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Untangling causal beliefs: understanding lay theories of happiness determinants using a factorial survey

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Abstract

After two decades of research, the evidence in cross-cultural studies has shown that the lay theories of happiness are not universal. Significant variations have been found in the beliefs about the sources of happiness between countries. However, heterogeneities within countries have been overlooked. In this article, I documented a folk theory of happiness beliefs for the Chilean case. Using factorial surveys, I estimated (a) causal beliefs of happiness, (b) the contingency of the belief about income upon other domains, and (c) the heterogeneity of these beliefs when considering respondents' experience on these dimensions. Health and income are the most prominent determinants of happiness in the belief system of Chileans. For the first time, income is reported as a prominent source of happiness from the perspective of laypeople. Nevertheless, this belief is contingent upon several of the other sources of happiness. In addition, the experience of long-exposure life circumstances explains the heterogeneity of beliefs about lifestyle and partner relationships. Overall, these findings compel us to re-evaluate other once-believed collectivistic countries that have gone through structural changes like Chile. Finally, the potentialities of using factorial surveys for cultural analysis are highlighted.

Keywords: Factorial survey, happiness beliefs, relationality, folk theory.

Introduction

At the personal level, beliefs play an essential role in motivating and justifying action (Vaisey 2009). In their pursuit of happiness, humans make choices where different kinds of beliefs are involved, based on what happiness is and what makes people happy. Decisions are not taken in a cultural vacuum; they are guided by elements such as embedded cultural dispositions, tacit or implicit beliefs and worldviews, among others. Thus, a growing body of literature has highlighted the role of beliefs in quality of life studies (Huang 2019; Sirgy 2018; Sirgy, Joshanloo, and Estes 2019; WHOQOL 2006; Wiersma et al. 2019) as well as sought to define lay theories of happiness (e.g. Delle Fave et al. 2016; Lu and Shih 1997; Pflug 2009). After two decades of research, the evidence in cross-cultural psychology has shown that the lay theories of happiness are not universal (Oishi et al. 2013; Oishi and Gilbert 2016; Veenhoven 2010). Using the typology of collectivistic and individualistic cultures (Hofstede, Hofstede, and Minkov 2010), important variations have been found in the beliefs about

determinants of happiness. However, heterogeneities within countries have been overlooked. As Veenhoven (2010) pointed out, the causes and consequences of happiness appear to be quite similar across cultures. However, there is more variation in beliefs about conditions for happiness.

Nevertheless, could these definitions vary based on personal experiences? Are our beliefs about happiness affected by individual experiences and circumstances? In this article, and following a mainstream framework in cultural sociology, I document a folk theory of happiness beliefs for a collectivistic country and examine how individual characteristics could explain the heterogeneity of these beliefs.

Contemporary cultural sociologists draw on the notion of culture as embedded in a complex relational network (Boutyline and Vaisey 2017; DiMaggio et al. 2018; Goldberg 2011). Social meanings emerge from the relationship of cultural units. Therefore, the challenge of defining a lay theory of happiness determinants in a relational perspective is threefold. First, if cultural elements are interrelated, the identification of a specific causal belief compels us to solve this endogeneity issue. Second, a full understanding of causal beliefs will require to examine the interrelations between them. Beliefs about causal relations are a clear example that illustrates this problem. People have specific ideas about one thing causing happiness (causal beliefs or causal attributions). How could we identify causal beliefs when there are multiple causes of a particular phenomenon? laypeople also should account for confounders of these beliefs. In addition, although these beliefs could be separated, we may understand the complex dynamics of multicausality in people's minds. Finally, the third challenge is to examine how this structure of beliefs and its constitutive units vary across individuals. Henceforth, beyond the substantive contribution to happiness studies, this article joins the effort to provide quantitative sociological tools to tackle the relationality of culture.

To address these challenges, in addition to its substantive contribution, this article aims to introduce factorial surveys as a methodological tool that enables us to identify causal beliefs, their structure, and variations across individuals. I apply a factorial survey to understand what people believe makes others happy. As Swidler (2001) explained about to love, happiness is a core theme in our popular culture (songs, self-help books, soap operas, etc.). As defined by Veenhoven (2001), happiness is a constitutive part of the subjective enjoyment of life. It is concurrent with the other two dimensions of quality of life: quality of the living environment and quality of performance.

