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The impact of attitudes on behavioural change: a multilevel analysis of predictors of changes in consumer behaviour

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KEYWORDS
Financial Education, attitudes toward purchasing, materialism, responsible behaviour, rationality, financial literacy

Abstract Introduction/objective: The paper sought to identify the predictor variables of changes in habits and behaviours of responsible consumption in students of Pedagogy of History and Geography in the city of Temuco, Chile. **Method:** The sample comprised of 110 students divided into an experimental ($n = 68$) and a control ($n = 42$) group. Pre-and post-intervention measurements were considered, within the framework of a pilot financial education programme for students of Pedagogy of History and Geography. Analyses included Multilevel Mixed Effects Analyses, which evaluated the predicting power of attitudes towards purchasing, materialism, self-discrepancy and levels of financial literacy regarding behavioural change in responsible consumption. **Results:** The results set forth rationality (a subscale of attitudes toward purchasing), and centrality (a subscale of materialism) as significant predictors of behavioural changes in purchasing. **Conclusions:** These results suggest guidelines for interventions to promote responsible consumption in university students.

El impacto de las actitudes en el cambio comportamental: un análisis multinivel de los predictores de los cambios en el comportamiento del consumidor

PALABRAS CLAVE
Educación financiera, actitudes hacia la compra, materialismo, conducta responsable, racionalidad; alfabetización financiera

Resumen Introducción/objetivo: Este artículo buscó identificar las variables predictoras de los cambios en hábitos y conductas de consumo responsable en estudiantes de Pedagogía en Historia y Geografía en la ciudad de Temuco, Chile. **Método:** La muestra se conformó por 110 estudiantes divididos en un grupo experimental ($n = 68$) y uno control ($n = 42$). Se consideraron mediciones pre y post intervención, en el marco de un programa piloto de educación financiera para estudiantes de Pedagogía en Historia y Geografía. Se incluyeron análisis de efectos mixtos multinivel, que evaluaron el poder de predicción de las actitudes hacia la compra, el materialismo, la discrepancia del yo, y los niveles de alfabetización financiera sobre el cambio en las conductas de consumo responsable. **Resultados:** Los resultados mostraron que

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racionalidad (una subescala de las actitudes hacia la compra) y centralidad (una subescala de materialismo) son los predictores significativos de los cambios comportamentales en la compra. **Conclusiones:** Estos resultados sugieren posibles pautas de intervención para promover el consumo responsable en estudiantes universitarios.

In recent decades Latin America has experienced a period of profound changes in the political and economic spheres, shifting towards a more complex socio-political and economic-cultural scenario, which in turn establishes adaptation as an important challenge to citizens (Baumann, 2007; Denegri et al., 2012). In this regard, it is worth remembering that Chile was one of the first countries to implement the recommendations of the Washington Consensus (Williamson, 1990), a set of recommendations conceived to help countries overcome the economic and financial crisis of the 1980s by reducing state regulations while strengthening the influence of markets. In practical terms, the implementations of the Washington Consensus meant the introduction of what we now know as the neoliberal model.

An important consequence of the introduction of the neoliberal model, according to Marambio Tapia (2018), is that lower-income individuals were granted access to financial tools such as credit cards, mortgages, and bank loans which they had been excluded from up until that point. Said access is defined by Marambio Tapia (2018) as part of a financialisaton process, a process in which money and finance take a central and dominant role in latterly capitalist societies. Overall, this process made consumption an important part of the individuals' identity since, under the neoliberal model, consumption would permeate several -if not all- spheres of life (Denegri, 2010; Marambio Tapia, 2018).

Nevertheless, access to financial tools can be a double-edged sword. In a context of financial tools growing in complexity, with minimal regulation and oversight from the state, individuals who struggle to adapt to this context may be at risk in terms of over-indebtedness and quality of life (Fernandes et al., 2014; Garay, 2015; Peñaloza et al., 2018).

In response to the increasing complexity of the economic context, various strategies have been developed to help citizens adapt, among them financial education strategies aimed at boosting the financial literacy of citizens and promoting responsible behaviours (Collins & O'Rourke, 2010; Denegri et al., 2012; Fernandes et al., 2014). Nevertheless, which variables actually predict responsible financial behaviours, and to what extent, is still being debated (Fernandes et al., 2014; Fox et al., 2005; Kim et al., in press).

