as calculated for developing countries is $0.0000$ (Table VII, column 4, row 5). Also, the association is not statistically significant in this case because of the inclusion of zero within the confidence interval ($-0.4143$ to $0.4143$). Therefore, the economy does not act as a moderating variable in the association between materialism and PFMB.

(Insert Table VII about here)

4.6 Self-control

The general meta-analysis shows a significant relationship between self-control and PFMB (Table VIII). The mean correlation ($\bar{r}$) for this relationship is $0.2089$ (Table VIII, column 4) with a confidence interval of $0.1580$ to $0.2582$ (Table VIII, Column 9-10). The mean correlation ($\bar{r}$) with a positive sign shows a positive relationship between self-control and PFMB. This indicates that individuals with good self-control are more likely to save money from every paycheck and have better general financial behavior. Also, they are less worried about financial matters and feel more secure about their current and future financial situation. When the sub-group analysis was performed concerning the young and adult age groups, we found a significant relationship in the case of adults. The mean correlation was found to be $0.2099$ (Table VIII, Column 4, row 2) with a confidence interval of $0.0418$ to $0.3779$ (Table
VIII, column 9-10, row 2). In the case of the young, the mean correlation is 0.1931 (Table VIII, column 4, row 3) with a confidence interval of –0.0603 to 0.4465 (Table VIII, column 9-10, row 3). The association is not statistically significant in the case of young people because zero within is the confidence interval. These results indicate that age serves as a moderating variable in the relationship between self-control and PFMB. In the second subgroup meta-analysis, three out of 6 independent relationships pertain to developed countries, and the remaining three belong to developing economies. The mean correlation ($\bar{r}$) for developed countries is 0.2450 (Table VIII, column 4, row 4) with a confidence interval of 0.1128 to 0.3771 (Table VIII, column 9-10, row 4). The association is significant in the case of developed countries. The mean correlation as calculated for developing countries is 0.1002 (Table VIII, column 4, row 5). Also, the association is not statistically significant in this case because of the inclusion of zero within the confidence interval (–0.0214 to 0.2219).

(Insert Table VIII about here)

5. Conclusion

This meta-analysis assimilates findings of prior empirical studies about the impact of psychological factors on PFMB. The results of this analysis underpin the role of self-control as a leading determinant of PFMB. Individuals who experience self-control failure make impulsive decisions such as compulsive purchasing (Strömbäck et al., 2017); as a result, their level of self-control may have a significant impact on their financial behavior and well-being. Findings are summarized in Table IX. All-embracing and in all subgroup analyses, this association is not statistically significant in all of the cases and differs in magnitude. Self-control (positively) and materialism (negatively) were found to be significantly associated with PFMB among adults. In contrast, the association between internal LOC and PFMB is significant and positive among the young. The role of locus of control is consistent with
The transtheoretical model of behavior change which suggests that internal locus of control plays a crucial role in behavioral change (Prochaska and DiClemente, 2005). Self-control appeared to be significantly and positively associated with PFMB in developed countries. In developing countries, financial attitude, financial self-efficacy, and internal LOC are significantly and positively associated with PFMB. The essence of this meta-analysis is latent in the evidence that variegated and contrasting results were found when we aggregated the findings on the influence of prominent psychological factors on PFMB. In addition, the overall meta-analysis also assigns a significant value to the chi-square statistic, which confirms the effect of moderating variables on the relationship. We found the interesting moderating influence of age group (young and adults) and economy (developed and developing) on the linkage between various psychological factors and PFMB. This provides conclusive evidence that the influence of psychological attributes may not necessarily be the same among all the individuals and the economy to which they belong. It also stages a call for future researchers to elicit research evidence on the psychological determinants of PFMB based on specific age cohorts and cross-country comparisons. It also highlights the need for stronger designs in future research. The use of dubious proxy variables for PFMB made it more difficult to interpret the literature. Unfortunately, most existing studies only evaluate financial behaviors when it is convenient for them, and they lack a comprehensive composition. Because there are so few validated financial management behavior scales in the study, researchers must create a financial behaviors inventory that covers all aspects of activity uniformly (Dew and Xiao, 2011; Goyal et al., 2021).