On the other hand, although happiness is a common concept in daily life, its meanings are much less evident in comparison with the other two dimensions of quality of life. Thus, a folk theory of happiness determinants is a step forward in understanding those conceptualizations from the

perspective of the subjects. Using factorial surveys sheds light on aspects that conventional methods in happiness studies are limited in their ability to do so. I identify beliefs about specific determinants of happiness net of other causal beliefs and confounders. At the same time, I address the complexity of these judgments combining these factors, which is hardly possible in real life. For instance, what is the effect of health and income in people's minds? And what happens when these factors are combined in different ways? As I shall discuss, neither traditional survey questions nor qualitative approaches could answer these questions accurately. As I will explain in detail, FSs consist of hypothetical units describing persons, institutions, or any phenomenon in the form of vignettes. Respondents read a group of vignettes and evaluate each one following a rating task. This rating task is the individual's judgment. Therefore, the relationships of the pre-defined vignette attributes and the rating task are the causal beliefs. In other words, I am predicting one side of the causal belief with the other side of the belief.

I use a representative sample of the Chilean population over the age of 18. The Chilean case is relevant because it could be considered an adjudicative case. As a Latin American country, it is classified as a collectivist culture, which is one of the axes of the main typology used in studies of happiness beliefs. Chile ranks in the highest quartile of the World Happiness Index, being the happiest country in the region. One of the explanations for this relatively high level of happiness is family support (Dirección de Estudios Sociales 2015; Rojas 2018). In collectivistic cultures, happiness is grounded on social ties such as family, friends, and romantic relationships. Thus, if beliefs about happiness are culture-specific, I may expect that collectivistic determinants of happiness are going to be the most important factors in Chileans' minds, as it has been shown for other Latin American countries (Chiasson, Dube, and Blondin 1996; Sotgiu et al. 2011). In addition, I analyze data from the 2015 edition of *El Barómetro de la Felicidad* [The Happiness Barometer], which is the only data set, to my knowledge, specialized in quality of life and which contains a FS for measuring happiness beliefs in a large probabilistic sample. This combination of measurements makes this dataset a unique resource to understand lay theories of happiness.

This article is structured in four sections. First, I review the literature seeking to define lay theories of happiness. Second, FSs are introduced as a method to identify causal beliefs net of the relationality of culture. This section aims to provide theoretical foundations for the method, which are often absent in methodological reviews. Third, the design of the FS to the understanding of causal attributions of happiness in the eyes of common people is presented in detail. Fourth, I report the results (a) identifying the beliefs about happiness determinants, (b) the interrelation between the belief

about income and the other domains, and (c) the heterogeneity between individuals. Finally, several conclusions are drawn regarding FSs and quality of life studies.

Heterogeneity of happiness beliefs

A research agenda in social psychology has outlined a cultural theory of happiness, whose primary concern is to investigate the meanings of happiness for people from different cultural settings. By using Folk Theory (Bruner 1990), researchers have sought to explain everyday intuitive theories about how our minds and the minds of others work and are shaped by culture. Thus, laypeople have beliefs about what happiness is and how it is achieved. Folk Theory understands happiness as a psychological process, and its meanings are culturally constituted (Lu and Gilmour 2004). Psyche and culture are mutually involved in an iterative process. Meanings, conceptions, and interpretative schemes are activated or constructed in social participation and practices (Shweder and Haidt 2000). Therefore, happiness beliefs may change across cultural communities. In cultural sociology (Vaisey 2009; Vaisey and Valentino 2018), beliefs are part of a cultural system of symbols and meanings that motivate and justify action. Although it is not sharply defined in Vaisey's (2009) seminal article, belief systems are part of the public culture, which is either internalized as the non-declarative form of personal culture or incorporated in the explicit repertoire of the declarative mode.

Once believed to be universal, a large body of comparative studies have confirmed that conceptions of happiness vary across-cultures (Oishi and Gilbert 2016; Veenhoven 2010). For instance, formal definitions of happiness vary in dictionaries across countries and time (Oishi et al. 2013). A prevailing explanation of differences across cultural settings is the distinction between individualistic and collectivist societies (Chiasson et al. 1996; Diener et al. 1995; Lu and Gilmour 2004; Pflug 2009). Collective societies emphasize belonging to groups, and individual societies are focused on individuals. Markus and Kitayama (1991) conceptualized independent self-construal - predominant in individualistic societies- as the individual's view of him/herself as an autonomous, bounded, unitary agent, and interdependent self-construal -predominant in collectivistic societies- as flexible and variable, changing between contexts and relationships. Overall, Eastern countries were found to be highly collectivist, whereas developed Western societies are more individualistic (Eaton and Louw 2000). Thus, individualism and collectivism are considered by Chiasson and colleagues (1996) to explain the importance of interpersonal factors in determining happiness in some contexts and intrapersonal factors in others.