Literature review

The scientific literature suggests various educational strategies for financial education and responsible consumption with a wide range of different teaching methods, contents and work objectives (Collins & O'Rourke, 2010; Fox et al., 2005). According to Collins and O'Rourke (2010), there are three main categories of financial education programmes; workplace-based programmes (WP), purchase counselling strategy (CS), and general financial education programmes (GFE).

Work-place based programmes correspond to training activities carried out mainly by productive sectors for their workers, where workshops are held in collaboration with financial and government institutions in order to increase worker financial literacy levels (Bayer et al., 2008; Holland et al., 2008; Kim, 2007, among others). According to Collins and O'Rourke (2010), the existing evidence on these programmes has demonstrated their effectiveness in increasing financial literacy levels, but, on the contrary, they do not have real determinations of behavioural change over time.

On the other hand, CS programmes correspond to personalised accompaniment and counselling interventions for responsible consumption, which seek to promote changes in the consumption behaviour of the participants through their own experiences (Agarwal et al., 2009; Barron & Staten, 2009; Carswell, 2009; Kim et al., in press; among others). The evidence resulting from these programmes signals the existence of significant effects on the behavioural change of the participants in the short and medium terms. However, these programmes are highly flawed in terms of their large-scale applicability given the customisation they require and the high cost associated with their implementation (Collins & O'Rourke, 2010; Lusardi & Mitchell, 2007).

Lastly, the GFE programmes correspond to those general courses on finance and responsible consumption (Bell, et al., 2009; Collins, 2013; Denegri et al., 2014; Spader et al., 2009; among others). These programmes are aimed at different target populations and have the main objective of generating positive changes in the consumption behaviour of the individual, over and above the exclusive increase in financial literacy levels (Collins, 2013). According to Denegri et al. (2014) and Collins and O'Rourke (2010), programmes of this type are structured educational programmes with specific learning and work sessions aimed at modifying the participants' consumption behaviour through the development of relevant skills and knowledge linked to a specific educational and theoretical frame of reference (OECD, 2005). Evidence regarding the effectiveness of these programmes suggests relative success in increasing financial literacy levels (Lusardi & Mitchell, 2007), but evidence regarding their effect on behavioural change is not conclusive given that each programme focuses on different skills (Collins, 2013; Collins & O'Rourke, 2010; Fox et al., 2005; Kim et al., in press).

The wide range of financial education programmes shows that supporting and educating citizens in financial matters is an important task. Nevertheless, the different focus and strategies assumed by said programmes show that there are no agreements -nor concrete evidence- regarding the variables directly related to behavioural change in consumer behaviour (Collins, 2013). There are studies that propose focusing on the attitudinal components and values associated with purchasing behaviour (Denegri et al., 2012; Denegri et al., 1999; Hamid & Loke, 2021; Luna-Arocas & Quintanilla, 2000; Luna-Arocas & Tang, 2004), improving financial literacy levels (Bayer et al., 2008; Bell et al., 2009; Denegri et al., 2014; Holland et al., 2008), and the knowledge of financial instruments as a strategy for inclusion in the financial system (Kim, 2007; Spader et al., 2009). However, these programmes tend to focus on specific variables without having concrete information regarding the impact that these variables may have on actual behavioural change (Collins & O'Rourke, 2010; Hamid & Loke, 2021).

To fill this void in research and intervention, Denegri et al. (2013) developed a financial education model which covered three main subjects. Attitudes and Values (social responsibility, self-control, critical evaluation of one's own needs, critical evaluation of the current economic model, and citizenship), Cognitive Abilities (systemic, and critical thinking), and Information and Skills (economy and finances, purchasing habits, and consumer rights). The model uses a tutoring methodology and aims at providing specific knowledge regarding economy and finances, developing practical skills, and developing positive attitudes toward a more rational and efficient use of resources, as a strategy that combines the three types of programmes proposed by Collins and O'Rourke (2010). Overall, testing this financial education programme would provide information regarding which variables have a significant impact on consumption behaviour change.