(Insert Table IX about here)

Our study holds practical implications for financial planning professionals, advisors, and consumers. In particular, by developing an understanding of the influence of psychological traits on PFMB, regulators and policymakers can wisely channel the limited educational and
counselling resources to address the issue of incommensurate personal financial planning. It encourages these counsellors to take a more advanced and practical approach, focusing not just on demographics but also on other psychological characteristics. Over the last few decades, policymakers and educators have launched a slew of initiatives to encourage prudent financial behavior among the general public. While the primary goal of such programmes has been to disseminate objective financial knowledge, it has only lately been recognised that psychological traits and non-cognitive skills play a role in explaining individual differences in financial behavior. We contribute to the body of knowledge by looking into the impact of psychological differences in predicting financial behavior. Recent studies on the financial vulnerability of distressed consumers suggest that the target programs that are often created to assist them in their navigation through the financial marketplace fail due to a weak understanding of how consumers' financial distress and perception function differently among Western and emerging economies (Martin and Hill, 2015) and how the psychology of different age groups is manifested. From a practical perspective, our research addresses an urgent need for financial market regulators and consumer policymakers worldwide to get a better understanding of PFMB. The results reveal that the financial behaviors stem from deeply embedded psychological traits like self-control, financial attitude, materialism, LOC, and financial self-efficacy. Therefore, the programs should be directed to view financial knowledge beyond the bounds to manoeuvre completely and efficiently transform knowledge into responsible financial behavior. Additionally, opportunities should be created to augment self-control and other psychological attributes. Doing so is important given the ever-increasing responsibility placed on individuals for managing their finances and procuring good financial health.

From a theoretical perspective, our results make a significant contribution. When examining economic theories, researchers are frequently confronted with a large quantity of
behavioral heterogeneity. Behavioral and experimental economics aims to better understand human behaviour via observation so that economic theories can be improved. One method to handle this heterogeneity is to realise that decision-makers differ fundamentally from one another and that these differences contribute to observable financial behavior differences. This study's goal was to understand the diverse non-cognitive processes that underpin financial behavior, with a particular focus on psychological factors. To the best of our knowledge, no study in the literature has attempted to quantitatively synthesize the findings on this topic. One limitation of our study is that the findings were based on only a limited number of available studies for some subgroups. Therefore, researchers must consider further extending this meta-analysis by incorporating additional empirical evidence available. Also, we have not included all the psychological variables in our study due to the availability of some studies. It will also be quite valuable if additional studies are performed to confirm the relationships analysed and consider other variables. There are numerous antecedents of PFMB, such as social factors, financial literacy, cultural factors, technological factors, demographic factors, etc. (Goyal et al., 2021). Scholars can also conduct a comprehensive meta-analysis considering these antecedents of PFMB. They can also confirm the findings of our meta-analysis by using different methodology, such as Fisher's Z transformation (Hedges and Olkin, 1985).
References


<table>
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<th>Variable</th>
<th>Number of Studies</th>
<th>Reference Study</th>
<th>Citations</th>
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<td>Personality Traits (Agreeableness, conscientiousness, agreeableness, openness to experience, extraversion)</td>
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<td>Financial Risk Tolerance</td>
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<td>A model for personal financial planning towards retirement Antecedents to responsible financial management behavior among young adults: moderating role of financial risk tolerance Consumer centric antecedents to personal financial planning</td>
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Table II. Description of studies included in meta-analysis

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<th>Study Reference</th>
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<td>College Students</td>
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<td>Internal Locus of Control</td>
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<td>Croatia</td>
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<td>Young adults</td>
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<td>Barbić et al. (2019)</td>
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<td>Richins and Dawson (1992)</td>
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<td>Materialism (Happiness)</td>
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<td>Responsible Financial Behavior</td>
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<td>Money management</td>
<td>Lea et al. (1995); Loke et al. (2015)</td>
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<td>Helm et al. (2019)</td>
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<td>Goldberg et al. (2003)</td>
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<tr>
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<td>Nature of economy</td>
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<td>Measure of dependent variable used in the study</td>
<td>Pearson’s r coefficient</td>
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<td>Meneau and Moorthy (2021)</td>
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<td>Adults</td>
<td>241</td>
<td>Self- Control</td>
<td>Tangney et al. (2004); Antonides et al. (2011)</td>
<td>Consumer Financial Behavior</td>
<td>Dew and Xiao (2011)</td>
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<td>Zulfaris and Mustafa (2020)</td>
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<td>College Students</td>
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<td>Self- Control</td>
<td>Sabri and MacDonald (2010)</td>
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Table III. Results of financial attitude