Beliefs about the determinants of happiness also have a significant place in cross-cultural happiness studies. Due to its level of abstraction, laypeople usually rely on the causes of happiness to conceptualize it (Lu 2001). Both regularities and heterogeneities across countries have been found. The regularities are explained by drawing on the argument that the fulfillment of basic needs has an impact on happiness (Tay and Diener 2011), and everyone has the same basic needs that need to be satisfied (e.g. drinking water). Therefore, once the minimum level of needs is satisfied, a certain level of happiness is also reached. Despite the overall pattern, differences appear in specific domains. According to Chiasson et al. (1996), culture explains heterogeneities on lay theories of happiness determinants. In the case of El Salvador, religion and good sociopolitical conditions are perceived as more salient in reaching a higher level of happiness, whereas in North America, hedonistic factors predominate. Lu and Shih (1997) interpreted the perceived sources of happiness according to the narratives of Taiwanese and Westerners living in Taiwan. They identify nine categories of sources, such as the harmony of interpersonal relationships, the satisfaction of material needs, and pleasure. However, the emphasis differs between cultural traditions, producing a country-specific configuration. While Westerners emphasize intrapersonal or internal evaluation and contentment, the Taiwanese conception of happiness places a greater focus on interpersonal or external assessment and satisfaction. Their findings are consistent with the individual vs. collective values approach.

A common pattern is also found by Delle Fave and colleagues (2016). They conducted a cross-cultural study with a sample of participants from seven countries (Australia, Croatia, Germany, Italy, Portugal, Spain, and South Africa) to examine lay definitions of happiness and associations with different life domains. Although the analysis by country is not reported, they pointed out that the belief structure is constant across countries. Lay definitions did not identify personal life satisfaction with happiness as the scientific use of happiness may suggest. Across countries, two lay conceptualizations were identified. First, at the psychological level, happiness is an inner harmony and a positive relationship between different facets of self. Second, at the relational level, harmonic family and social relationships are pivotal components of happiness. Thus, rather than forming a collectivistic-individualistic distinction, these definitions coexist and are shared by a heterogeneous sample of countries from five continents. However, the qualitative approach used does not enable the accurate definition of the weight of each domain in an entire society. Delle Fave et al. (2016) did not use representative or probabilistic samples. Therefore, country-level inference is not possible. However, despite their lack of representativeness, the results do suggest that family, followed by relations, are the most predominant life domains associated with happiness in people's narratives.

The importance of relationships as life domains associated with happiness in people's narratives has also been supported by studies conducted in the United Kingdom (Crossley and Langdridge 2005) and South Korea (Kim et al. 2007). In a quantitative study comparing a sample of Italians and Cubans aged between 60 to 97 years (Sotgiu et al. 2011), respondents suggest similar sources of happiness. However, they vary in the frequency and importance attributed to each of these factors. Health, family, and money are cited by more than half of the respondents in Italy. In contrast, only health reaches more than 50 percent in Cuba, which is followed by love and faith. The predominance of health in both countries could indicate variations in causal attributions due to the individual experience of elders with these factors. None of these studies have used probabilistic sampling for population inference.

The advancement in the knowledge of causal beliefs about happiness has been led by cross-cultural psychologists. Therefore, variations across-countries have been emphasized over variations within countries. The understanding of the heterogeneity of beliefs between individuals requires differentiation between non-declarative and declarative modes of culture (Lizardo 2017; Patterson 2014). Declarative culture is acquired explicitly and is symbolically mediated. It could be encoded through a small number of exposures and deployed explicitly. In contrast, the non-declarative form of culture is encoded via long-term and repeated exposures. They are implicit and do not require symbols to be deployed. Beliefs about happiness determinants could be found in both formats. In interview-based studies, individuals define happiness reflectively in a slow and effortful process. However, individuals also have cognitive associations between causes and effects stored in their non-declarative-memory system (Lizardo 2017; Lizardo et al. 2016). These non-declarative causal beliefs have been absent in the study of culture and happiness. They are relevant to study the relationship between conceptualizations of happiness and what people do to pursue their happiness. Beliefs in their declarative form are toolkits to make sense of individual experience (Swidler 1986, 2001), but they do not explain actions.