With this background, this study sought to examine the scientific evidence regarding the variables that predict changes in responsible consumption behaviour. The study followed a quasi-experimental design with pre- and post-manipulation measurements, comparing two groups of Pedagogy of History and Geography students, one that took part in a financial education programme, and one that did not. This study focuses on the Pedagogy of History and Geography students considering that they will be responsible for teaching financial education contents to secondary education students. Additionally, the evidence on the impact of financial education programmes indicates that targeting the intervention in populations like this could generate a double impact, boosting their own financial skills and knowledge and that of their future students (Kourilsky et al., 1996; Vargha, 2004; Walstad & Allgood, 1999; Walstad & Rebeck, 2001). Both the experimental and control groups completed a set of questionnaires regarding attitudes toward purchasing, materialism, financial literacy, self-discrepancy, and purchasing behaviours; these questionnaires were completed before and after the experimental programme. The study aimed to identify the significant predictors of variation in consumer behaviour when considering attitudes toward purchasing, materialism, self-discrepancy, and financial literacy, controlling the effects of the intervention programme.

Method

Participants

The sample comprised of 110 students of Pedagogy of History and Geography from two universities in Temuco (Chile) belonging to the Council of Rectors of Chilean Universities. Participants were divided into an experimental group and a control group. The experimental group comprised of 68 participants (57.4% men) with an average age of 22.3 years old (± 2.5 S.D.), while the control group comprised of 42 participants (61.9% men) with an average age of 20.85 years old (± 2.42 S.D.).

Variables and measures

The instrument comprised of measurements of attitudes towards purchasing, materialism, economic literacy, self-discrepancy, and an ad-hoc questionnaire of sociodemographic variables. The measures used for each variable are described below including test-retest reliability analysis measured with Kendall's Coefficient of Concordance function (Gamer, 1948) included in the Tools for Descriptive Statistics package (Signorell, 2020).

Attitudes toward purchasing were measured using the Attitudes Toward Purchasing Scale. The scale was developed by Luna-Arocas and Fierres (1998) and comprises 18 Likert-type items. Participants indicate their level of agreement to each item on a scale from 1 to 6, ranging from "*Totally Disagree*" to "*Totally Agree*". Items are organised in three subscales regarding attitudes toward purchasing. Rationality is defined as a purchasing style characterised by high cognitive analysis and low emotional charge. Impulsivity is defined as a purchasing style characterised by low cognitive analysis and a high emotional charge. Compulsivity is defined as a purchasing style characterised by a high cognitive analysis and emotional charge, which leads to critical situations of loss of control in purchasing situations (Denegri, 2010). Recent studies have shown adequate reliability scores ranging from α = .82 to α = .92 (Godoy et al., 2018). The present study showed adequate test-retest reliability scores ranging from W = .722 to W = .995.

Materialism was measured with the Richins and Dawson (1992) Values-oriented Materialism Scale. The scale consists of 18 Likert-type items in which participants indicate their level of agreement to each item on a scale from 1 to 6, ranging from "*Totally Disagree*" to "*Totally Agree*". The items are organised into three subscales regarding materialism; Possessions-defined success is defined as the perception that material acquisitions define personal success, in addition to the fact that material acquisition is considered a life goal. Acquisition centrality is defined as the notion of consumption as a mechanism to satisfy needs. It involves the recognition and ranking of needs and the prioritisation of the satisfaction of immediate versus not immediate needs. Acquisition as the pursuit of happiness is defined as the perception that material acquisitions define personal happiness. Results of the present study present adequate test-retest reliability scores, ranging from W = .733 to W = .766.

Self-discrepancy was measured with the Self-Discrepancy Scale, originally developed by Dittmar et al. (1996) and later revised and adapted by Luna-Arocas and Quintanilla (1999). The scale consists of 7 Likert-type items measuring respondents' self-discrepancy related to their intellectual, physical (health), aesthetic, social, personal, emotional, and socioeconomic ideal self. The scale uses a 4-point scale, ranging from "*Just as I am*" (1) to "*Much better than who I am*" (4). Higher scores indicate a greater discrepancy between their current and ideal selves. Results of the present study present adequate test-retest reliability (W = .753).

