

Title: Design and Evaluation among Young Adults of a Financial Literacy Scale Focused on Key Financial Decisions

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Declarations of interest: none.

No potential competing interest was reported by the authors.

Supplementary Files

Table S1. Financial Literacy (FL) Definitions and Dimensions Compared (2010-2021).

#	Definitions per Author	Author Reference	Embedded Dimensions			
			FK	FB	FA	#
1	Financial literacy has been identified as the solution for achieving better financial decisions.	(Paraboni and da Costa 2021)	X	X	X	3
2	“Financial literacy is composed of Accounting Information; Market Information; Broad Overview; and Technical Knowledge.”	(Prasad, Kiran, and Sharma 2021)	X			1
3	Awareness of saving and borrowing instruments, such as bank accounts and credit cards, are also an integral part of financial literacy.	(Rink, Walle, and Klasen 2021)	X			1
4	“Financial literacy is the ability to understand and analyze financial options, plan for the future, and respond appropriately to events. This ability can influence the conditions of life and work and can be very helpful in anticipating the future to increase income.”	(Philippas and Avdoulas 2020)	X		X	2
5	Financial literacy equips individuals with the knowledge and skill they need to attain financial stability through self-sufficiency.	(Ogbolu and Sukidjo 2020)	X			1
6	Financial literacy is defined as the possession of knowledge and skills that enable informed and effective money management.	(Dat 2020)	X	X		2
7	“Define financial literacy as one’s capacity to make effective financial decisions, where “capacity” refers specifically to knowledge, skill, and self-efficacy.”	(Warmath and Zimmerman 2019)	X	X	X	3
8	“Definition of financial literacy: understanding compound interest. I provide financial education on a specific aspect of financial literacy and link understanding of compound interest with actual pension savings. In a recent field experiment”.	(Song 2019)	X			1
9	“About to be well equipped to make decisions related to financial management. People need to be financially literate to make informed financial choices regarding saving, investing, borrowing, and more.”	(Klapper and Lusardi 2019)	X			1
10	“Financial literacy concerns an individual’s ability to understand how money works in the world; this includes how money is earned, how it should be managed, how it can be invested as well as how it can be used to help others.”	(Hayei and Khalid 2019)	X	X		2
11	“The interrelationships between the three dimensions of financial literacy as well as on how money attitudes and time preferences affect financial literacy among the young.”	(Aydin and Akben Selcuk 2019)	X	X	X	3

12	"A measure of the degree to which one understands key financial concepts and the ability to manage personal finances."	(Penner and Spizman 2019)	X			1
13	"Financial knowledge is termed as a key dimension of financial literacy and most of the time it is considered as a synonym of financial literacy."	(Sarath Chandran M.C.1 2018)	X	X	X	3
14	"Financial literacy is an essential life skill that has important impact on individual, family well-being and on the broader economy."	(Oseifuah, Gyekye, and Formadi 2018)	X	X	X	3
15	"Cognitive categories structure behaviors and actions of poor households, which determines their financial decisions and choices."	(Bongomin et al. 2018)	X	X		2
16	"A driving force behind becoming financially literate resides in the ability to understand numbers and having an emotional attitude towards numbers that does not interfere with an individual's daily engagement in activities involving mathematics and financial decisions."	(Skagerlund et al. 2018)	X	X	X	3
17	"There is a relationship between financial literacy and individual behaviors."	(Xue et al. 2018)	X	X		2
18	"Combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing. OECD International Network on Financial Education."	(OECD 2017)	X	X	X	3
19	FL can also be considered as a personal characteristic; social cognition; psychopathology; and specific motivation, suggested by the I-PACE (Interaction of Person-Affect-Cognition-Executive) model.	(Lam and Lam 2017)	X	X	X	3
20	"Financial literacy is a multidimensional concept for which a single construct would be insufficient to cover all dimensions involved. Therefore, there is a need to develop and validate models that examine different measurements and their interrelationships simultaneously."	(Potrich, Vieira, and Kirch 2017)	X	X	X	3
21	"Financial literacy, precautionary savings and retirement planning are positively correlated, but this is mostly driven by perceived, not actual, literacy: controlling for self-perceptions, actual literacy has low predictive power. Perceptions drive decision-making among low-literacy respondents and are associated with mistaken beliefs about financial products and less willing to accept financial advice."	(A. Anderson, Baker, and Robinson 2017)	X	X	X	3
22	"Ability to comprehend financial information, optimize financial decisions and effectively manage financial resources."	(Huhmann 2017)	X	X		2
23	"The early definition of financial literacy basically meant "financial knowledge," but the latest definition has been extended to include or refer to consumers' financial behaviors, consumers' interactions with their social and economic environments, and the effect of cognitive biases on consumers' financial behaviors."	(Kamiya 2017)	X	X		2
24	"Financial literacy for it equips the individuals to take quality financial decisions to enhance their financial wellbeing."	(Garg and Singh 2016)	X	X		2
25	"University student' s financial literacy is preceded by financial behavior, financial knowledge, and financial attitude, with a higher impact from attitude."	(Potrich, Vieira, and Mendes-Da-Silva 2016)	X	X	X	3
26	"Financial self-efficacy has a role in explaining a woman's personal finance behavior that is above-and-beyond that of financial literacy bears important implications for policy efforts targeted at improving financial literacy, such as financial education programs."	(Farrell, Fry, and Risse 2016)	X		X	2
27	"It is defined as part of a "political arsenal" aimed at facilitating better outcomes for consumers."	(Gerrans and Heaney 2016)	X	X		2
28	"It is a critical competence in the twenty-first century for individuals and follows OECD guidance on the dimensions that measure it."	(Messy and Monticone 2016)	X	X	X	3
29	"Financial literacy measured as a combination of financial behavior, attitudes, and knowledge."	(Potrich, Vieira, and Kirch 2015)	X	X	X	3
30	"Ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions."	(Lusardi, Klapper, and Van	X	X		2