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<th>$S_r^2$</th>
<th>$S_e^2$</th>
<th>$S_p^2$</th>
<th>$S_e^2/S_r^2$</th>
<th>UL (Upper limit)</th>
<th>LL (Lower Limit)</th>
<th>$\chi^2_{K-1}$</th>
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<tr>
<td>General meta-analysis</td>
<td>12669</td>
<td>16</td>
<td>0.2610</td>
<td>0.0713</td>
<td>0.0011</td>
<td>0.0702</td>
<td>1.5372</td>
<td>0.7805</td>
<td>-0.2585</td>
<td>1040.86*</td>
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<td>Adults</td>
<td>1742</td>
<td>5</td>
<td>0.2985</td>
<td>0.1227</td>
<td>0.0024</td>
<td>0.1203</td>
<td>1.9407</td>
<td>0.9784</td>
<td>-0.3814</td>
<td>257.63*</td>
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<td>Young</td>
<td>10927</td>
<td>11</td>
<td>0.2550</td>
<td>0.0629</td>
<td>0.0009</td>
<td>0.0143</td>
<td>1.4308</td>
<td>0.7431</td>
<td>-0.2330</td>
<td>768.78*</td>
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<tr>
<td>Developed Country</td>
<td>6750</td>
<td>7</td>
<td>0.0710</td>
<td>0.0341</td>
<td>0.0010</td>
<td>0.0330</td>
<td>3.0132</td>
<td>0.4273</td>
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<td>232.31*</td>
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<td>Developing Country</td>
<td>5919</td>
<td>9</td>
<td>0.4778</td>
<td>0.0257</td>
<td>0.0009</td>
<td>0.0248</td>
<td>3.5249</td>
<td>0.7863</td>
<td>0.1692</td>
<td>255.33*</td>
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Notes: Chi square statistics significant at 0.05 level of confidence interval. Significant figures represent that the association investigated is moderated and indicate the need to perform the tests using sub-groups meta-analysis. For assessing whether association between independent variable and dependent variable is significant, see if 0 comes between UL and LL which implies relationship is significant, otherwise not.
Table IV. Results of financial self-efficacy

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<th>( S_r^2 )</th>
<th>( S_e^2 )</th>
<th>( S_p^2 )</th>
<th>( S_e^2/S_r^2 )</th>
<th>UL (Upper limit)</th>
<th>LL (Lower Limit)</th>
<th>( \chi^2_{K-1} )</th>
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<td>0.1438</td>
<td>0.0302</td>
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<td>0.0285</td>
<td>5.4871</td>
<td>0.4748</td>
<td>–0.1872</td>
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<td>Adults</td>
<td>740</td>
<td>3</td>
<td>0.2697</td>
<td>0.0234</td>
<td>0.0035</td>
<td>0.0199</td>
<td>14.9011</td>
<td>0.5462</td>
<td>–0.0068</td>
<td>20.13*</td>
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<tr>
<td>Young</td>
<td>3315</td>
<td>4</td>
<td>0.1157</td>
<td>0.0274</td>
<td>0.0012</td>
<td>0.0262</td>
<td>4.2931</td>
<td>0.4329</td>
<td>–0.2014</td>
<td>93.17*</td>
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<td>Developed Country</td>
<td>3025</td>
<td>3</td>
<td>0.0961</td>
<td>0.0243</td>
<td>0.0010</td>
<td>0.0233</td>
<td>4.0054</td>
<td>0.3955</td>
<td>–0.2033</td>
<td>74.90*</td>
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<td>1030</td>
<td>4</td>
<td>0.2839</td>
<td>0.0211</td>
<td>0.0033</td>
<td>0.0178</td>
<td>15.5626</td>
<td>0.5455</td>
<td>0.0223</td>
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**Notes:** Chi square statistics significant at 0.05 level of confidence interval. Significant figures represent that the association investigated is moderated and indicate the need to perform the tests using sub-groups meta-analysis. For assessing whether association between independent variable and dependent variable is significant, see if 0 comes between UL and LL which implies relationship is significant, otherwise not.
Table V. Results of internal locus of control