Economic literacy was measured by means of the Adults' Economic Literacy Scale (Gempp et al., 2007). The scale consists of 27 multiple choice items, each with one correct and three incorrect answers. The instrument was calibrated with Rasch Analyses with a sample of 840 economically active adults from the city of Temuco (Chile), with appropriate reliability scores (α = .87) (Gempp et al., 2007). Results of the present study presented a low but satisfactory test-retest reliability (W = .689).

Lastly, responsible consumption behaviour was measured using the Consumption Habits and Behaviours Scale (Denegri et al., 1999). The scale consists of 19 items where participants must respond with regards to the frequency with which they carry out certain purchasing behaviours in relation to planning, budget, quality and responsibility in purchasing. The present study considered the overall score of the scale, as a measurement of a more planned and responsible consumption behaviour. Answers are graded on a three-point scale in which participants indicate how often they behave in the way described in each item (e.g., making a list of products before purchasing, comparing prices, checking labels). Previous studies have presented adequate reliability scores for the overall scale (α = .66; Parrado & Mendivelso, 2015), while the present study presented a low but satisfactory test-retest reliability score (W = .677).

Procedure

The study was structured as the pilot for a financial education programme for students of Pedagogy of History and Geography at two universities in Temuco, Chile. Using a quasi-experimental design, the experimental group comprised of students of the specialisation in history, while the control group comprised of students of the specialisation in geography. Both groups of students were taking specialisation modules (mutually exclusive) as part of the Pedagogy of History and Geography programme. Participants were invited to take part in a two-part study; they were offered the option of declining participation in the study making it clear that no consequences were associated with this decision (regarding their participation in the specialisation modules). Participants of each group received study credits at the end of the semester for their participation in their respective specialisation module.

The elective courses are operational for one academic semester (two hours a week for 16 weeks), comprising: (1) A diagnostic evaluation regarding the participants' financial literacy, attitudinal profiles, and consumption behaviour prior to taking part in the study, (2) A financial education programme based on the model proposed by Denegri et al. (2013); and, (3) A post-intervention evaluation that mirrored the diagnostic evaluation. For each measurement, participants received and signed an informed consent form detailing the ethical guidelines of the study. Ethical guidelines included guaranteeing the participants' safety, the confidentiality of their participation and responses, and the freedom to participate as well as to stop participating if they deemed it necessary, thus complying with the ethical requirements stipulated by the Ethics Committee of the University of La Frontera, as part of the project FONDECYT 1110711.

The contents of the financial education programme focused on three main subjects: Attitudes and Values, Cognitive Abilities, and Information and Skills. Detailed information regarding the contents and methodology of the intervention can be found in Figure 1 and Denegri et al. (2016).

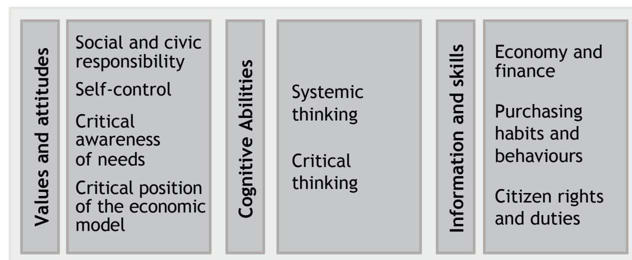

Figure 1. Central components and topics of Denegri et al. (2014) financial education model, adapted from Denegri et al. (2016)

Analyses

The Linear mixed-effects Model [LMER] (Bates et al., 2015) was used to determine the effect of the variables studied on the changes in responsible consumption behaviour, included in the lme4 R package (Bates et al., 2015). Working with a bootstrapping method of 100 simulations, the confidence intervals for each parameter estimated were computed, using a restrictive parameter of 95%, also included in the Bates et al. (2015) package.

