Humanities & Social Sciences Communications



ARTICLE

Check for updates

1

https://doi.org/10.1057/s41599-024-03007-3

OPFN

Parents' financial socialization or socioeconomic characteristics: which has more influence on Gen-Z's financial wellbeing?

Khalid Abdul Ghafoor (1) 1,2 & Muhammad Akhtar (1) 3 M

This research aims to explore the effectiveness of various approaches for promoting financial wellbeing among Gen-Z, with a particular focus on the parental role in shaping financial attitudes and behavior, using the theoretical lens of family financial socialization theory. The study utilized a mixed-methods approach to obtain in-depth findings on parental financial socialization and parental socioeconomic characteristics for Gen-Zs' financial wellbeing. The qualitative findings revealed that parents use different strategies to financially socialize children by involving them in savings, financial decisions, and household and personal finances. Furthermore, it is found that parents are more inclined to teach daughters than sons about finances because of the expectations that females handle the household finances. Likewise, quantitative findings revealed that the father's education level negatively influences Gen-Z's financial attitude. This study strengthens the concept of family socialization and establishes a ground to explore potential mechanisms of action and implications for future research and practice.

¹ National University of Computer & Emerging Sciences, Islamabad, Pakistan. ² Shaheed Zulfikar Ali Bhutto Institute of Science and Technology University, Islamabad, Pakistan. ³ FAST School of Management, National University of Computer & Emerging Sciences, Islamabad, Pakistan. [™]email: muhammad.akhtar@nu.edu.pk

Introduction

inancial wellbeing is a critical aspect of the overall wellbeing of individuals. It can impact the ability to meet basic needs, achieve life goals, and handle unexpected financial emergencies (Diener, 2000, Fan and Henager, 2022; She et al., 2021). While struggle to manage finances leads to stress, anxiety, and financial hardship (Elliott and Lewis, 2016). Particularly after COVID-19, there has been a growing interest in the interventions aimed at improving the financial wellbeing of Gen--Z (aged 18-29 years) (Philippas and Avdoulas, 2020; Renaldo et al., 2020). The pandemic affected the global economic system and increased economic uncertainty, wherein many households experienced job losses, income reduction, and financial stress, which influenced Gen-Zs' education, career, and identity formation (Bosch et al., 2016; LeBaron et al., 2020; Loayza and Pennings, 2020; Ranta et al., 2020; Shim et al., 2009; Terriquez and Gurantz, 2015; Xiao et al., 2009). Literature documents that Gen-Z's financial attitudes, behavior, and wellbeing are influenced by many factors including their upbringing, education, and socioeconomic background (Shim et al., 2010). However, among these, parental financial socialization has been found predominant in previous studies (Fan and Chatterjee, 2019; Zhao and Zhang, 2020). Therefore, this study aimed to explore the effectiveness of various approaches for promoting financial wellbeing among Gen-Z, particularly focusing on the role of parental financial socialization and parents' socioeconomic characteristics in shaping children's financial attitudes, behavior, and wellbeing.

Parents play an important role in shaping children's financial attitudes and behavior by providing them with guidance and support (Fan et al., 2022). The family financial socialization theory posits that parents can influence children's behavior explicitly and implicitly (Gudmunson and Danes, 2011). Both methods were found prominent but distinct in their modes of communication and financial socialization approaches to convey financial knowledge, attitudes, beliefs, and behavior to growing adults. Explicit (purposive parental financial socialization) refers to direct, intentional, and financial communication on budgeting, savings, and financial goals from parents to children that can be considered a motivational force for children's financial wellbeing (Fan, Lim and Lee, 2022; LeBaron-Black et al., 2022; Pak et al., 2023; Sheng et al., 2022). Correspondingly, Implicit financial socialization (the role-modeling method of parental financial socialization), is the most dominant financial socialization process. It involves the transmission of parental financial attitudes, values, and behavior that are shaped by socioeconomic characteristics through everyday interactions, involving savings, spending, and financial management behavior (Jorgensen and Savla, 2010). Hence, both explicit and implicit parental financial socialization play a vital role in shaping growing adults' financial attitudes and behavior, offering a holistic approach to financial socialization within the family unit (Zhao et al., 2023). Prior literature, analyzed these two factors as a single construct rather than differentiating explicit and implicit parental socialization (Jorgensen and Savla, 2010; Ndou, 2023; Pak et al., 2023; Zhao et al., 2023). Thus, this study explores purposive parental financial socialization as an explicit and parents' socioeconomic characteristics as an implicit factor to distinguish their influence on Gen Zs' financial wellbeing.

Parents' socioeconomic characteristics, such as education, occupation, income, and social status, affect children's education and occupational achievement (Erola et al., 2016). However, these effects were found to be different for fathers and mothers in Asia-Pacific developing countries. Specifically, fathers are seen as the head of the family and is more responsible for intergenerational financial achievements through financial assets. Mothers are associated with managing household finance and children's

educational achievements. Therefore, fathers work full-time and earn higher earnings than mothers and retire earlier from the workforce than mothers (Fan et al., 2022). Literature documents that parents' occupation and education significantly influence children's financial behavior and outcomes. Parents with higher education and income tend to have better financial literacy, financial management skills, and incomes than others (Chevalier et al., 2013; Glick and Sahn, 2000). However, this may impact Gen-Zs' financial attitude differently (Andrea, 2023; Salikin et al., 2012). Young adults navigate the complex world of personal finance, so the influence of parent's socioeconomic characteristics and purposive financial socialization on their financial behavior and wellbeing cannot be overlooked (Fan et al., 2022; Khawar and Sarwar, 2021; LeBaron et al., 2020). Therefore, this study seeks to investigate the impact of parents' socioeconomic characteristics (occupation and education) on children's financial attitudes, behavior, and wellbeing. Understanding these relationships can provide insights for financial educators and policymakers to develop effective interventions and policies to improve financial behavior and wellbeing of Gen-Zs.

The present study diverges from the previous literature by focusing on Gen-Z in Asia-Pacific developing countries. Individuals in these countries might be affected by unique regional and cultural aspects which may impact the financial socialization process in developing Gen-Z's financial attitudes and behavior. It is important to test the outcomes of the results obtained from economically developed countries with that of developing countries such as Pakistan. Therefore, this study contributes to the existing literature in several ways. First, the study reconnoitered two distinguished dimensions of parental financial socialization, i.e., explicit (purposive parental financial socialization), and implicit (parental socioeconomic characteristics) to provide a more nuanced understanding of the role of parental financial socialization in shaping Gen-Zs' financial attitudes and behavior. Second, this study fills the literature gap by providing qualitative evidence on the parental socialization process in shaping the financial attitude and behavior of Gen-Z, along with parents' perception regarding children's financial wellbeing. Third, the existing literature mostly focused on middle, older-aged, and working adults' financial wellbeing (Kiso and Hershey, 2017; Koposko, 2014; Nga and Yeoh, 2021). However, the current study aimed to tap Gen-Z to get in-depth knowledge about the role of parental socialization in shaping the financial attitude and behavior of Gen-Z. The remaining paper has been divided into four parts. The first part covers the literature review, followed by methodology and findings, while detailed analysis followed by theoretical and practical implications are covered in the last section.

Literature review

Parental financial socialization and theoretical underpinning. The key aims of this study were guided by the theory of family financial socialization (Gudmunson and Danes, 2011) to emphasize that parents are the most influential social agents that influence an individual's financial attitude, behavior, and wellbeing (Agnew et al., 2018; Deenanath et al., 2019; Madinga et al., 2022; Webley and Nyhus, 2006, 2013). Moreover, theory argues that parental financial socialization can impact both explicitly through purposive financial communication and implicitly through day-to-day family interactions. Explicit parental financial socialization can be exercised by encouraging and educating the children on financial management topics like budgeting, savings, and investments during their early life (Bucciol and Veronesi, 2014, Hira et al., 2013; Webley and Nyhus, 2006, 2013).

Importantly, engaging them in open family finances conversations enhances children's financial knowledge and improves their short and long-term financial behavior (Shim et al., 2009). In addition, literature also found the role of gender through which children explicitly learn from their parents (Eccles et al., 1990; 2000). In many cultures, parents are more inclined to teach their daughters than sons about finances because of the understanding that females handle household finances (Boateng et al., 2014; Yusof, 2015). This might have happened because parents believe that empowering females in household decision-making process impacts their wellbeing (Jabeen et al., 2020; Lee et al., 2020; Solbes-Canales et al., 2020). Hence, explicit parental financial socialization is positively correlated with responsible financial behavior among Gen-Z that can significantly energize their efforts to attain financial knowledge, attitude, and skills (Fan et al., 2022; Jorgensen et al., 2017; Kaur et al., 2023; LeBaron-Black et al., 2022; Pandey et al., 2020; Wee and Goy, 2022). Correspondingly, implicitly, children learn by observing parents' financial behavior, attitude, asset accumulation, spending, savings, and investment behavior (Agnew, 2018; Kagotho et al., 2017; Saurabh and Nandan, 2019). In addition to this way of parental financial socialization, parents' socioeconomic characteristics can also implicitly influence their children's financial attitude and behavior (Bradley and Corwyn, 2002; Mahapatra et al., 2023). Although it has been noticed in the existing literature that both explicit and implicit socialization work together in developing the financial attitude and behavior of Gen-Z. No research has been conducted to empirically examine how both methods separately influence Gen-Z's financial wellbeing. To address this gap, the study aims to empirically investigate the impact of explicit parental financial socialization (i.e., purposive financial socialization) and implicit parental financial socialization (i.e., parents' socioeconomic characteristics) on Gen-Zs' financial behavior and wellbeing.