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<th>K</th>
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<th>( S_r^2 )</th>
<th>( S_e^2 )</th>
<th>( S_p^2 )</th>
<th>( S_e^2/S_r^2 )</th>
<th>UL</th>
<th>LL</th>
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<td>0.1144</td>
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<td>Adults</td>
<td>2744</td>
<td>5</td>
<td>0.2903</td>
<td>0.0557</td>
<td>0.0015</td>
<td>0.0542</td>
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<tr>
<td>Young</td>
<td>743</td>
<td>2</td>
<td>0.3941</td>
<td>0.0006</td>
<td>0.0019</td>
<td>-0.0013</td>
<td>100#</td>
<td>0.3235</td>
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<tr>
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<td>1974</td>
<td>3</td>
<td>0.2060</td>
<td>0.0521</td>
<td>0.0014</td>
<td>0.0507</td>
<td>2.6739</td>
<td>0.6475</td>
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<td>112.20*</td>
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<tr>
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<td>1513</td>
<td>4</td>
<td>0.4512</td>
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<td>0.0018</td>
<td>48.5255</td>
<td>0.5338</td>
<td>0.3685</td>
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Notes: #since error variance (\( S_e^2 \)) is higher than observed variance (\( S_r^2 \)), a zero residual variance (\( S_p^2 \)) is used to determine the confidence interval. Chi square statistics significant at 0.05 level of confidence interval. Significant figures represent that the association investigated is moderated and indicate the need to perform the tests using sub-groups meta-analysis. For assessing whether association between independent variable and dependent variable is significant, see if 0 comes between UL and LL which implies relationship is significant, otherwise not.
Table VI. Results of external locus of control

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<th>LL (Lower Limit)</th>
<th>( \chi^2_{K-1} )</th>
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<td>-0.0994</td>
<td>0.0055</td>
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<td>0.0051</td>
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<td>Adults</td>
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<td>0.0101</td>
<td>0.0002</td>
<td>0.0099</td>
<td>2.3670</td>
<td>0.1000</td>
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<td>0.1118</td>
<td>0.0034</td>
<td>0.1084</td>
<td>3.0704</td>
<td>0.5900</td>
<td>-0.7005</td>
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<td>3</td>
<td>-0.1015</td>
<td>0.0004</td>
<td>0.0002</td>
<td>0.0002</td>
<td>58.7128</td>
<td>-0.0761</td>
<td>-0.1269</td>
<td>5.11</td>
</tr>
<tr>
<td>Developing Country</td>
<td>579</td>
<td>2</td>
<td>-0.0553</td>
<td>0.1118</td>
<td>0.0034</td>
<td>0.1084</td>
<td>3.0704</td>
<td>0.5900</td>
<td>-0.7005</td>
<td>65.14*</td>
</tr>
</tbody>
</table>

**Notes:** Chi square statistics significant at 0.05 level of confidence interval. Significant figures represent that the association investigated is moderated and indicate the need to perform the tests using sub-groups meta-analysis. For assessing whether association between independent variable and dependent variable is significant, see if 0 comes between UL and LL which implies relationship is significant, otherwise not.
Table VII. Results of materialism

<table>
<thead>
<tr>
<th></th>
<th>N (sample size)</th>
<th>K (No of relationships)</th>
<th>( \bar{F} )</th>
<th>( S_{r}^2 )</th>
<th>( S_{e}^2 )</th>
<th>( S_{p}^2 )</th>
<th>( S_{e}^2/S_{r}^2 )</th>
<th>UL (Upper limit)</th>
<th>LL (Lower Limit)</th>
<th>( \chi^2_{K-1} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>General meta-analysis</td>
<td>4339</td>
<td>11</td>
<td>-0.0684</td>
<td>0.0256</td>
<td>0.0025</td>
<td>0.0231</td>
<td>9.8074</td>
<td>0.2295</td>
<td>-0.3663</td>
<td>112.16*</td>
</tr>
<tr>
<td>Adults</td>
<td>1164</td>
<td>5</td>
<td>-0.2323</td>
<td>0.0076</td>
<td>0.0038</td>
<td>0.0037</td>
<td>50.6978</td>
<td>-0.1125</td>
<td>-0.3522</td>
<td>9.86*</td>
</tr>
<tr>
<td>Young</td>
<td>3175</td>
<td>6</td>
<td>-0.0083</td>
<td>0.0187</td>
<td>0.0019</td>
<td>-0.0019</td>
<td>10.0786</td>
<td>-0.0935</td>
<td>0.0770</td>
<td>59.53*</td>
</tr>
<tr>
<td>Developed Country</td>
<td>3581</td>
<td>9</td>
<td>-0.1124</td>
<td>0.0227</td>
<td>0.0025</td>
<td>0.0202</td>
<td>10.8017</td>
<td>0.1664</td>
<td>-0.3912</td>
<td>83.32*</td>
</tr>
<tr>
<td>Developing Country</td>
<td>758</td>
<td>2</td>
<td>0.0000</td>
<td>0.0473</td>
<td>0.0026</td>
<td>0.0447</td>
<td>5.5763</td>
<td>0.4143</td>
<td>-0.4143</td>
<td>35.86*</td>
</tr>
</tbody>
</table>