The variance explained by models was estimated applying the Pseudo-R-squared for Generalised Mixed-Effect models statistics (Nakagawa et al., 2017) by means of a delta method as a consequence of the distribution of the response variable, the statistical analysis procedure is contained in the MuMIn for R package (Bartoń, 2019). Finally, power and effect dimensions were extrapolated utilising the PowerSIM estimation contained in the simr R-package developed by Green and MacLeod (2016).

All variables tested were centred using a mean difference transformation, that is, the mean of each variable and its measurements was subtracted from each participant's score, reflecting the difference in scores between subject and mean. In order to estimate the reliability of scores between measurements, Kendall's coefficient of concordance (W) was calculated using the Kendall function contained in the "irr" R-package (Gamer et al., 2012).

For the analysis procedure, first, a null model was tested to identify the correct fit of the data-structure proposed. After that, the final model was obtained by testing all the predictors and using a systematic elimination method.

Following the methodological recommendations of Harrison et al. (2018) and Bates et al. (2015), confidence interval analysis was included as an additional element to evaluate the significance of the parameters included in the final model, so as to control the existence of nested effects. To control multicollinearity problems in the final model, general model and predictors where analysed employing the kappa index and variance inflation factor, respectively, included in the mer-utils package (Frank, 2011).

All statistical analyses were performed using R (R Core Team, 2018).

Results

This study endeavoured to examine the variables that predict changes in responsible consumption behaviour, comparing two groups of Pedagogy of History and Geography students, one that took part in a financial education programme, and one that did not. Both groups completed a set of questionnaires regarding attitudes toward purchasing, materialism, financial literacy, self-discrepancy, and purchasing behaviours, before and after the experimental group took part in the programme. Prior to carrying out the main analyses, descriptive statistical analyses were undertaken, the results of which are described below.

Descriptive statistics

Mean scores and standard deviations were computed for each scale. As shown on Table 1, mean scores presented small variations when comparing the pre- and post-manipulation measurements with the biggest change being registered on the Impulsivity scale. All the scores presented appear to be consistent over time, exhibiting low variability between measurements and adequate levels of test-retest reliability.

Multilevel Linear Mixed-Effect model of change in responsible consumption behaviour

A Multilevel Linear Mixed-Effect model was used to evaluate predictors of changes in responsible consumption behaviour. Prior to conducting the analyses all variables were centred to the mean, reflecting the variation in the scores of each subject with respect to the average observed in the full sample.

A null model was used as a first step in this analysis, to identify the viability and the fit of the proposed data-structure. Data was arranged following a 3-level structure, including a main random intercept effect of the intervention group (level 3), and the random effect of subject (level 2) and measurement (level 1), as is presented in Figure 2.

Results of the null model tested reveal that the multilevel structure of data fits appropriately with the variables tested explaining 49% of response variable variance, and the interaction point did not significantly differ from zero. Results of the null model can be found on Table 2.

The subsequent step consisted of the inclusion of the predictor variables and their interactions in the model, which allowed for the identification of significant predictors of changes in consumption behaviour. Working with a systematic elimination method, we identified that the levels of financial literacy, impulsivity and compulsivity (attitudes toward purchasing), happiness and success (materialism), and self-discrepancy are not significant predictors of changes in consumption behaviour ($p > 0.05$). Therefore, the final

Table 1 Mean of punctuations for scale and measurement time, and concordance between measurement analysis

	Scales	Measurement	Mean	S.D.	Test-retest reliability	p-value of concordance
Financial Literacy		Pre	17.01	3.13	0.689	0.005
		Post	17.51	3.21		
Attitudes Toward Purchase	Rationality	Pre	16.39	4.90	0.995	< 0.001
		Post	16.48	4,76		
	Impulsivity	Pre	23.19	7.46	0.768	< 0.001
		Post	20.06	7.53		
	Compulsivity	Pre	11.51	5.52	0.722	0.002
		Post	11.08	5.40		
Materialism	Possession-defined success	Pre	14.55	4.79	0.735	< 0.001
		Post	14.59	5.01		
	Acquisition Centrality	Pre	32.97	5.10	0.733	< 0.001
		Post	32.82	5.49		
	Acquisition as Happiness	Pre	12.79	4.96	0.766	< 0.001
		Post	13.18	4.41		
Self-discrepancy		Pre	14.56	4.37	0.753	< 0.001
		Post	14.06	4.78		
Consumption Behaviours		Pre	39.82	5.43	0.677	0.008
		Post	39.22	6.77		

Note. n =110 for measurement. Total of observations by variable = 220. Test-retest reliability was computed using a Kendall's coefficient of concordance (W).