Gen-Z, the first cohort to come of age in the era of social media, experiences continuous exposure to well-crafted portrayals of lifestyle, affluence, and material things. This exposure stimulates a craving for immediate satisfaction and consumerism, while also generating impractical expectations for spending and saving behaviors. Children may experience the influence of peer pressure, which can compel them to comply with societal expectations and participate in conspicuous consumption as a means of upholding their social status. It has critical financial implications for both sides. On the one hand, parents have to make extra efforts to meet the financial needs and expectations of children. On the other hand, their extra efforts are not only making them time-poor but also distancing them from their children. This leads to an ongoing challenge for parenting and financially socializing Gen-Z. Therefore, the current study aimed to explore the potential impact of parental financial socialization on Gen-Z's financial attitude and behavior.

Financial wellbeing. Financial wellbeing is defined as "having financial security and financial freedom of choice to make prudent financial decisions in the present and the future" (Consumer Financial Protection Bureau, 2015). The indicators of financial wellbeing were found both objective financial wellbeing (OFW) and subjective financial wellbeing (SFW). OFW reveals material possessions, and it is measured through income, savings, debt, asset accumulation, liquidity, and so forth. SFW is used as a parameter to measure individuals' self-satisfaction level regarding their finances (Sorgente and Lanz, 2017, 2019; Xiao and O'Neill, 2018). Financial wellbeing has been investigated as a prerequisite to financial security against financial risks triggered by macroeconomic factors, including a hyperinflationary environment (She

et al., 2021). It makes a significant contribution to individuals' life quality, health, productivity, satisfying social relationships, and general wellbeing (Fan and Henager, 2022; She et al., 2021; Xiao and O'Neill, 2018). Moreover, it enables individuals to manage household finances, captivate financial tremors, plan and meet financial goals, and eventually get financial freedom. However, the question that still needs attention is; 'what are the antecedents of financial wellbeing?' Previous studies have constructed a significant relationship between financial wellbeing and various precursors including financial stress, job insecurity (Choi et al., 2020; Friedline et al., 2021), financial behavior (Iramani and Lutfi, 2021; Riyazahmed, 2021; Setiyani and Solichatun, 2019), and financial knowledge (Lee et al., 2020; Riitsalu and Murakas, 2019; Rabbani et al., 2022). Furthermore, parents are found one of the influential social agents who can stimulate financial wellbeing (Pak et al., 2023; Pandey et al., 2020; Xiao et al., 2009). In addition, parental demographics such as gender, age, marital status, family size, labor market forces, and so forth were also found to be linked with individuals' financial wellbeing. Hence, all these findings encourage the study to further enrich the literature on the antecedents of the financial wellbeing of Gen-Z.

Financial behavior. Financial behavior is "any human behavior that is relevant to money management, such as cash, credit, and saving behavior" (Xiao, 2008). Short-term financial behavior refers to cash or debt management in a way that keeps an individual away from financially stressful events; whereas, long-term financial behavior detains more future financial planning to avoid financially stressful events (Wagner and Walstad, 2019). The literature describes the coping behavior of an individual as either problem-focused to mitigate financial stress or, emotion-focused to manage emotions. Financial stress caused by financial stressors i.e., non-descriptive financial events that may affect social status of the household (Kim and Sakamoto, 2008). These include job insecurity, work dissatisfaction, bankruptcy, forced home closure, wage reduction, and overdue medical, utilities, and credit card bills (Topa et al., 2018). Financial stress also leads to reduced wellbeing (Best, 2022) and causes enormous negative effects on overall life (Brzozowski and Spotton Visano, 2020). These arguments predict that financial behavior, directly or indirectly, influences individuals' self-financial satisfaction, savings, spending, and investment behavior (Xiao and Porto, 2017). Undoubtedly it can be constructed that positive financial behavior plays an important role in defining individual SFW. However, there is a need to conduct comprehensive research focusing on the impact of explicit and implicit modes of parental financial socialization on the financial attitude and behavior of Gen-Z. Therefore, the current study grounded by family socialization theory (see Fig. 1) as a backdrop for understanding the influence of parental financial socialization, both explicitly and implicitly, on the financial attitude and behavior of Gen-Z.

Methodology

This study utilized a mixed-methods approach, combining both qualitative and quantitative data collection and analysis techniques based on the research objectives. The study was conducted in two phases. The first phase involved data collection from parents, using semi-structured interviews. This technique provided a rich source of textual data leading to the identification of codes, categories, and themes explaining explicit parental financial socialization in Pakistani culture (Haq, 2015). The qualitative part is followed by a cross-sectional, close-ended questionnaire-based survey, a representative sample of Gen-Z, and provides information on whether explicit or implicit parental financial socialization which is more influential in shaping Gen-Zs'

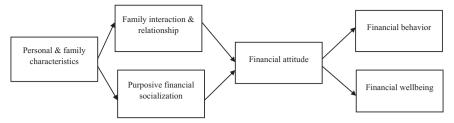


Fig. 1 Showing a conceptual model for the theory of family financial socialization.

financial behavior and wellbeing. For both qualitative and quantitative parts, the unit of analysis was an individual. However, mixed method techniques allowed data triangulation, and were collected from different sources (Bronstein and Kovacs, 2013; Haq, 2015; Levanon et al., 2021; Teddlie and Tashakkori, 2012). The approach used aligns with the methodology employed by LeBaron et al. (2020), except for the fact that they conducted qualitative research across multiple generations, interviewing both sons and daughters and their parents and grandparents. However, the current study utilized a mixed-method approach, interviewing parents related to Gen-Zs and a questionnaire-based survey collected from the sample of Gen-Z (333) which was not limited to children of previously interviewed parents only.

Qualitative methodology. Most of the literature investigating the financial behavior of individuals relied on quantitative research methods (Diener, 2000, Fan and Henager, 2022; Philippas and Avdoulas, 2020; Renaldo et al., 2020; She et al., 2021). While few researchers used qualitative methods (LeBaron et al., 2020), which helps better in exploring parents' financial socialization and children's financial behavior in greater depth. However, this study applied generalized qualitative research (Yin, 2015), through interviews with Gen-Zs' parents. The data for this study were collected by conducting interviews with the parents of children who were born during 1995 to 2010.

Interviews were conducted with 35 parents, living in different areas of Pakistan, taking into account the diverse cultural, economic, and social backgrounds. This geographical and demographical diversity in the sample enhances the external validity of the study. The 35 parents who participated in the interviews were chosen from a pool of parents conveniently available for participation, using purposive convenience sampling. This sampling technique ensured a purposeful selection of willing participants, who could provide significant input for achieving the study's research objectives (Marshall, 1996). The inclusion criteria for parents were having at least higher secondary education and having children belonging to Gen-Z.

Majority of the interviews were conducted in person, while a few were conducted online. Each interview's duration was between 20 and 40 min. Before interviewing, the interviewees were given a brief detail of the project. The researcher interviewed after getting the interviewees' informed consent. All the interviews were transcribed verbatim to maintain objective results. The sample comprised 20 male and 15 female participants, and the average age of participants was 42.5 years. Detailed attributes of some of the interviewees are shown in Table 1.

Interview guide. The interview guide was designed to gain insights into parental financial socialization. Questions were framed to make interviewees comfortable in providing answers, leading to enriching descriptions rather than just surface explanations. The interviewees were asked to reflect on changes in their child's financial attitude, behavior and wellbeing as a result of their financial socialization.

Table 1 Attributes of the interviewees.							
S.NO	Gender	Qualification	Working experience	Labor market status			
1	Male	Ph.D.	More than 22 years	Teaching			
2	Female	ACCA, MS	More than 14 years	Teaching			
3	Male	Ph.D.	More than 20 years	Teaching			
4	Female	Master	More than 14 years	Nursing			
5	Female	Matric	NA	Housewife			
6	Male	PhD	More than 40 years	Govt. (R)			
7	Male	Master	More than 22 years	Teaching			
8	Female	Master	More than 20 years	Teaching			
9	Female	Master	More than 25 years	Teaching			
10	Male	Master	More than 26 years	Business			

Data analysis procedure. NVivo 10 was used to evaluate the data in five stages; compilation, disassembling data, re-assembling data, interpretation, and conclusion (Yin, 2015). Before conducting interviews, a coding structure for template analysis was created based on the literature review, which was then improved by a methodical assessment of transcriptions and coding. Figure 2 shows the final version of the hierarchical coding system.

Quantitative methodology

Research settings. The researcher used a self-administered online questionnaire, created on Google Docs to gather data from individuals who were born from 1995 through 2010. A total of 333 individuals responded to the online survey studying in different educational institutions in Pakistan. However, the sample was not limited to children of previously interviewed parents. The sample size was calculated by applying prior sample estimation to avoid type-I and type-II errors. Purposive convenience sampling technique was used to access the participants from a pool of conveniently available Gen-Z as this technique is most useful in approaching respondents, particularly in survey-based research. Hence, the researcher approached the participants who were willing to participate and could provide significant input to achieve the research objectives of this study. The selection criteria for participants were; having at least higher secondary education; between 15 and 28 years of age; and being able to understand the English language, as the survey was in the English language. The parental socioeconomic characteristics of the sample Gen-Z are shown in Table 2.

Measurement of variables

Subjective financial wellbeing. The SFW of Gen-Z was evaluated by using eight items, five points Likert scale, coded 1–5, where 1 = low SFW and 5 = high SFW, adapted from Prawitz et al., (2006) consistent with the former studies of Gutter and Copur (2011) and Pandey et al. (2020). The reliability coefficient for SFW was 0.83 which exceeded the required threshold as suggested by Fabrigar et al. (1999).