31	"Financial literacy is knowledge and understanding of financial concepts, and the skills, motivation, and confidence to apply such knowledge and understanding to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life."	Oudheusden 2015b) (OECD 2015)	X	X		2
32	"The construction of a foundation of financial knowledge sufficient to evaluate the information and immediate situational choices."	(Faulkner 2015)	X	X		2
33	"It is seen as fundamental to financial decision-making and to financial independence, as measured by interest knowledge issues and debt repayment."	(Disney, Gathergood, and Weber 2015)	X	X		2
34	"Ability of individuals to obtain, understand and evaluate information required to make decisions to secure their financial future as best as possible."	(Agarwalla et al. 2015)	X	X		2
35	"Financial literacy comprises basic knowledge of key financial concepts, skills like the ability to calculate interest rates and prepare a family budget, attitude towards money, spending and saving, and behavior to secure the financial future."	(Jang, Hahn, and Park 2014)	X	X	X	3
36	"Financial literacy cannot merely be viewed as the ability to read and write in the language of finance and accounting. Instead, financial literacy is a concept that needs to be situated and studied in practice because the characteristics that constitute financial literacy, or those that apply to it, vary with time and place."	(Bay, Catasús, and Johed 2014)	X	X	X	3
37	"Ability to use knowledge and skills to administer financial resources securely and effectively throughout one's lifetime."	(Hastings, Madrian, and Skimmyhorn 2013)	X	X		2
38	"A combination of knowledge, skills, attitudes and conduct that is necessary to make solid financial decisions with the ultimate purpose of achieving individual economic welfare."	(Atkinson and Messy 2012)	X	X	X	3
39	"The confident and accurate ability to make financial decisions sufficient to achieve "a lifetime of financial wellbeing."	(Livengood and Venditti 2012)	X	X	X	3
40	"A combination of the understanding (knowledge), skills, attitude, and ability to make sound judgment and decision (behavior) on personal financial matters resulting in individual financial well-being."	(Governors 2012)	X	X	X	3
41	"Financial literacy, understood as a knowledge-based resource involving "familiarity with financial concepts and products", is determined and supported by the individual's level of numeracy, referring to a skill-based cognitive ability "to process numerical information and perform simple calculations."	(Almenberg and Widmark 2011)	X			1
42	"The ability to make informed judgments and to take effective actions regarding current and future use and management of money."	(Dodaro 2011)	X	X		2
43	"Empirical studies provided supportive evidence for a direct relationship between FL and general consumer behavior, as such financial literate individuals were more likely to take control of their financial situation reflecting from their buying behavior and expenditures"	(Capuano and Ramsay 2011)	X	X		2
44	"Financial literacy is defined and classified into five categories: (1) Knowledge of financial concepts, (2) Ability to communicate about financial concepts, (3) Aptitude in managing personal finances, (4) Skill in making appropriate financial decisions, (5) Confidence in planning effectively for future financial needs."	(Remund 2010)	X	X	X	3
45	"Measuring how well an individual can understand and use personal finance related information." (p. 306)	(Adele Atkinson et al. 2010)	X	X		2
Number of concepts per dimension			45	36	19	98