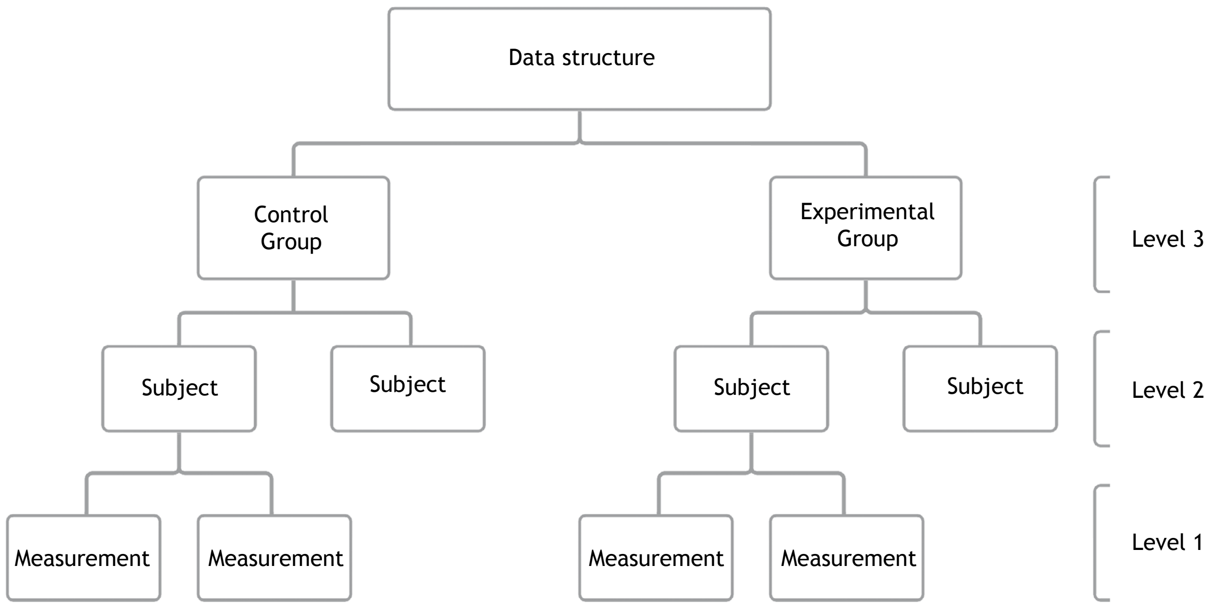

Figure 2. Data structure for multilevel analysis

model revealed the existence of four statistically significant predictors: rationality (attitudes toward purchasing), centrality (materialism), the interaction between the two, and the interaction between rationality and the experimental group. The final model shows that the interception effect, and the differences between the two groups (experimental and control) are relatively close to zero, but increases and decreases in rationality, centrality, their interaction, and the interaction between rationality and the intervention group explain changes in responsible consumption behaviour. More specifically, increases in centrality explain increases in the dependent variable (responsible consumption behaviour), while increases in rationality explain decreases in the dependent variable. An unexpected result was that centrality and having taken part in the experimental condition acted as moderators of the effect of rationality on responsible consumption behaviour, observing that in both cases the effect of rationality on the dependent variable changes depending on the value of centrality and on having taken part (or not) in the experimental group.

Additionally, as can be observed on Table 2, the final model explains 66% of the total variance in the data set, presenting appropriate power and effect scale estimations. The significance of the differences between the null and final models was tested working with an ANOVA of mixed models, revealing that the final model presented a significantly better model fit than the null model (X^2 = 43.831; D.F. = 5; *p-value* < 0.001). A multicollinearity analysis revealed appropriate levels of variance inflation factors for all predictors (VIF < 3.3; Montgomery et al., 2001), and the general model presented reasonable levels of multicollinearity (κ = 3.970; Frank, 2011).