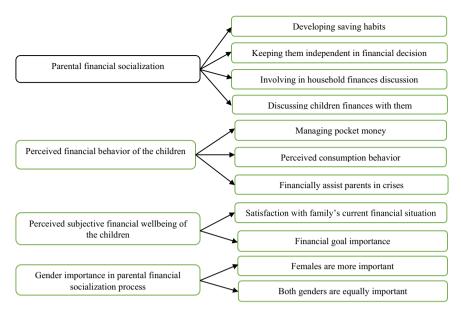


Fig. 2 Final version of the hierarchical coding system.

		N	Percent
Father education level	Lower than high school	22	6.6
	High school	29	8.7
	College/associate's	47	14.1
	Bachelor	103	30.9
	Master or higher	132	39.6
Mother education level	Lower than high school	50	15.0
	High school	40	12.0
	College/associate's	53	15.9
	Bachelor	110	33.0
	Master or higher	80	24.0
Father occupation	Government-employee	101	30.3
	Private-employee	67	20.1
	Business/self-employed	105	31.5
	Retired/out of work-force	38	11.4
	Others	22	6.6
Mother Occupation	Government-employee	32	9.6
	Private-employee	38	11.4
	Business/self-employed	18	5.4
	Retired/out of work-force	49	14.7
	Housewife	196	58.9

Financial behavior. Financial behavior was measured in line with Wagner and Walstad (2019), who opted from FINRA, USA. All questions summed up to create a 1–5 scale, where higher values showed more positive financial behavior and vice versa. The reliability coefficient for the financial behavior was 0.87 which exceeded the required threshold.

Financial attitude. A five-point Likert scale, ranging from 1 = highly undesirable to 5 = highly desirable, has been used to measure the financial attitude. These measurements are based on previous studies of (Hilgert et al., 2003; Shim et al., 2009; Xiao et al., 2006). The reliability coefficient for the financial behavior was 0.81 which exceeded the required threshold.

Financial goal importance. Financial goal importance has been measured in line with the previous studies of (Kasser and Ryan,

1996; Gardarsdottir et al., 2009), using nine items, five points Likert scale ranging from 1 (not at all) to 5 (very important). All the items have been selected from the aspiration index developed by Kasser and Ryan, (1996). A higher score reflects a stronger material aspiration. As recommended by Fabrigar et al. (1999), the reliability coefficient for the financial goal importance was 0.92 which exceeded the required threshold.

Parent's socioeconomic characteristics. The study used two different socio-economic parental characteristics (separately for fathers and mothers), to analyze the importance of dynamic aspects of parental backgrounds. Education was coded into five levels: 1 = lower than high school, 2 = high school, 3 = college/ associate, 4 = bachelor, and 5 = Master or higher. Likewise, parental occupation was measured in 5 levels: 1 = government-employee, 2 = private employee, 3 = business/self-employed, 4 = retired/out of the workforce, and 5 = others.

Parental financial socialization. Participants were asked to indicate whether they were included by their parents in the discussions about the importance of savings, family spending plans, participants' spending, and the use of credit. A 5-point Likert scale with 1 being no discussion in any of the areas and 5 being yes, was used. These measurements align with the previous study of Shim et al. (2009).

Qualitative analysis and results. This section elaborates on the findings in four key areas. First, parental financial socialization, i.e., how parents develop the financial behavior of their children. Second, the perceived financial behavior of children experiencing different parental financial socialization. The third area entails the perceived subjective financial wellbeing of children. Fourth, the gender importance in the parental financial socialization process was highlighted. Figure 2 shows the hierarchical coding system, and Table 3 defines the key codes.

Parental financial socialization. Most of the parents expressed a positive approach to the financial socialization of their children. Parents were asked questions on four dimensions, i.e., developing the saving habits of children, keeping them independent in financial decisions, involving them in domestic financial matters,

Table 3 Explanation of the key areas.					
Variables	Themes explanation				
Parental financial socialization	Financial socialization is a process of attaining, evolving, and structuring the values, behaviors, norms, and knowledge of children that promote their subjective financial wellbeing.				
Perceived financial behavior of the children	Perceived financial behavior is "any human behavior of the children, perceived by the parents, that is relevant to their money management, such as cash, credit, and saving behavior.				
Perceived subjective financial wellbeing	SFW is used as a parameter to measure parents' perception of their children's self-satisfaction level about their family's finances.				
Gender importance in the parental financial socialization process	Financial goals can be defined as 'an individual's future desired financial results, including saving, spending, and investing, that he/she visualizes, plans, and obligates to achieve.				

Theme	Subtheme	Findings	Frequency
Parental financial socialization	Developing saving habits	Parents encouraged children to spend the money rather than save	8
		Parents encouraged children to save money	11
	Keeping them independent in financial	Parents do care about children's choices but the final decision about what to purchase is kept with the parents.	9
		Children are free from all financial issues and parents are supposed to make their financial decisions.	16
		Financial independence in children's decisions develops their financial behavior, but challenging for middle or salaried-class families.	13
	Involving in household financial discussion	Parents involved children in purchasing groceries or household items.	13
		Parents used to encourage the participation of children in household economics.	16
	Discussing finances with them	Parents just gave growing children limited pocket money with known venues to spend.	21
		Parents give children a fixed amount of pocket money at the start of each month and educate them on how to spend it.	12
Perceived financial behavior of the children	Managing pocket money	The perceived financial behavior of the children varies with their personalities.	19
		Children save their pocket money, rather than utilizing it	6
		Parents have controlled financial management in households	10
	Perceived children's consumption	Children spend pocket money on food items.	22
	behavior	Children spend savings on buying their mobile, laptop, books, or similar valuable things.	8
	Financially assist parents in crisis	Children started various jobs to financially assist parents.	12
		The children didn't start any job to assist us, but they realized the financial situation of the family during stressors.	14
Perceived subjective financial wellbeing	Satisfaction with family's current financial position	Children showed their needs sometimes but did not aggressively demand them.	12
		Children are satisfied with family's financial situation by observing parents' financial position when they are growing.	11
	Financial goals importance	One major importance found from the findings is the social welfare of the society, not the status quo.	8
		One of the importance of money is a better life.	15
Gender importance in parental	Females are more important	It is more important for their daughters as compared to their sons.	13
financial socialization	Both genders are equally important	Parents emphasized equal importance for both genders to be financially socialized	21

and discussing finances with children. The frequency of these themes is shown in Table 4.

Developing the saving habits of children. Though Pakistani households are currently facing a hyperinflationary environment, internal political turmoil, uncertain natural disasters, undefined fluctuation of foreign exchange rate, and an uncertain economic environment, modest responses are received from parents in developing children's saving habits during growing age. Some of the respondents said that they always encouraged children to spend money rather than save as they were too young for that and did not want them to be deprived of their

happiness of spending. Therefore, parents advised them to start saving on started their professional careers as they would have a lifetime for that.

My children used to save their money in piggy banks, in the early start they even used to save bank notes in it as well. When I saw this then I guided them to only save the coins and spend the bank notes. I never asked them to save money. I always encouraged them to spend the money that they used to have (P1-PhD-3).

Correspondingly, some parents encouraged their children to save money to buy things for their own needs.

Along with that, we are also helping them develop those habits. Since the beginning, we would tell her that if she has fifty rupees, try to at least twenty-five rupees and save the other twenty-five rupees in case of any emergency. Initially, it was hard for her, around the time she was a school-going student, but since then she has made a habit of it and now saves. Currently, she has her savings as well (P2-ACCA-1).

Keep them independent in financial decisions. Overall findings have reflected that children are not financially independent in purchasing decisions as they are not socialized, especially by parents. They are free from all financial issues and parents are supposed to make financial decisions.

I try to a great extent to prevent my daughter from being spoiled. Being a single child, she thinks, she has the right over all the belongings of her parents. So, I am overconscious in realizing that it's not easy to get the things she wants (P2-ACCA-1).

Many parents care about children's choices, but the final decision on what to purchase is kept with the parents.

Yes, they are just dependent on what they want but never pay for it. But I have never made a difference. What I wear, I buy for them the same thing. So, they never feel disappointed (P7-Master-2).

Few parents kept children financially independent in making purchase decisions and believed that giving the children financial independence develops their financial behavior, but is challenging for middle-class or salaried-class families.

I have made my children independent but this is a challenge in today's time as the youth is surrounded by social media and is influenced by different lifestyles. These kinds of extended personalities and lifestyles become a challenge for the middle class or the salaried class to maintain and hence I try to educate my children on these things (P8-Master-4).

Involving them in domestic financial matters. One of the ways parents used to financially socialize their children is by involving them in household financial discussions. Though few parents believed that indulging their children in financial matters may divert attention from studies, however, the majority of parents involved children in purchasing groceries or household items.

All the shopping and grocery are done by the children, I give them the money and they spend it on household items and I am unaware of what they are getting (P1-PhD-3).

In the same vein, parents developed better financial behavior in children, they used to encourage the participation of children in household economics. They also discussed and even involved children in the payment of utility bills, which enhanced the financial behavior of the growing child, leading to financial wellbeing.

So, during phases when the utility bills or electricity bills are too high where it exceeds my budget, I would ask her if she has any savings she can contribute. So that moment she would inform me that she had fifty thousand rupees in savings and that I could use them towards the bill payments (P8-PhD-1).

Discussing children finances with them. Conversing about children's finances and questioning about their pocket money are vital factors in developing the financial behavior of children

during their growing age. Most of the parents just gave their growing children limited pocket money with known venues to spend.

It is not fixed per month usually it becomes daily as well I give her a hundred rupees per day. Yes, I habitually ask about their spending on food how much they spend, and where they have spent (P2-ACCA-1).

Likewise, few parents gave children a fixed amount of pocket money at the start of each month and educate them on how to spend it.

we would give her around twenty-five hundred to five thousand rupees per month. She will have to make do with the money for a whole month. Now whether she spends it in one whole day or fifteen days is up to her. However, she has been very economical in her spending since a young age so she would normally avoid going out, but if she does go out, she can manage her money well (P8-Master-1).