There is a common idea in cultural sociology that if it is not shared and public, it is not cultural (Patterson 2014). Therefore, completely individual and idiosyncratic happiness beliefs cannot be conceptualized as cultural. However, the Semiotic Theory of Practice (Sewell 2005) states that the coupling between public culture and non-declarative personal culture is affected by other forces of the environment where it occurs. This argument raises the possibility of the individual contingency of beliefs about happiness determinants. For instance, the predominant belief that family relationships matter for happiness in a specific belief system (Delle Fave et al. 2016) interacts with the own family experience when it is encoded into the personal culture. Hence, I expect that individual beliefs about

determinants of happiness will vary accordingly to their own experience of each of those dimensions. Thus, the belief about each determinant of happiness will be stronger or weaker due to the availability heuristic (Thaler and Sunstein 2008). People use mental shortcuts that rely on immediate examples to evaluate the potential causes of happiness. Their own experience of happiness determinants will make them more cognitively salient when making judgments of what makes people happy. For example, individuals with economic problems will be more likely to associate money with happiness. The same could be expected for health status, family relationships, etc.

Another gap in the literature of causal attributions of happiness remains unfulfilled. The collectivistic-individualistic taxonomy has led researchers to oversimplify the analysis of beliefs about the determinants of happiness. The idea that cultural systems are formed by complex relations of symbols and meanings is ignored. The focus on the predominance of one belief over other sidelines the interrelation between them. Most of the studies elaborate conclusions about which determinant of happiness is believed to be the most relevant across cultures (e.g. Delle Fave et al. 2016; Imada 2012). But in reality individuals are unlikely to make judgments using single elements. To fully identify a heuristic of happiness determinants also requires elaborating on the combinations of these determinants. Is money still necessary when there are bad family relationships? Does the influence of lifestyle on happiness depend on health status? Are females and males equally happy or unhappy when they have broken up? People have beliefs about these situations that have not been addressed in the current state of the research. To begin to address these belief systems will entail the use of experimental methods, as I will explain in the following section. Nevertheless, to address all the potential combinations on a system of beliefs is an exponential and overwhelming enterprise. In this study, I move forward the literature by asking how people evaluate the determinants of happiness in combination with income. The empirical evidence suggests a robust effect of income on happiness (Aknin, Norton, and Dunn 2009; Dunn, Aknin, and Norton 2008; Jebb et al. 2018) and the “money buys happiness” belief is recurrent in popular culture (Easterlin 2004; Hyman 2014). Paradoxically, studies of happiness beliefs rarely report this dimension as relevant (an exception is Sotgiu et al. 2011). I argue that previous interview- and survey-based studies do not control for potential social desirability bias, which affects self-reported and income-related variables (Hariri and Lassen 2017). Therefore, through FSs, implicit beliefs that rule out social desirability are analyzed for the first time. Thus, I closely examine this dimension by answering whether this belief is contingent upon other beliefs about sources of happiness.

To understand the configuration of causal beliefs of happiness, I focus on the case of Chile. This Latin American country has been characterized as collectivistic (Hofstede et al. 2010; Loewe et

al. 2014)¹. It ranks in the highest position of the World Happiness Index among Latin American countries, which is the “happiest” region in the world. Scholars have explained the performance of Chile in this rank by the role of family (Rojas 2018), which is the prototypical predictors of happiness in any collectivistic culture. It is consistent with national surveys that show the relevance of family ties explaining the level of happiness in Chile (Dirección de Estudios Sociales 2015). Hence, the significance of the group provides a robust test of the variations of happiness beliefs between individuals. In these cultures, the belief system may exert a strong influence on individuals (Baldwin and Mussweiler 2018). Therefore, a strong coupling between shared beliefs about happiness and personal culture is expected, leaving less room to the variation by individual experience. The objective is not to compare with another context, but instead to understand individual variations of causal beliefs on a collective culture where a strong coupling is expected. A recent study (Olivos, Olivos-Jara, Browne, 2019) has also challenged the idea of Chile as a collectivistic culture. In a social comparison framework, the happiness level of Chileans is strongly explained by a comparison with the happiness level of acquaintances. But paradoxically, the direction of the effects results from individualistic norms. Happiness level is driven by comparisons with acquaintances - envy of better-off acquaintances and gratitude for not being in the position of worse-off acquaintances. Thus, happiness is collectively determined but following individualistic norms.