Lastly, in order to describe the impact of random effects, the final model coefficients were computed. Table 3 summarises the variations in the coefficients estimated in the final model when random effects are included in the predictions, revealing differences in subject, measurement, and their interaction in the final prediction. Furthermore, results show that the random-intercept parameter presented small non-significant differences between conditions.

Discussion

The present study endeavoured to examine the variables that predict changes in responsible consumption behaviour. The study evaluated the predictive power of attitudes toward purchasing, materialism, financial literacy, and self-discrepancy while controlling for the effects of an intervention programme, using a quasi-experimental design on a sample of students of Pedagogy of History and Geography from two universities in Southern Chile. Mixed-multilevel model analyses revealed the existence of four significant predictors of changes in responsible consumption behaviour: rationality (attitudes toward purchasing), acquisition centrality (materialism), the interaction between the two, and interaction between rationality and the experimental group.

In detail, our results revealed that increases in centrality (materialism) and rationality explain a proportional increase and decrease, respectively, in responsible consumption behaviour and habits for both intervention groups. Surprisingly, our model shows that the intervention group acts as a moderator of the effect of rationality on responsible consumption behaviour, ascertaining that the increase in levels of rationality, moderated by participation in the experimental group, significantly explains the increases in responsible consumption behaviour. Likewise, the proposed model allows us to determine that, in addition to what was described above, the effect of rationality on the dependent variable is moderated by the centrality for both intervention groups.

Specifically, the effect of rationality on changes in responsible consumption behaviour is moderated by the intervention group, where the effect of rationality on changes in consumption behaviour is significantly greater for the experimental group compared to the control group, with

Table 2 Null and final mixed-effects models: random Intercept-Group, Measurement, Subject-Measurement effect, LMER parameters estimates (Est.), standard errors (SE), confidence intervals and *P*-values for parameter estimations

	Null Model				Final Model			
Parameter	Est.	SE	Confidence interval		Est.	SE	Confidence interval	
			Lower	Upper			Lower	Upper
Intercept	1.478	4.285	-6.920	9.876	-1.165	5.444	-11.835	9.505
Rationality (Att. toward Purchase)	-	-	-	-	-0.315	0.136	-0.582	-0.048*
Centrality (Materialism)	-	-	-	-	0.173	0.070	0.036	0.309*
Experimental Group	-	-	-	-	2.987	7.669	-12.043	18.018
Rationality by Centrality	-	-	-	-	0.034	0.014	0.006	0.061*
Rationality by Experimental Group	-	-	-	-	0.749	0.168	0.420	1.078***
Intercept-Group covariance	40.560	6.369			29.310	5.414		
Subject covariance	0.0001	0.011			0.0000001	0.0008		
Measurement covariance	1.041	1.020			28.540	5.343		
Subject-Measurement covariance	0.0001	0.012			0.002	0.043		
Restricted Maximum Likelihood [REML]	1451.7				1419			
Marginal R^2	0%				10,1%			
Conditional R^2	49%				65,8%			
Power estimation	-				0.630			
Effect size estimation	-				0.999			

Note. n = 110. Parameters indicated with "-" were not included in the null model. Group 0 "Control group" set to zero for identification. P values not given for covariance parameters and goodness of fit. Confidence intervals at 2.5% (Lower) and 97.5% (Upper). "*" *p-value* < .05; "**" *p-value* < .01; "***" *p-value* < .001.

the latter experimenting a null effect. These results are consistent with previous studies that have determined the existence of a close relationship between attitudinal measurements and real-world behaviour (Ajzen & Fishbein, 1977; Denegri et al., 2012), and with authors proposing that attitudes and values play an important role in predicting responsible consumption behaviour (Denegri et al., 2014). According to the proposal of Denegri et al. (2014; 2016), financial education programmes must consider participants' attitudes and values regarding behavioural change, in order to internalise them as habit and, thus, achieve more responsible consumption practices.