Perceived financial behavior of children. Three factors emerged showing the financial behavior of the children i.e., managing pocket money, consumption behavior, and assisting families during the pandemic.

Managing pocket money. The second factor, identified from the findings, is the perceived financial behavior of the children experiencing different parental socialization. Parents were asked whether children managed expenses with pocket money or demanded extra money. Findings showed a mix of perceived financial behavior of the children in managing pocket money. One of the findings revealed that the perceived financial behavior of the children varied with their personalities.

The younger daughter does not ask for more money but the elder one complains that this amount is not sufficient for managing her expenditures and she demands an extra amount for her academy the same day in the evening (P4-Master-2).

Similarly, some informants also said that children saved their pocket money, rather than utilizing it. Such behavior turned from observing the controlled financial management behavior and limited financial resources of parents.

She normally avoids getting pocket money and carries lunch with her. All of my children are very sensible and mature they know how to cut their coats according to their clothes. My elder children get a thousand rupees at the start of the month and save money through committees. So, I also give them some extra amount for lunch (P5-Matric-2).

In the same vein, a few parents also said that they have controlled financial management in households i.e., they purchase all the refreshment items and even took them out for that, but they were not given any extra amount as pocket money. Therefore, children never asked for any extra demand and managed the amount given by the parents.

No, they do not demand extra money mostly but I have told them to ask for it whenever they need it. My wife inquired them about their spending, sometimes. She also takes them to KFC for fast food and all that but she does not give them direct pocket money. For some time, she buys something from outside for lunch. Further, she purchases refreshment stuff for them like biscuits and frozen food (P10-PhD-4).

Perceived consumption behavior. Perceived consumption behavior means how the children spend savings or pocket money. Parents were asked where their children spent pocket money. Most of the findings exhibited that the children spent pocket money on food items.

My children are very fond of eating outside their priority is to spend money on food, they used to spend much on eating out and ever since online delivery has taken over the traditional way of outing, they usually prefer home delivery over the phone or through the Food Panda app. They love to experience new restaurants and new dishes. Sometimes I used to pool in as well. They managed to do all this with the pocket money that was given to them (P3-PhD-2).

Moreover, findings also revealed that the children spent savings on buying mobile, laptops, books, or similar valuable things. Children showed positive financial behavior to relieve parents from financial stress.

She realized that I would not give her the extra amount, so for any financial need like books, mobile, etc., she usually used to save the amount. That's how her savings habits are improved. More interestingly she has three different valets for that (P2-ACCA-1).

Assist the parents in crises. COVID-19 had a colossal impact on the financial behavior of households. Such stressful events cause families to face financial stressors. Thus, in coping with such events, parents revealed that children started various jobs to financially assist them.

Both my kids used to work online during the pandemic my eldest son is Hafiz-e-Quran and used to teach the Holy Quran online to different students. I guess he taught for almost three years. He used to teach online to students in the US and he used to get money through Western Union. Whatever he used to earn he used to give to us and only took his pocket money from his earnings to spend. The younger one was working as a freelancer and did different projects and similarly used to hand over his earnings to us. The children had the sense of responsibility to save and help us in contribution (P1-PhD-3).

A few parents also said that even though children did not start any job to assist them, they realized the financial situation of the family during stressors and showed intent to do so.

Yes, during her break after O' level study, she starts thinking about doing something to make her financially independent. She even tried to start an online card or stationery business with her friend during COVID-19. But unluckily that not goes well. But she still wants to do something and even asks me to suggest it (P2-ACCA-1).

Perceived subjective financial wellbeing of children. The findings of the study suggested that parents perceived their children to be satisfied with families' financial position. However, financial satisfaction is a product of better parental financial socialization. While interviewing the parents, two factors were identified i.e., financial satisfaction with the current family situation, and financial goals importance.

Satisfaction with parent's current financial position. Parents were asked whether their children were satisfied with their current financial position or situation to examine the subjective financial wellbeing of their children. The findings of the research presented

that most of the parents perceived their children to be satisfied with their current family financial situation. Though the children shared their needs/requirements sometimes, they did not aggressively demand money or compliance.

There were one or two instances where my children wished for something but due to my financial capacity, I declined. They would have felt bad for a moment or two but then after some thought, they realized it and moved on in their lives, there was no strong reaction to the decision. I have never felt in my life that it would be hard for me to manage the kids and my home and I have always felt that Almighty Allah will fulfill all my desires as I have a very strong faith. My children were always satisfied with my financial capacity (P1-PhD-3).

Findings also revealed that children were satisfied with family's financial situation by observing parents' financial position when they were growing. Thus, when inquired about how parents realized that children were satisfied with finances, parents said that they simply observed and did not hide anything from them.

There was a moment when I had bought land to build my house, I had spent all the money and savings on it and my niece's wedding came up and I didn't have money to go to the wedding, that was the only time in my life that I had borrowed some money from a close friend and after the arrangement of funds then only we attended the wedding. All this is known to my children. They know each n everything about me (P1-PhD-3).

Financial goal importance. Another factor, reflected in findings regarding perceived subjective financial wellbeing was financial goals' importance. Parents were asked whether they had ever discussed with children the importance of 'having money' with children. Only a small number of parents said that they usually involved their children in such discussions. A key insight collected from the findings is fostering the social welfare of the society, rather than merely maintaining the status quo.

Yes, many times. I normally used to talk to her about the importance of good money in life. But along with this, I also realize that money is not everything but we need money for everything. You must have enough financial independence that you can help others, not to get help for others. Nothing is free in the universe. Therefore, you have to perform to get something. And I think this is a major thing that she is told regularly. Moreover, the major goal is to get financially strong in social welfare, not a status quo (P2-ACCA-1).

Similarly, while surveying the parents about conversations with children regarding the importance of financial goals, an additional element highlighted was better living standards.

To spend your life well and keep up with the latest generation it's important to earn money because without money it's very difficult to have a good life.so it's very important to have a good education and money (P9-Master-3).

Gender importance in parental financial socialization. The fourth dimension explored by the study is gender importance in parental financial socialization. It refers to how females need to be more financially socialized than males or parental financial socialization is equally important for that. Many parents taught daughters more about finances because of the understanding that females handle the household finances.

Table 5 Correlation.								
	1	2	3	4	5	6	7	8
Father education level	1							
Mother education level	0.535 ^a	1						
Father occupation	-0.145 ^a	-0.022	1					
Mother occupation	−0.179 ^a	-0.470^{a}	0.018	1				
Financial attitude	-0.094	-0.007	-0.036	0.081	1			
Parental financial Socialization	-0.030	-0.012	0.105	-0.049	0.073	1		
Financial behavior	0.048	0.089	0.068	-0.044	0.019	0.018	1	
Subjective financial wellbeing	0.042	0.038	0.085	-0.010	0.099	0.041	0.751 ^a	1
Financial goals	-0.099	-0.011	0.037	-0.067	0.012	-0.007	0.293 ^a	0.291a

Table 6 Single source-bias.							
	Financial Attitude	Financial behavior	Financial goals	Subjective financial wellbeing			
VIF	1.017	2.345	1.108	2.365			

I think that would be more important for females as she is responsible for household financial management. Though the major long-term financial decisions are taken by males but still, even as per the teaching of Islam, a female is a custodian of males' income, So, she should and must take care of his money and manage and spend it in a better way (P1-PhD-3).

Correspondingly, few parents emphasized equal importance for both genders to be financially socialized as they believed that both have equal responsibility and requirements in running the household.

It's very important for both because both have to work and live their lives. Due to the Islamic culture females don't go out very often but still, they are trained to be financially trained. Both sons and daughters are very important to be financially aware of how the house runs (P8-Master-1).

Quantitative data analysis and results. Tables 5–18 show the results of regression analysis, indicating the impact of parental socio-economic characteristics and parental financial socialization on the financial goals, attitude, behavior, and subjective financial wellbeing of growing adults, in addition to the correlation analysis of the studied variable.

The study investigated the relationship between parental socioeconomic characteristics and children's financial attitude, behavior, parental socialization, and financial wellbeing. A Pearson correlation coefficient was implied, which is appropriate for normally distributed data. The Pearson correlation coefficient between Gen-Z's financial behavior and subjective financial wellbeing (r = 0.751) indicates a strong positive correlation. Similarly, the statistical value for the correlation coefficient between Gen-Z's financial goals' importance and financial behavior and subjective financial wellbeing was also found significant (r = 0.293, r = 0.291) respectively. The p-values associated with these correlation coefficients were less than 0.01, indicating that the correlation is statistically significant. Results are shown in Table 5. In addition, to assess the multicollinearity among the variables, Variance Inflation Factors (VIF) were implied. The values, as shown in Table 6, suggest that for the most part, multicollinearity was not a major concern (VIF < 5).

Table 7 Model summary.							
Model	R	R ²	Adjusted R ²	SE	R ² Change		
1	0.133	0.018	0.006	0.78473	0.018		
Donadi ataura	Desdition (Constant) and have a second in fall and the fa						

Predictors: (Constant), mother occupation, father occupation, father education level, mother education level.

Table 8 ANOVA.								
Мо	del	Sum of squares	df	Mean square	<i>F-</i> value	Sig.		
1	Regression Residual Total	3.660 201.982 205.642	4 328 332	0.915 0.616	1.486	0.206		

Dependent Variable: Financial goals.

Predictors: (Constant), mother occupation, father occupation, father education level, mother education level.

Parental socioeconomic characteristics and Gen-Z's financial goals importance. The ANOVA regression model ($R^2 = 0.018$) indicates negligible variance in Gen-Z's financial goal's importance as explained by the parental socioeconomic characteristics, i.e., parental education and occupation, included in the model. The F-statistic (1.486) is not significant (p > 0.05), indicating that parental socioeconomic variables, including in the model, are not a significant predictor of the Gen-Z' financial goals' importance, as shown in Tables 7–8.