Forty-five listed study has FK as an effective dimension to evaluate FL. 84% of the studies declare FB and 44% FA as part of their FL definitions. 19/45 (42%) listed studies have FA, FB, FK as embedded dimensions.

The analyzed studies are from 2010-2021 years, with at least two samples per year, four on average.

4/45 studies are literature review (Ogbolu and Sukidjo 2020) (Faulkner 2015) (Huhmann 2017) (Kamiya 2017). Forty-one studies develop a kind of evaluation proposing a new scale or replying to one almost all.

Table S2. The FL scale and item characteristics: Factor loading, items source with KFD connections. (n:478)

Code	Items	Factor Loading	Item source		KFD related
			Author	Action	
<i>Financial Attitude (1 Strongly disagree- 5 Completely agree). α 0,852**</i>					
FA-1	It is important for a family to develop a regular pattern of saving and stick to it.	0,62	1	C	RA
FA-2	Families should write financial goals that help determine priorities in spending.	0,61	1	C	C,H,RA
FA-3	A written budget is essential for successful financial management.	0,53	1	C	C,H,RA
FA-4	It is essential to plan for the possible disability of a family wage earner.	0,43	1	C	C,H,RA
FA-5	Planning for spending money is essential to manage one's life successfully.	0,53	1	C	C,H,RA
FA-6	Planning for the future is the best way of getting ahead.	0,51	1	C	C,H,RA
FA-7	Thinking about where you will be financially in 5 or 10 years is essential to financial success.	0,42	1	C	C,H,RA
FA-8	Families should concentrate on the present when managing their finances.	X	1	C	C,H,RA
FA-9	Financial planning for retirement is not necessary for assuring ones' security in old age. *	0,43	1	C	RA
FA-10	Having a financial plan makes it difficult to make financial investment decisions. *	0,48	1	C	C,H,RA
FA-11	Having a savings plan is not necessary in today's world to meet one's financial needs. *	0,63	1	C	C,H,RA
FA-12	Planning is an unnecessary distraction when families are just trying to get by today. *	0,61	1	C	C,H,RA
FA-13	Keeping records of financial matters is too time- consuming to worry about. *	0,57	1	C	C,H,RA
FA-14	Saving is not really important. *	0,67	1	C	RA
FA-15	As long as one meets monthly payments there is no need to worry about the length of time it will take to pay off outstanding debts. *	0,61	1	C	C,H,RA
FA-16	Financial plans are set up once and you use that same plan throughout your life. *	0,54	2	A	C,H,RA
FA-17	Financial plans should take into account possible changes in your life.	0,33	2	A	C,H,RA
FA-18	Financial planning is about investment only. *	0,42	2	A	C,H,RA
<i>Financial Behavior (1 Never- 5 Always). α 0,857</i>					
FB-1	I take notes and control my expenses (e.g., expense and revenue spreadsheet).	0,52	1	C	C,H,RA
FB-2	I compare prices when buying something.	0,51	1	C	C,H,RA
FB-3	I save some of the money I get each month for a future need.	0,74	1	C	RA
FB-4	I have a plan for expenses/budget.	0,61	1	C	C,H,RA
FB-5	I am very competent in managing my finance.	0,65	3	A	C,H,RA
FB-6	I pay my bills without delay.	0,57	1	C	C,H,RA
FB-7	I save monthly.	0,75	1	C	RA
FB-8	I analyze my financial situation before a major purchase.	0,64	1	C	C,H,RA
FB-9	I always pay my debts on time to avoid extra charges.	0,56	1	A	C,H,RA
FB-10	I save regularly to achieve financial targets in the long-term.	0,75	1	C	C,H,RA
FB-11	I save more when I get a pay rise.	0,40	1	C	C,H,RA
FB-12	I have a financial reserve at least three times my monthly earnings, which can be used in unexpected circumstances.	0,27	1	C	RA
FB-13	In the last 12 months, I have been able to save money.	0,69	1	C	C,H,RA
<i>Financial Knowledge (correct answer). α 0,747</i>					