Measuring causal beliefs using factorial surveys

Beliefs refer to subjective propositions about the world of which a person is at least minimally confident (Fishbein and Ajzen 1975; Hedström 2005; Rydgren 2009). For instance, individuals could believe subjectively in a relationship between age and happiness, and subsequently, possess some degree of certainty about it. Beliefs are also part of the culture in the form of narratives, frames, or elements of boundary-making (Vaisey and Valentino 2018), and forced-choice surveys leverage the understanding of how people make judgments in a way that is limited in the traditional interview-based approach.

Although FSs and choice experiments are different methods, both provide similar solutions to overcome the methodological challenges of dealing with causal beliefs. As described by Liebe et al. (2017), both methods require respondents to evaluate scenarios that vary in their characteristics. However, in choice experiments, respondents compare two alternatives and choose between them, while in FSs, respondents assess each of these situations according to criteria such as agreement,

¹ Kolstad and Horpestad (2009) contradicts this classification but based on a non-probabilistic and small sample of university students from Santiago, capital of Chile.

approval, or fairness. This methodology was created by Peter Rossi to understand household status in the eyes of others (Rossi and Anderson 1982) and is a widespread technique in a myriad of fields.² Following Vaisey (2009), several explanations could be posited as to why choice surveys and FSs are better suited to study causal beliefs. Fixed-response formats lead us to better estimates of decision processes and are less cognitively demanding than open or semi-structured interviews. Moreover, they rely more on heuristics and practical consciousness. In other words, what *makes* people decide in daily life as opposed to *discussing* these decisions. Respondents' ratings may more accurately reveal the underlying cultural schemas to which their beliefs belong because they reproduce everyday decision-making processes.

FSs consist of hypothetical units such as persons, institutions, facts, or short stories in the form of texts, videos, or pictures called vignettes. These units are composed of different dimensions that describe them. Respondents may read a group of vignettes and evaluate each one based on a rating task. The basic idea of the analysis is the explanation of single judgments through the dimensions of the vignettes. A universe of vignettes is obtained from the full combination of dimensions' values, and respondents are faced with a sample from this universe. Thus, FSs enable methodological challenges of endogeneity to be solved.

In statistical terms, a variable is endogenous when there is a correlation between an independent variable and the error term (effects of the variables that were omitted from the equation). Moreover, a variable could be defined as endogenous when it is explained by relationships between functions within the explanatory model. For instance, the belief that money makes happiness could be confounded by the belief that education causes happiness, because in the "real world" income and happiness level are explained by educational level.

In cultural sociology, belief systems could be understood as networks. Beliefs are interrelated nodes. Converse (2006[1964]) described a system of beliefs as elements held together by pairwise constraints or functional interdependence. In a dynamic case, constraint or interdependence of beliefs refers to the probability that any change in a particular belief would require a compensating change in the structure. For instance, "*if a person is opposed to the expansion of Social Security, he is probably a conservative and is probably opposed as well to any nationalization of private industries*" (Converse 2006[1964]:3). If the belief about social security changes, the belief about nationalization of private industries could also change because of the logical constraint. In a recent study, Boutyline

² For an extensive review see Wallander (2009).

and Vaisey (2017) showed that political beliefs are organized around political identity, which works as a heuristic to process information from the political field. Thus, egalitarian beliefs may be related to moral relativism, which in turn may be related to group-specific rights, and everything tied to political identity. Therefore, this structural interdependence of any belief system gives rise to the problem of identifying independent causal beliefs. In cultural sociology, this foundational principle is termed relationality (DiMaggio et al. 2018; Goldberg 2011). Beliefs are related and confound each other. Methods addressing this relationality are needed in order to isolate causal beliefs and, at the same time, understand them in relation to each other. FSs acknowledge this relationality and isolate particular causal beliefs.

FSs are a methodological tool that enables us to overcome these endogeneity issues on beliefs about happiness determinants or any other kind of causal belief. In cultural sociology, they are called narratives and refer to the causal link of phenomena established by individuals (Vaisey, 2019). These causal beliefs present the same problem as estimations of causal inference in the “real world”. Laypeople, as social scientists, have to make causal judgments based on complex realities. A belief about income as a determinant of happiness could be connected with the belief about health as a predictor of happiness. Beliefs about these determinants usually work together in explaining people’s happiness, because they belong to the same belief system. A counterfactual is needed.