Table 9 shows the regression coefficients for Gen-Z's financial goals' importance. The statistical results revealed that there is no relationship between fathers' education level and their Gen-Z' financial goals' importance ($\beta=-0.076,\ p>0.05$). The results suggest that fathers' education level does not affect their growing adults' financial goals' importance.

Parental socioeconomic characteristics and Gen-Z's financial behavior. The model summary ($R^2 = 0.013$) shows the insignificant variance in Gen-Z's financial behavior as influenced by the parental socioeconomic characteristics, i.e., parental education and occupation, included in the model as shown in Table 7. Furthermore, the statistical results for ANOVA revealed an

education level

education level.

Table 9 Coefficients.								
	β	SE	t-value	Sig.				
(Constant)	3.519	0.261	13.500	0.000				
Father education level	-0.076	0.043	-1.782	0.076				
Mother education level	0.008	0.042	0.181	0.856				
Father's occupation	0.014	0.036	0.389	0.698				
Mother's occupation	-0.046	0.035	-1.324	0.186				
Dependent variable: Financial goal	s.							

Table 10 Model summary.							
Model	R	R ²	Adjusted R ²	SE	R ² Change		
1	0.114a	0.013	0.001	0.711	0.013		

Predictors: (Constant), mother occupation, father occupation, father education level, mother education level.

Table 11 ANOVA.							
Model	Sum of squares	df	Mean square	F-value	Sig.		
Regression Residual Total	2.178 165.39 167.56	4 328 332	0.545 0.504	1.080	0.366		

Dependent variable: Financial behavior. Predictors: (Constant), mother occupation, father occupation, father education level, mother education level.

Table 12 Coefficients.									
	β	SE	t-value	Sig.					
(Constant)	2.775	0.236	11.766	0.000					
Father education level	0.008	0.039	0.217	0.828					
Mother education level	0.042	0.038	1.113	0.266					
Father's occupation	0.042	0.032	1.290	0.198					
Mother's occupation	-0.002	0.032	-0.071	0.943					
Dependent Variable: Financial behavior.									

insignificant effect of parental socioeconomic characteristics on Gen-Z's financial behavior (F = 1.080, p > 0.05) as shown in Tables 10-11.

Table 12 shows the regression coefficients for Gen-Z's financial behavior. The statistical results show that there is no significant relationship between parents' socioeconomic conditions, including their education and occupation on Gen-Z financial behavior. (p > 0.05). The results suggest that Gen-Z's financial behavior is not influenced by their parent's education level and occupation.

Parental socioeconomic characteristics and Gen-Z's subjective financial wellbeing. Table 13 predicts that the subjective financial wellbeing of Gen-Z is not significantly influenced by their parents' socioeconomic characteristics such as education level and occupation ($R^2 = 0.011$). These findings are further supported by the statistical results of ANOVA (F = 0.872, p > 0.05), as shown in Table 14. Hence, none of the parents' socioeconomic variables (education and occupation) have a significant impact on Gen-Z' subjective financial wellbeing.

Table 13 Model summary.							
Model	R	R ²	Adjusted R ²	SE	R ² Change		
1	0.103 ^a	0.011	-0.002	0.55642	0.011		
Predictors: (Constant), mother occupation, father occupation, father education level, mother							

Table 14 ANOVA.								
	Model	Sum of squares	Df	Mean square	F- value	Sig.		
1	Regression Residual Total	1.080 101.60 102.63	4 328 332	0.270 0.310	0.872	0.481		
Dep	Dependent variable: subjective financial wellbeing.							

Predictors: (Constant), mother occupation, father occupation, father education level, mother

β	SE	t-value	Sig.
2.752	0.185	14.892	0.000
0.022	0.030	0.718	0.473
0.007	0.030	0.233	0.816
0.042	0.025	1.664	0.097
0.002	0.025	0.079	0.937
	0.022 0.007 0.042	2.752	2.752 0.185 14.892 0.022 0.030 0.718 0.007 0.030 0.233 0.042 0.025 1.664

Table 16 Model summary.							
Model	R	R ²	Adjusted R ²	SE	R ² Change		
1	0.156 ^a	0.024	0.012	0.986	0.024		
Predictors: (Constant), mother occupation, father occupation, father education level, mother education level.							

Table 17 ANOVA.						
	Model	Sum of squares	df	Mean square	F- value	Sig.
1	Regression	7.962	4	1.990	2.048	0.087
	Residual	318.83	328	0.972		
	Total	326.80	332			

Parental socioeconomic characteristics and Gen-Z's financial attitude. The model summary shows that parents' socioeconomic characteristics do not influence the financial attitude of Gen-Z ($R^2 = 0.024$, p > 0.05) as shown in Table 16. Furthermore, ANOVA and coefficient results (see Tables 17–18) indicate that fathers' education has a negative influence on Gen-Z's financial attitude ($\beta = -0.121$, p < 0.05), showing that a unit change in fathers' education level results in a (1.21-units) change in Gen-Z's financial attitude. Likewise, the mother's education and occupation have an insignificant impact on Gen-Z's financial attitude ($\beta = 0.091$; $\beta = 0.081$, p > 0.05) respectively.

education level.

Table 18 Coefficients.							
	β	SE	t-value	Sig.			
(Constant)	3.113	0.327	9.506	0.000			
Father education level	-0.121	0.054	-2.259	0.025			
Mother education level	0.091	0.053	1.729	0.085			
Father's occupation	-0.047	0.045	-1.033	0.303			
Mother's occupation	0.081	0.044	1.839	0.067			
Dependent Variable: Financial attitude.							

Table 19 Tests of between-subject effects.							
Source		Type III Sum of Squares	df	Mean square	F-value	Sig.	
Corrected	FA	28.840	16	1.803	1.912	0.019	
Model	FB	6.404	16	0.400	0.785	0.703	
	SFW	5.424	16	0.339	1.102	0.352	
	FG	6.297	16	0.394	0.624	0.864	
Intercept	FA	2278.80	1	2278.80	2416.81	0.000	
	FB	2115.40	1	2115.40	4147.83	0.000	
	SFW	2004.31	1	2004.31	6515.78	0.000	
	FG	2128.44	1	2128.44	3373.99	0.000	
PFS	FA	28.840	16	1.803	1.912	0.019	
	FB	6.404	16	0.400	0.785	0.703	
	SFW	5.424	16	0.339	1.102	0.352	
	FG	6.297	16	0.394	0.624	0.864	

Predictors: (Constant), Parental financial socialization. Where; FA Financial attitude, FB Financial behavior, SFE subjective financial wellbeing, FG Financial goals, PSF Parental financial socialization.

Parental financial socialization and Gen-Z's financial goals importance, behavior, subjective wellbeing and attitude. The test of Between-Subject Effects was conducted to analyze the effect of parental financial socialization on Gen-Z's financial attitude, behavior, and subjective financial wellbeing. The results showed that parental financial socialization had a significant effect on Gen-Z's financial attitude only (F = 1.912, p < 0.05). The F-value (1.912) indicates that the variance between the groups is greater than the variance within the groups. This suggests that there is a significant difference between the groups in terms of parental financial socialization. The *p* values for financial attitude (p < 0.05) suggest that this difference is unlikely to be due to chance. Therefore, the study concluded that parental financial socialization has a significant effect on Gen-Z's financial attitude. These results (see Table 19) provide valuable insights into the relationship between parental financial socialization and Gen-Z's financial attitude. Moreover, these results are further supported by estimated margin means graphs with parental financial socialization on the X-axis and financial outcomes (including financial attitude, behavior, goals, and subjective wellbeing) on the Y-axis. These graphs comprise the understanding of how parental financial socialization impacts these financial outcomes (see Figs. 3-6).

Discussion

This study strengthens the concept of family socialization theory, particularly in the context of the financial wellbeing of Gen-Z. The findings of the study support most of the previously conducted researches (Fan and Park, 2021; Ilyas and Djawahir, 2021; Lanz et al., 2020; LeBaron-Black et al., 2022; Philippas and Avdoulas, 2021; Shim et al., 2009; Sheng et al., 2022). This study targeted Gen-Z and the role of parental financial socialization in

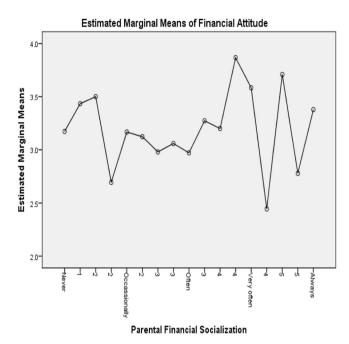


Fig. 3 The estimated margin mean graphs.

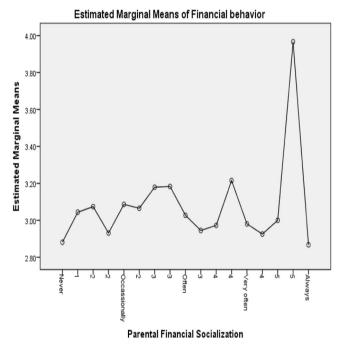


Fig. 4 The estimated margin mean graphs.

developing countries such as Pakistan, as individuals in these countries may be affected by unique regional, economic, and cultural aspects that influence their financial behavior and investment intentions, notably, a high inflationary environment, strong family system, emerging technology, extensive use of internet, social media, and complex cultural bindings. All of these may have an impact on the financial behavior and financial wellbeing of Gen-Z.