FK-1	Imagine you have USD 100 in a savings account and the interest rate is 10% per year. After five years, how much money will you have in this account? [<u>More than USD 150</u>]; [Equal to USD150]; [Less than USD 150]; [I don't know]	X	1	A	RA
FK-2	Imagine the tax rate applied to your savings account is 6% per year, and the inflation rate is 10% per year. After one year, how much will you be able to buy with the money from this account? [More than today]; [The same]; [<u>Less than today</u>]; [I don't know]	0,55	1	A	C,H,RA
FK-3	Imagine you take a loan of USD 10,000 to be paid after one year, and the total loan amount with interest is USD 10,600. The interest rate you will pay this loan is: [0,3%]; [<u>6,0%</u>]; [0,6%]; [I don't know]	0,60	1	A	C,H
FK-4	Imagine you saw the same television at two different stores at the initial price of USD 1,000. Store A offers a discount of USD 150, while the Store B offers a discount of 10%. What is the best alternative: [<u>Buy in Store A (Discount USD 150)</u>]; [Buy in Store B (Discount 10%)]; [I don't know]	0,79	1	A	C,H
FK-5	Suppose a friend inherits USD 10,000 today and his brother will inherit USD 10,000 within three years. Due to the inheritance, who is richer, four years after today? Considering that they do not invest it or generate extra profitability during these years: [My friend]; [His sibling]; [<u>They are equally rich</u>]; [I don't know]	X	4	A	C,H,RA
FK-6	Suppose you started working at the age of 25 and will retire at the age of 60. Considering you want to have the higher monthly payment in your pension plan. What age is better to start saving money in your retirement account to reach this aim? [<u>25-33</u>]; [34-42]; [43-51]; [52-60]; [I don't know]	0,53	3	A	RA
FK-7	Luisa and Rosa are friends of the same age. At age 30, Luisa began saving USD 200 per month while Rosa saved nothing. At age 45, Rosa realized that she needed money for retirement and started saving USD 400 per month while Luisa continued saving her USD 200. Now they are both 60 years old. Who has the most money in her retirement account considering the same interest rate along the time? [Rosa, because she saved more money each year]; [Total amount of Luisa is the same of Rosa]; [<u>Luisa, because her money has grown for a more extended period with a higher number of deposits.</u>]; [I don't know]	0,33	3	A	RA
FK-8	If you are trying to choose a loan to buy your new car USD 35,000 do you prefer to pay it in: [Small monthly payments for five years or more.]; [<u>Higher monthly payments to finish in less than three years.</u>]; [I don't know]	0,63	5	N	C
FK-9	When an investor diversifies, dividing his investment among different assets. The risk of losing money then: [Increases]; [Remains the same]; [<u>Decreases</u>]; [I don't know]	0,55	1	C	C,H,RA
FK-10	A loan lasting 15 years typically requires higher monthly payments than a 30-year credit, but the total interest paid in the shortest loan will be less. This affirmation is: [<u>True</u>]; [False]; [I don't know]	0,51	1	C	C,H
FK-11	Your net worth is the difference between your: [Income and expenditure]; [<u>Assets and liabilities</u>]; [Cash inflow and outflow]; [I don't know]	0,62	3	A	C,H,RA
FK-12	If you wanted to minimize the total amount of interest you pay on your home loan you could: [Pay half your monthly payment every fortnight]; [<u>Increase the amount of your regular payments.</u>]; [Put some of your payments on your credit card and pay the credit card off every six months]; [I don't know]	0,61	2	A	H
FK-13	In which of the following situations would it be better to have 2 years fixed interest rate home loan rather than a variable or floating rate home loan? [When your bank comes out with a better-fixed interest rate than the other banks]; [<u>When interest rates are expected to increase over the next two years</u>]; [When interest rates are expected to fall over the next	0,52	2	A	C,H,RA

two years]; [When the value of your house is going to increase over the next two years]; [I don't know]

α Cronbach's alpha (Cronbach 1951)

* Reverse coded

** FA. A: α 0,844 (direct) and FA. B: α 0,843 (reverse)

X: Deleted Items after Correlational analysis.