**Notes:** Chi square statistics significant at 0.05 level of confidence interval. Significant figures represent that the association investigated is moderated and indicate the need to perform the tests using sub-groups meta-analysis. For assessing whether association between independent variable and dependent variable is significant, see if 0 comes between UL and LL which implies relationship is significant, otherwise not.
Table VIII. Results of self-control

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>K</th>
<th>F</th>
<th>$S_r^2$</th>
<th>$S_e^2$</th>
<th>$S_p^2$</th>
<th>$S_e^2/S_r^2$</th>
<th>UL (Upper limit)</th>
<th>LL (Lower Limit)</th>
<th>$\chi^2_{K-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>General meta-analysis</td>
<td>3315</td>
<td>6</td>
<td>0.2089</td>
<td>0.0024</td>
<td>0.0017</td>
<td>0.0007</td>
<td>69.1460</td>
<td>0.2582</td>
<td>0.1580</td>
<td>8.68</td>
</tr>
<tr>
<td>Adults</td>
<td>2963</td>
<td>4</td>
<td>0.2099</td>
<td>0.0086</td>
<td>0.0012</td>
<td>0.0074</td>
<td>14.3686</td>
<td>0.3779</td>
<td>0.0418</td>
<td>27.84*</td>
</tr>
<tr>
<td>Young</td>
<td>352</td>
<td>2</td>
<td>0.1931</td>
<td>0.0220</td>
<td>0.0053</td>
<td>0.0167</td>
<td>23.9577</td>
<td>0.4465</td>
<td>–0.0603</td>
<td>8.35*</td>
</tr>
<tr>
<td>Developed Country</td>
<td>2470</td>
<td>3</td>
<td>0.2450</td>
<td>0.0056</td>
<td>0.0011</td>
<td>0.0045</td>
<td>19.0978</td>
<td>0.3771</td>
<td>0.1128</td>
<td>15.71*</td>
</tr>
<tr>
<td>Developing Country</td>
<td>845</td>
<td>3</td>
<td>0.1002</td>
<td>0.0073</td>
<td>0.0035</td>
<td>0.0039</td>
<td>47.4442</td>
<td>0.2219</td>
<td>–0.0214</td>
<td>6.32*</td>
</tr>
</tbody>
</table>

Notes: Chi square statistics significant at 0.05 level of confidence interval. Significant figures represent that the association investigated is moderated and indicate the need to perform the tests using sub-groups meta-analysis. For assessing whether association between independent variable and dependent variable is significant, see if 0 comes between UL and LL which implies relationship is significant, otherwise not.
### Table IX. A summary of meta-analysis results

<table>
<thead>
<tr>
<th>Psychological antecedent</th>
<th>Direct association with PFMB</th>
<th>Adults</th>
<th>Young</th>
<th>Developed country</th>
<th>Developing country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial attitude</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Significant (Positive)</td>
</tr>
<tr>
<td>Financial self-efficacy</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Significant (Positive)</td>
</tr>
<tr>
<td>Internal locus of control</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Significant (Positive)</td>
<td>Insignificant</td>
<td>Significant (Positive)</td>
</tr>
<tr>
<td>External locus of control</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>Materialism</td>
<td>Insignificant</td>
<td>Significant (Negative)</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
<tr>
<td>Self-control</td>
<td>Significant (Positive)</td>
<td>Significant (Positive)</td>
<td>Insignificant</td>
<td>Significant (Positive)</td>
<td>Insignificant</td>
</tr>
</tbody>
</table>

**Notes:** Summary of the results of our meta-analysis study.