Theoretical significance of qualitative findings. This study has contributed by highlighting the change in the financial behavior of Gen-Z as a major part of the process of parental financial

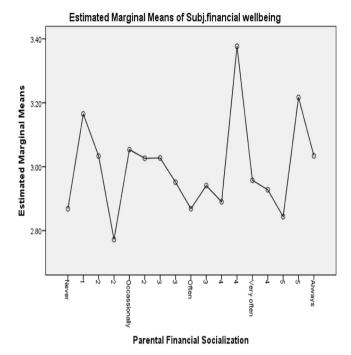


Fig. 5 The estimated margin mean graphs.

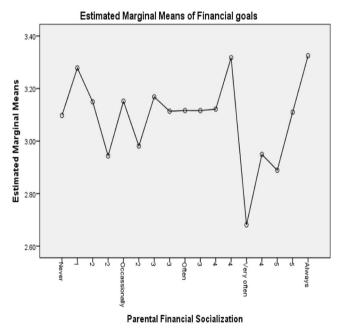


Fig. 6 The estimated margin mean graphs.

socialization. This study expands on the findings in the following four key areas. The first is the explicit parental financial socialization process, followed by the perceived financial behavior of their children. The third part is the perceived subjective financial wellbeing of the children followed by gender importance in the parental financial socialization process.

Explicit parental financial socialization process. We deduce from our qualitative findings that parents use different approaches to socialize their children financially such as involving them in the household financial discussion, keeping independent in the financial decision-making process, discussing children's finances

with them, and developing their saving habits (Furnham and Milner, 2017; Shim et al., 2009). The findings of the study explored that as far as explicit financial socialization is concerned, parents believed that involving children in financial matters would distract them from their studies. Similarly, through explicit parental financial socialization, the majority of parents included their children in the purchase of groceries or household items. Parents stated that they used to encourage their children's participation in household economics to help them develop better financial behavior. Likewise, modest responses are received from parents in developing their children's saving habits during their growing age.

Perceived financial behavior of children. Financial behavior is a powerful source of shaping Gen-Z' financial wellbeing, as previously explored (Hira et al., 2013; LeBaron and Kelley, 2021; Webley and Nyhus, 2006, 2013). The findings of this study provide valuable insights that parental financial socialization causes significant changes in a children financial behavior, specifically in managing pocket money, consumption behavior, and helping parents in crises. The findings showed that various children spent savings on mobile phones, laptops, computers, books, or other valuable items. Such behavior is a result of parent's controlled financial management and limited financial resources. Moreover, stressful events like the COVID-19 pandemic and its ongoing impact on household finances put a strain on families' finances. As a result, parents revealed that children began various jobs to financially assist parents. Though few of them did not begin working to help their parents, however, they were aware of the family's financial situation during stressful times and expressed intention to do so.

Perceived subjective financial wellbeing of the children. Emerging adults having healthy financial behavior might be more financially satisfied with family's financial position (Zimmerman, 1995). Financial wellbeing may decline if individuals do not control their financial behavior (Mahdzan et al., 2019; Xiao et al., 2014). Liu et al. (2022) argued that emerging adults who enact positive financial behavior are likely to be financially equipped and satisfied, and lead to the attainment of goals. While parents' financial socialization was associated with healthy financial behavior and satisfaction of emerging adults (Damian et al., 2020), the current study found that parents perceived that the desirable financial behavior of growing child contributes to financial satisfaction with family finances. They believed that such subjective financial wellbeing of growing children is the result of parental financial socialization. Furthermore, findings also revealed that parents' perception that children become satisfied with their financial position by observing parents' financial situation.

Gender importance in the parental financial socialization process. Gender issues have gained immense importance in social sciences research over the years (Reshi and Sudha, 2023; Wang et al., 2023). It accommodates gender differences in various aspects of human behavior, and the field of finance is no exception. Males were more encouraged to participate in financial decisions in comparison to females (Deenanath et al., 2019; LeBaron et al., 2020; Lep et al., 2022), which leads to males receiving greater exposure to financial decisions and exhibiting a higher propensity to engage in financial matters (Cupák et al., 2022; Halko et al., 2012). The study investigated the importance of gender in parental financial socialization. Parents emphasized the importance of financial socialization for both genders as they believed that both were equally responsible for managing the

household. However, parents who observe traditional gender roles within their households are more likely to teach their daughters about finances under the assumption that they will eventually take responsibility for managing household expenses (Boateng et al., 2014; Yusof, 2015). Moreover, parents also believed that empowering females in the household decision-making process impacts their wellbeing (Jabeen et al., 2020; Lee et al., 2020; Solbes-Canales et al., 2020). Hence, parental financial socialization was found a significant antecedent of males' and females' financial behavior and wellbeing.

The theoretical significance of quantitative findings. Although the body of literature on financial wellbeing has developed, only a few studies have shed light on the subjective financial wellbeing using the comparative analysis of both explicit and implicit parental financial socialization, particularly in the setting of Gen-Z in Asia-Pacific developing countries like Pakistan. This study augments the existing literature by determining the key antecedents of subjective financial wellbeing (SFW) among Gen-Z, considering the fathers' and mothers' occupations and education levels as parental socioeconomic characteristics and purposive financial socialization. One of the major findings of the study revealed that father's education level negatively influenced the Gen-Z' financial attitude. These findings are aligned with the previous studies of (Andrea, 2023; Salikin et al., 2012), and supported by the Theory of Reactance by Jack Brehm, (1966), which documented that Gen-Zs with highly educated fathers may rebel against perceived financial attitude and behavior. Further findings revealed that parents' socioeconomic characteristics and parental financial socialization have an insignificant impact on Gen-Z's financial behavior and wellbeing because of their unique characteristics to elders.

Gen-Z was born with the onset of widespread, ubiquitous internet access through a variety of portable devices (Daoud et al., 2020; López-Castro and Priegue, 2019). Hence, they are known as digital natives, profoundly molded by the progression of technology (Gabrielova and Buchko, 2021; Shorey et al., 2021; Seemiller and Grace, 2017). However, technological evolution is a double-edged sword. Besides the fact that the use of the internet is no longer a luxury, its excess leads to internet addiction. The literature indicates an increasing internet addiction among the growing number of Gen-Z which affects mental health and quality of life (Mahabal, 2023). Gen-Z today is majorly using the internet as a tool to build their virtual identity and withhold the personalities they are not confident about. As a result, they consider their online persona more important than the real one (Back et al., 2010; Stahl and Literat, 2023). Hence, it is evident that Gen-Z favors the virtual world, and finds it a safe place to experiment with their identities (Djafarova and Foots, 2022; Hernandez-Pozas and Carreon-Flores, 2019). Furthermore, Gen-Z experiences continuous exposure to well-crafted portrayals of lifestyle, affluence, and material things. Social media platforms amplify the influence of peer pressure on Gen-Z as they are consistently inundated with images and messages that endorse materialism and material affluence. Both influencers and celebrities frequently promote products and experiences that encourage a culture of excessive spending and luxury, intensifying the influence of peer pressure to conform to trends and acquire costly things. Engaging in online consumerism, digital subscriptions, and virtual transactions makes it a cumbersome task for parents to draw a fine line between giving them financial independence and ensuring their financially responsible behavior. This constant connectivity to the virtual world and extensive and permeating internet access is creating unique challenges to parenting and financial socializing of Gen-Z (Oerther and Oerther, 2021).

Managerial implication. The study recommended that educational institutes must emphasize designing a curriculum that incorporates the concepts of personal financial management, budgeting, investing, and debt management. In addition to this, they also need to collaborate with parents through workshops, seminars, and informational sessions to create a holistic approach to parental financial socialization of Gen-Z. Likewise, policy-makers can create programs and interventions for parents that foster parental financial socialization of Gen-Z. It will help them in shaping Gen-Z's financial behavior and induce self-financial confidence for their better future. Moreover, the improved saving and investing behavior of Gen-Z has a momentous impact on the economy as a whole, as they will foster a technology-driven, sustainable, and more socially responsible financial environment.

Limitations and suggestions for future research. The study purposively selected 333 individuals from the pool of conveniently available Gen-Z population to address the research objective of the study. Future researchers can include three generations of participants, as suggested by LeBaron et al. (2020). Furthermore, the results of this study supported behavioral changes in Gen-Z through parental financial socialization process. However, future researchers may examine Gen-Z's financial behavioral changes through the internet and social media. Moreover, this study provides a base for future qualitative research which may include other generations in the sample for more insights into parental financial socialization in developing countries.

Conclusion

This study is possibly the first mixed-method attempt to explore the significant role of explicit and implicit parental financial socialization in shaping Gen-Zs' financial attitudes, behavior, and wellbeing in developing countries like Pakistan. The findings of the study augmented the concept of family financial socialization theory by exploring that explicit parental financial socialization has a significant influence on Gen-Z's financial attitude. However, financial behavior and well-being of Gen-Zs might not be directly influenced by parental financial socialization due to various other factors such as peer interaction, media exposure, and internet influence. Furthermore, parents' education and occupation are the indicators of socioeconomic status, they may not fully cover the nuances of parents' financial socialization.

Data availability

All data generated or analyzed during this study are included in this published article (and its supplementary information files).