KFD Car (C), House (H), Retirement account (RA)

This scale based on five formal studies.

1. (Potrich, Vieira, and Kirch 2017), **33 or 75%**
2. (Colmar Brunton 2013), **5 or 11%**
3. (Kiliyanni and Sivaraman 2016), **4 or 9%**
4. (van Rooij, Lusardi, and Alessie 2011) **1 or 2%**
5. The authors, **1 or 2%**

Forty-four Items: 34% Adapted (A), 64% Copy (C)and, 2% New(N).

1

The 44 items proposed for the FL Scale and detailed in appendix 2 are listed as follows:

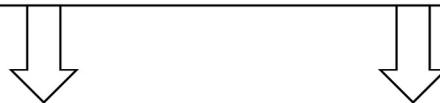
- Financial Attitude= FA-1, FA-2, FA-3, FA-4, FA-5, FA-6, FA-7, FA-8, FA-9, FA-10, FA-11, FA-12, FA-13, FA-14, FA-15, FA-16, FA-17, FA-18 (Likert scale)
- Financial Behavior= FB-1, FB-2, FB-3, FB-4, FB-5, FB-6, FB-7, FB-8, FB-9, FB-10, FB-11, FB-12, FB-13 (Likert scale)
- Financial Knowledge= FK-1, FK-2, FK-3, FK-4, FK-5, FK-6, FK-7, FK-8, FK-9, FK-10, FK-11, FK-12, FK-13 (Right or wrong)



2

The valuation of every dimension according these criterions:

Financial Attitude		Financial Behavior		Financial Knowledge	
Value	Code	Value	Code	Value	Code
1	Strongly disagree	1	Never	0	Wrong answer
2	Disagree	2	Almost never	1	Right answer
3	Indifferent	3	Sometimes	Apply from FK-1 to FK-13	
4	Agree	4	Almost always		
5	Completely agree	5	Always		
Direct: FA-1 to FA-8, FA-17.			Direct: FB-1 to FB-13		
Invert: FA-9 to FA-16, FA-18					
Empty for missing data				Zero for missing data	



3

The FL standardized process applied. (included FL dimensions).

- FL of robust CFA modelization.
 - $FA = \sim x * FA.A + y * FA.B$
 - $FA.A = \sim FA.1 + FA.2 + FA.3 + FA.4 + FA.5 + FA.6 + FA.7 + FA.17$
 - $FA.B = \sim FA.8 + FA.9 + FA.10 + FA.11 + FA.12 + FA.13 + FA.14 + FA.15 + FA.16 + FA.18$
 - $FB = \sim FB.1 + FB.2 + FB.3 + FB.4 + FB.5 + FB.6 + FB.7 + FB.8 + FB.9 + FB.10 + FB.11 + FB.12 + FB.13$
 - $FK = \sim FK.1 + FK.2 + FK.3 + FK.4 + FK.5 + FK.6 + FK.7 + FK.8 + FK.9 + FK.10 + FK.11 + FK.12 + FK.13$
 - $FL = \sim (a * FA) + (b * FB) + (c * FK)$

Where, $a > 0$; $b > 0$; $c > 0$; $x > 0$; $y > 0$, and $a + b + c = 1$

- FL.Z. The standardization process of FL (Milligan and Cooper 1988)

$(FL.Z < - (FL - Media.FL) / SD.FL)$.

Verification needed: $N(Media, SD)$ Test applied before, and $N(0, 1)$ Test after. (T. W. Anderson and Darling 1952)

- FL.SC. The empirical rule (Morris 1983) (Zimmerman and Zumbo 1993)

$FL.SC < - (FL.Z * New SD) + New Media$

New $(SD < -50/3, Media < -50)$

- FL.SC levels, rescaled into five levels:

Level	Score
Very High	80-100
High	60-80
Average	40-60
Low	20-40
Very Low	0-20

Figure S1. The FL scale process from CFA to the Standardization.