On the other hand, the final model highlights the importance of centrality (materialism) as a predictor in consumption behaviour changes. According to Srikant (2013), increases in centrality (materialism) entail an increase in the importance that people attribute to material possessions, mainly to those that are fundamental to their lives; therefore, it assumes an implicit hierarchization of needs to be satisfied and the impact of consumption on their quality of life. Our results are consistent with this perspective, since one of the fundamental principles of responsible consumption is the satisfaction of needs in a hierarchical order and with a view to improving the quality of life (Denegri, 2010).

Finally, it is important to emphasise the moderator effect of centrality on the effect of rationality (in consumption behaviour changes). Although there are no previous studies describing this close relationship between both constructs, our results show that the effect of the levels of rationality on responsible consumption behaviour depends on the increases in the levels of centrality. Overall, this suggests that rationality must be accompanied by the development of critical thinking regarding purchasing as a means to satisfy needs, in order to promote changes in consumption behaviour.

Conversely, results of the present study show other attitudinal variables that do not significantly predict changes in consumption behaviour, namely: attitudes toward impulsive purchasing, attitudes toward compulsive purchasing, possession defined by success (materialism), acquisition as happiness (materialism), and self-discrepancy. These results make sense to the extent that the modification of these

Table 3 Final model random-effects coefficients

	Random effects covariances			
Group	Subject	Measurement	Subject by measurement	Intercept
Control	0.0001	-0.1040	0.0008	-1.1663
Experimental	-0.0001	-2.1427	0.0173	-1.0422

attitudes may not lead to behavioural change, insofar as responsible consumption is not defined as the absence of irresponsible behaviour, but rather, as the acquisition of permanent patterns of behaviour and consumption habits classified as responsible (Denegri et al., 2014; Özçağlar-Toulouse, 2009). Also, it is important to note that in the present study, financial literacy did not significantly predict responsible consumption behaviour, which coincides with what was reported by Denegri et al. (2016), but opposes other studies showing direct association between economic literacy and responsible behaviour in consumer matters (Bosshardt & Watss, 1994; Varcoe & Fitch, 2003). A possible explanation is that the results of financial education programmes have reported that increases in financial education correlate strongly with measures of personal well-being; therefore, the impact of these levels of financial literacy on behaviour would lead to people's perceptions and interactions with the economic system rather than to specific behaviours (Holland et al., 2008).

An important finding of the study stems from the absence of an effect of the group (experimental and control) as a predictor of changes in responsible consumption behaviour. This would mean that despite the absence of randomisation in the allocation of the participants in each of the groups, this factor did not appear to present significant differences associated with the study variables.

Regarding the limitations of the study, two main issues arise. The first limitation arises from the limited generalisation of the results due to the sample's composition being solely of university students, meaning that results could vary with different samples (e.g., older participants), or more varied samples (e.g., a sample of participants from different educational backgrounds). The second issue comes from the quasi-experimental design applied in the study, as it did not consider random assignment of participants to the study conditions. This study design does not permit discarding the effect of self-selection or subject-preference bias. That is, the participants that were part of the experimental condition, were there because of preference, which would indicate interest and/or affinity for the subject of the specialisation module (as opposed to the participants of the control group). The issue arises from the possibility that the composition of the experimental and control groups may have not been equivalent since group allocation was accomplished via self-selection. Ultimately, students who expressed interest in the financially literacy course may have a greater affinity for the subject and/or come from different socioeconomic backgrounds, which could provoke them to respond better to the experimental programme.

Conclusion

Our study provides data-based evidence on the contents and skills that have a higher impact in programmes aimed at developing more responsible consumption behaviour. These findings are relevant as there is no clear consensus as yet regarding what financial education programmes should focus on in order to achieve the best possible outcomes (Collins, 2013). By virtue of complex statistical models, the present study offers an analysis on the significant predictors of consumption behaviour change, within a quasi-experimental design that brought to bear a financial education programme for pedagogy students. Ultimately, these findings might guide the development of more effective interventions that focus their resources on those elements that are more likely to enhance the participants' financial education. It is recommended that future studies should follow a completely randomised experimental design, in order to avoid possible biases in the allocation of participants, as well as considering sampling processes that include participants from different socioeconomic origins, ages, activities, and educational levels.

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