Received: 24 March 2023; Accepted: 2 April 2024;

Published online: 18 April 2024

References

Agnew S (2018) Empirical measurement of the financial socialization of children by parents. Young Consum 19(4):421–431

Agnew S, Maras P, Moon A (2018) Gender differences in financial socialization in the home—An exploratory study. Int J Consum Stud 42(3):275–282

Andrea L (2023) Does the educational level of parents influence their (adult) offspring's financial behavior? Rev Eur Stud 15:27

Back MD, Stopfer JM, Vazire S, Gaddis S, Schmukle SC, Egloff B, Gosling SD (2010) Facebook profiles reflect actual personality, not self-idealization. Psychol Sci 21(3):372–374

Best R (2022) Refining policies for financial stress. Australian J of Public Adm 81(1):1-18

Boateng GO, Kuuire VZ, Ung M, Amoyaw JA, Armah FA, Luginaah I (2014) Women's empowerment in the context of millennium development goal 3: a case study of married women in Ghana. Soc Indic Res 115:137–158

- Bosch LA, Serido J, Card NA, Shim S, Barber B (2016) Predictors of financial identity development in emerging adulthood. Emerg Adulthood 4(6):417–426
- Bradley RH, Corwyn RF (2002) Socioeconomic status and child development. Annu Rev Psychol 53(1):371–399
- Brehm JW (1966) A theory of psychological reactance
- Bronstein LR, Kovacs PJ (2013) Writing a mixed methods report in social work research. Res Soc Work Pract 23(3):354–360
- Brzozowski M, Spotton Visano B (2020) Having money's not everything, not having 'it is: the importance of financial satisfaction for life satisfaction in financially stressed households. J Happiness Stud 21(2):573–591
- Bucciol A, Veronesi M (2014) Teaching children to save and lifetime savings: what is the best strategy. J Econ Psychol 45:1–17
- Chevalier A, Harmon C, O'Sullivan V, Walker I (2013) The impact of parental income and education on the schooling of their children. IZA J Labor Econ 2(1):1–22
- Choi SL, Heo W, Cho SH, Lee P (2020) The links between job insecurity, financial well-being, and financial stress: a moderated mediation model. Int J Consum Stud 44(4):353–360
- Consumer Financial Protection Bureau (CFPB) (2015) Financial wellbeing: The goal of financial education: https://files.consumerfinance.gov/f/201501_cfpb_report_financial-well-being.pdf
- Cupák A, Fessler P, Hsu JW, Paradowski PR (2022) Investor confidence and high financial literacy jointly shape investments in risky assets. Econ Model. 116:106033
- Damian LE, Negru-Subtirica O, Domocus IM, Friedlmeier M (2020) Healthy financial behaviors and financial satisfaction in emerging adulthood: A parental socialization perspective. Emerg Adulthood 8(6):548–554
- Daoud R, Starkey L, Eppel E, Vo TD, & Sylvester A (2020) The educational value of internet use in the home for school children: a systematic review of literature, J Res Technol Educ. Advance online publication. https://doi.org/10.1080/ 15391523.2020.1783402
- Deenanath V, Danes SM, Jang J (2019) Purposive and unintentional family financial socialization, subjective financial knowledge, and financial behavior of high school students. J Financial Counseling Plan 30(1):83–96
- Diener E (2000) Subjective wellbeing: the science of happiness and a proposal for a national index. Am Psychol 55(1):34
- Djafarova E, Foots S (2022) Exploring ethical consumption of generation Z: theory of planned behaviour. Young Consum 23(3):413–431
- Eckes T, Trautner HM (eds) (2000) The Developmental Social Psychology of Gender, 1st ed, Psychology Press. https://doi.org/10.4324/9781410605245
- Eccles JS, Jacobs JE, Harold RD (1990) Gender role stereotypes, expectancy effects, and parents' socialization of gender differences. J Soc Issues 46(2):183–201
- Elliott W, Lewis M (2016) Student debt effects on financial well-being: Research and policy implications, A Collection of Reviews on Savings and Wealth Accumulation, pp. 33–57
- Erola J, Jalonen S, Lehti H (2016) Parental education, class, and income over the early life course and children's achievement. Res Soc Stratification Mobil 44:33–43
- Fabrigar LR, Wegener DT, MacCallum RC, Strahan EJ (1999) Evaluating the use of exploratory factor analysis in psychological research. Psychol Methods 4(3):272–299
- Fan L, Chatterjee S (2019) Financial socialization, financial education, and student loan debt. I Fam Econ Issues 40(1):74–85
- Fan L, Henager R (2022) A structural determinants framework for financial wellbeing. J Fam Econ Issues 43(2):415–428
- Fan L, Park N (2021) Factors mediating the association between financial socialization and wellbeing of young adults: Testing a conceptual framework. J Financ Couns Plan 32(2): https://doi.org/10.1891/JFCP-20-00056
- Fan L, Lim H, Lee JM (2022) Young adults' financial advice-seeking behavior: the roles of parental financial socialization. Fam Relat 71(3):1226–1246
- Friedline T, Chen Z, Morrow SP (2021) Families' financial stress & wellbeing: the importance of the economy and economic environments. J Fam Econ Issues 42(1):34–51
- Furnham A, Milner R (2017) Parent's beliefs and behaviors about the economic socialization, through allowances/pocket money, of their children. Psychology 8(8):12–16
- Gabrielova K, Buchko AA (2021) Here comes Generation Z: Millennials as managers. Bus Horiz 64(4):489–499
- Gardarsdottir RB, Dittmar H, Aspinall C (2009) It's not the money, it's the quest for a happier self: the role of happiness and success motives in the link between financial goals and subjective wellbeing. J Soc Clin Psychol 28(9):1100–1127
- Glick P, Sahn DE (2000) Schooling of girls and boys in a West African country: the effects of parental education, income, and household structure. Econ Educ Rev 19(1):63–87
- Gudmunson CG, Danes SM (2011) Family financial socialization: theory and critical review. J Fam Econ Issues 32(4):644–667
- Gutter M, Copur Z (2011) Financial behaviors and financial wellbeing of college students: evidence from a national survey. J Fam Econ Issues 32:699–714
- Halko ML, Kaustia M, Alanko E (2012) The gender effect in risky asset holdings. J Econ Behav Organ 83(1):66–81

- Haq M (2015) A comparative analysis of qualitative and quantitative research methods and a justification for adopting mixed methods in social research. https://doi.org/10.13140/RG.2.1.1945.8640
- Hernandez-Pozas O, Carreon-Flores H (2019) Teaching international business using virtual reality. J Teach Int Bus 30(2):196–212
- Hilgert MA, Hogarth JM, Beverly SG (2003) Household financial management: the connection between knowledge and behaviour. Federal Res Bull 89:309–322
- Hira TK, Sabri MF, Loibl C (2013) Financial socialization's impact on investment orientation and household net worth. Int J Consum Stud 37:29–35
- Ilyas M, Djawahir AH (2021) The effect of financial knowledge and financial wellbeing on investment intention mediated by financial attitude: a study on millennial generation and Gen Z in Malang City. Int J Res Bus Soc Sci 10(8):175–188
- Iramani R, Lutfi L (2021) An integrated model of financial wellbeing: the role of financial behavior. Accounting 7(3):691–700
- Jabeen S, Haq S, Jameel A, Hussain A, Asif M, Hwang J, Jabeen A (2020) Impacts of rural women's traditional economic activities on household economy: changing economic contributions through empowered women in rural Pakistan. Sustainability 12:7
- Jorgensen BL, Savla J (2010) Financial literacy of young adults: the importance of parental socialization. Fam Relat 59(4):465–478
- Jorgensen BL, Rappleyea DL, Schweichler JT, Fang X, Moran ME (2017) The financial behavior of emerging adults: a family financial socialization approach. J Fam Econ Issues 38:57–69
- Kagotho N, Nabunya P, Ssewamala F, Mwangi EN, Njenga G (2017) The role of family financial socialization and financial management skills on youth saving behavior. J Adolesc 59(1):134–138
- Kasser T, Ryan RM (1996) Further examining the American dream: differential correlates of intrinsic and extrinsic goals. Personal Soc Psychol Bull 22(3):280–287
- Kaur G, Singh M, Gupta S (2023) Analysis of key factors influencing individual financial wellbeing using ISM and MICMAC approach. Qual Quant 57(2):1533–1559
- Khawar S, Sarwar A (2021) Financial literacy and financial behavior with the mediating effect of family financial socialization in the financial institutions of Lahore, Pakistan. Future Bus J 7(1):1–11
- Kiso H, Hershey DA (2017) Working adults' metacognitions regarding financial planning for retirement. Work Aging Retire 3(1):77-88
- Kim CH, Sakamoto A (2008) The rise of intra-occupational wage inequality in the United States, 1983 to 2002. Am Sociol Rev 73(1):129–157
- Koposko JL (2014) Parental and early influences on expectations of financial planning for retirement. J Personal Financ 13:2
- Lanz M, Sorgente A, Danes SM (2020) Implicit family financial socialization and emerging adults' financial wellbeing: a multi-informant approach. Emerg Adulthood 8(6):443–452
- LeBaron AB, Kelley HH (2021) Financial socialization: a decade in review. J Fam Econ Issues 42(1):195–206
- LeBaron AB, Marks LD, Rosa CM, Hill EJ (2020) Can we talk about money? Financial socialization through parent-child financial discussion. Emerg Adulthood 8(6):453-463
- LeBaron-Black AB, Curran MA, Hill EJ, Toomey RB, Speirs KE, Freeh ME (2022) Talk is cheap: parent financial socialization and emerging adult financial well-being. Fam Relat 72(3):1201–1219
- Lee IC, Hu F, Li WQ (2020) Cultural factors facilitating or inhibiting the support for traditional household gender roles. J Cross-Cultural Psychol 51(5):333–352
- Lee JM, Lee J, Kim KT (2020) Consumer financial wellbeing: knowledge is not enough. J Fam Econ Issues 41(2):218–228
- Lep Ž, Zupančič M, Poredoš M (2022) Saving of freshmen and their parents in Slovenia: saving motives and links to parental financial socialization. J Fam Econ Issues 43(4):756–773
- Levanon A, Lavee E, Strier R (2021) Explaining the factors shaping the likelihood of poverty among working families by using a concurrent mixed method design. Soc Indic Res 157(3):1089–1109
- Liu X, Dong M, Li Y, Gao S, Ye M (2022) Analysis and research on influencing factors of college emerging adults' satisfaction with physical education. J Environ Public Health 2022. https://doi.org/10.1155/2022/7506157
- Loayza N, Pennings SM (2020) Macroeconomic policy in the time of COVID-19: a primer for developing countries, World Bank Research and Policy Briefs 147291. https://ssrn.com/abstract=3586636
- López-Castro L, Priegue D (2019) Influence of family variables on cyberbullying perpetration and victimization: a systematic literature review. Soc Sci 8(3):98
- Madinga NW, Maziriri ET, Chuchu T, Magoda Z (2022) An investigation of the impact of financial literacy and financial socialization on financial satisfaction: Mediating role of financial risk attitude. Glob J Emerg Mark Econ 14(1):60–75
- Mahabal, KD (2023) Internet addiction Self-esteem Body self-relations Narcissistic and Histrionic traits among Gen Z adolescents across Gender and Educational streams
- Mahapatra MS, Xiao JJ, Mishra RK, Meng K (2023) Parental financial socialization and life satisfaction of college students: mediation and moderation analyses. Young Consumers

- Mahdzan NS, Zainudin R, Sukor MEA, Zainir F, Wan Ahmad WM (2019) Determinants of subjective financial wellbeing across three different house-hold income groups in Malaysia. Soc Indic Res 146(3):699–726
- Marshall MN (1996) Sampling for qualitative research. Fam. Pract 13(6):522–526 Ndou A (2023) Parental financial socialization and socioeconomic status. Financial
- Nga JKH, Yeoh KK (2021) Factors influencing financial planning for marriage amongst young Malaysian couples. Int J Bus Soc 22(1):33–54
- Oerther S, Oerther DB (2021) Review of recent research about parenting generation Z Pre-Teen Children. West J Nurs Res 43(11):1073–1086
- Pak TY, Fan L, Chatterjee S (2023) Financial socialization and financial wellbeing in early adulthood: the mediating role of financial capability. Family Relations
- Pandey A, Ashta A, Spiegelman E, Sutan A (2020) Catch them young: impact of financial socialization, financial literacy and attitude towards money on the financial well-being of young adults. Int J Consum Stud 44(6):531–541
- Philippas ND, Avdoulas C (2020) Financial literacy and financial wellbeing among generation-Z university students: evidence from Greece. Eur J Financ 26(5):360–381
- Philippas ND, Avdoulas C (2021) Financial literacy and financial wellbeing among generation-Z university students: evidence from Greece. In Financial Literacy and Responsible Finance in the FinTech Era (64-85). Routledge
- Prawitz AD, Garman ET, Sorhaindo B, O'Neill B, Kim J, Drentea P (2006) In-Charge financial distress/financial well-being scale: Development, administration, and score interpretation. J of Financ Couns and Plan 17:34–50
- Rabbani AG, Heo W, Lee JM (2022) A latent profile analysis of college students' financial knowledge: the role of financial education, financial wellbeing, and financial risk tolerance. J Educ Bus 97(2):112–118
- Ranta M, Silinskas G, Wilska TA (2020) Young adults' personal concerns during the COVID-19 pandemic in Finland: an issue for social concern. Int J Sociol Soc Policy 40(9):1201–1219
- Renaldo N, Sudarno S, Marice HB (2020) The improvement of Gen Z financial wellbeing in Pekanbaru. J Manaj Dan Kewirausahaan 22(2):142–151
- Reshi IA, Sudha T (2023) Economic empowerment of women: a review of current. Int J Educ Rev Law Soc Sci 3(2):601–605
- Riitsalu L, Murakas R (2019) Subjective financial knowledge, prudent behavior, and income: The predictors of financial wellbeing in Estonia. Int J Bank Mark 37(4):934–950
- Riyazahmed DK (2021) Does Financial Behavior Influence Financial Well-being? J Asian Finance Econ Bus (JAFEB) 8(2):273–280
- Salikin N, Wahab NA, Zakaria N, Masruki R, Nordin SN (2012) Students' saving attitude: does parents' background matter. Int J Trade Econ Finance 3(6):479–484
- Saurabh K, Nandan T (2019) Role of financial knowledge, financial socialisation and financial risk attitude in financial satisfaction of Indian individuals. Int J Indian Cult Bus Manag 18(1):104–122
- Seemiller C, Grace M (2017) Generation Z: Educating and engaging the next generation of students. Campus 22(3):21-26
- Setiyani R, Solichatun I (2019) Financial well-being of college students: An empirical study on mediation effect of financial behavior. KnE Soc Sci 3(11):451–474
- She L, Rasiah R, Turner JJ, Guptan V, Nia HS (2021) Psychological beliefs and financial wellbeing among working adults: the mediating role of financial behaviour. Int J Soc Econ 49(2):190–209
- Sheng SY, Feng W, Spohn D (2022) Family matters: examine the role of family financial socialization to improve consumer financial wellbeing. J Appl Bus Econ 24:3
- Shim S, Barber BL, Card NA, Xiao JJ, Serido J (2010) Financial socialization of firstyear college students: the roles of parents, work, and education. J Youth Adolesc 39:1457–1470
- Shim S, Xiao JJ, Barber BL, Lyons AC (2009) Pathways to life success: a conceptual model of financial wellbeing for young adults. J Appl Dev Psychol 30(6):708–723
- Shorey S, Chan V, Rajendran P, Ang E (2021) Learning styles, preferences and needs of generation Z healthcare students: Scoping review. Nurse Educ Pract 57:103247
- Solbes-Canales I, Valverde-Montesino S, Herranz-Hernández P (2020) Socialization of gender stereotypes related to attributes and professions among young Spanish school-aged children. Front Psychol 11:609
- Sorgente A, Lanz M (2017) Emerging adults financial well-being: A scoping review.

 Adolesc Res Rev 2(4):255–292
- Sorgente A, Lanz M (2019) The multidimensional subjective financial well-being scale for emerging adults: Development and validation studies. Int J Behav Dev 43(5):466-478
- Stahl CC, Literat I (2023) GenZ on TikTok: the collective online self-portrait of the social media generation. J Youth Stud 26(7):925–946

- Teddlie C, Tashakkori A (2012) Common core characteristics of mixed methods research. a review of critical issues and call for greater convergence. Am Behav Sci 56(6):774–788
- Terriquez V, Gurantz O (2015) Financial challenges in emerging adulthood and students' decisions to stop out of college. Emerg Adulthood 3(3):204–214
- Topa G, Hernández-Solís M, Zappalà S (2018) Financial Management behavior among young adults: the role of need for cognitive closure in a three-wave moderated mediation model. Front Psychol 2(1):9
- Wagner J, Walstad WB (2019) The effects of financial education on short-term and long-term financial behaviors. J Consum Aff 4(2):173–186
- Wang S, Chen Y, Lv X, Xu J (2023) Hot topics and frontier evolution of science education research: a bibliometric mapping from 2001 to 2020. Sci Educ 32(3):845–869
- Webley P, Nyhus EK (2006) Parents' influence on children's future orientation and saving. J Econ Psychol 27(1):140–164
- Webley P, Nyhus EK (2013) Economic socialization, saving and assets in European young adults. Econ Educ Rev 33:19–30
- Wee LLM, Goy SC (2022) The effects of ethnicity, gender and parental financial socialization on financial knowledge among Gen Z: the case of Sarawak, Malaysia. Int J Soc Econ 49(9):1349–1367
- Xiao JJ (2008) Applying behavior theories to financial behavior. In: Xiao JJ Ed Handbook of consumer finance research. Springer, New York
- Xiao JJ, Chen C, Chen F (2014) Consumer financial capability and financial satisfaction. Soc Indic Res 118(1):415–432
- Xiao JJ, Tang C, Shim S (2009) Acting for happiness: Financial behavior and life satisfaction of college emerging adults. Soc Indic Res 92(1):53–68
- Xiao JJ, Porto N (2017) Financial education and financial satisfaction: financial literacy, behavior, and capability as mediators. Int J Bank Mark 35(5):805–817
- Xiao JJ, Sorhaindo B, Garman ET (2006) Financial behavior of consumers in credit counseling. Int J Consum Stud 30(2):108–121
- Xiao JJ, O'Neill B (2018) Propensity to plan, financial capability, and financial satisfaction. J Consum Stud 42(5):501–512
- Yin RK (2015) Qualitative research from start to finish Guilford publications
 Yusof SA (2015) Household decision-making in Malaysia: the ethnic dimension.
 Soc Indic Res 124:283–293
- Zhao H, Zhang L (2020) Talking money at home: the value of family financial socialization. Int J Bank Mark 38(7):1617–1634
- Zhao H, Zhang L, Anong S (2023) Financial socialization and financial distress: the role of cognitive and noncognitive abilities. J Consum Affairs 57(3):1236–1257
- Zimmerman S (1995) Understanding family policy: Theories and applications Sage

Author contributions

MA supervised and conceived the idea, and helped in revision work; KAG contributed to the conception, design, analysis, and drafting of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

Approval to conduct the study was given by the ethical committee, research center of the lead author's institution, Shaheed Zulfikar Ali Bhutto Institute of Science and Technology University, Islamabad, Pakistan.

Informed consent

Informed consent was obtained from all participants. To reduce any potential concerns, participants were given written informed consent forms that explained the aim of the study and its significance. Additionally, the consent form also stated that the interviewees' information would remain confidential and used solely for the study. All participants were asked whether they consented voluntarily to be a participant in this study. They were told they could refuse to answer any question and could withdraw from the study at any time, without needing to justify their decision and without prejudice. From the received document analysis, it was impossible to determine how each individual participated as the commenters' names and information are completely anonymous.

Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1057/s41599-024-03007-3.

Correspondence and requests for materials should be addressed to Muhammad Akhtar.

Reprints and permission information is available at http://www.nature.com/reprints

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit https://creativecommons.org/licenses/by/4.0/.

© The Author(s) 2024