For instance, ordinary people have an idea about how happy a lottery winner might be. However, people may also evaluate the happiness status of those who do not win the lottery, keeping all the other characteristics of the individual constant (age, gender, health, religion, etc.). This could be called “the counterfactual of winning the lottery”. The difference between those beliefs will be the causal belief about the impact of winning the lottery on happiness. However, people may also have beliefs about who plays the lottery or who has better luck. Thus, beliefs about lottery winners could also be confounded. Let us say that more religious people have a higher likelihood of winning the lottery, and older people play the lottery more often than youth. Now, the narrative of the happy lottery winner is confounded by religion and age. Nevertheless, FSs address this problem by “breaking” this relationality of beliefs.

The hypothetical units to be evaluated by respondents (vignettes) are the product of a full factorial combination of pre-defined characteristics. In the example above, there are two possible states for a lottery winner (winner or loser), two possible states for religion (with religion or without), and two possible states for age (18-60 or 61+ years). In a factorial design, there are $2 \times 2 \times 2 = 8$ possible scenarios. Respondents will evaluate the effect of winning the lottery, considering all the possible

states of religion and age. A FS could be regarded as a multitreatment experiment, where each dimension of the vignette is a single treatment. By randomly assigning a group of vignettes with uncorrelated dimensions, systematic differences in post-treatment answers (rating task) are attributable to the experimental manipulation of dimensions (Hainmueller, Hopkins, and Yamamoto 2014). Thus, predicting the rating task by each dimension, I will obtain the causal beliefs. As I shall show in the analyses, the causal belief is the particular coefficient obtained from the regression for each dimension.

In the literature on causal inference, Hainmueller et al. (2014) explain that FSs enable us to non-parametrically identify average marginal component effects (AMCE), which is the effect of a dimension averaged over the joint distribution of the remaining dimensions. Thus, the AMCE of the information about lottery winner status represents the average effect of this dimension on the believed level of happiness, where the average is identified over the distribution of the dimensions (age and religion) across repeated samples. In addition to AMCE, analysts could also estimate interactions between vignette dimensions, referred to as the average component term effect (ACIE). In other words, the causal belief of winning the lottery could vary with the values of the other treatments. Both AMCE and ACIE are causal beliefs unbiasedly estimated through FSs.

The diagram illustrated in Figure 1 represents a hypothetical structure of beliefs and how factorial surveys enable us to identify causal beliefs. Y represents the level of happiness, and each X_i a potential determinant. Let's say income (X_1). The relationship between X_1 and Y is the causal belief. It is equivalent to the coefficient of the rating task predicted by that vignette dimension. However, as in the “real world”, income is correlated with gender (X_2) considering the well-known gender gap in earnings. It is represented with the dashed line connecting X_1 and X_2 . Thus, combining the vignette's dimensions, I block the link between X_1 and X_2 due to the orthogonality. The same happens with any other dashed line connecting X_i dimensions.

Randomization could also avoid backdoor paths generated by unobserved determinants as X_7 . X_5 and X_6 are randomly assigned as with any other dimension of the vignette. Therefore, the design rules out the effects from X_7 . A particular case is the dimension denoted with Z . It is a dimension not included in the vignette, such as X_7 . Its effect on X_1 is canceled because of randomization. Nevertheless, the effect of X_1 on Z is possible. For instance, in the beliefs structure, income (X_1) could affect happiness (Y), because people with higher income could travel more (Z). And people who travel could be happier. Hence, I have a direct effect ($X_1 \rightarrow Y$) and an indirect effect ($X_1 \rightarrow Z \rightarrow Y$). In causal inference literature, these relationships are termed *mechanisms as causal processes*, which describes

how the effect of a treatment (vignette dimension) flows through another intermediate variable in a causal pathway from X to Y (Imai et al. 2011). It highlights the relevance of the accurate selection of dimensions to be included in the vignettes. They should be supported by theory, previous studies, or qualitative fieldwork. Although the effect of any dimension on a particular judgment is a causal belief, missing an important Z could lead to overlooking important causal mechanisms. A solution that some social scientists have adopted in survey experiments is withholding one of the dimensions as a possible variation. Doing this, I could estimate the overall average treatment effect and the controlled direct effect of a dimension when the mechanism is present (Acharya and Sen 2018; Imai, Tingley, and Yamamoto 2013). In addition, the design requires working from the assumption that all relevant mediators have been accounted for. However, a potential limitation in every FS is the omission of essential dimensions.

Apart from endogeneity, this approach could assess the relationality of the beliefs by interacting dimensions of vignettes. Ω_1 represents the interaction of X_1 and X_2 . All the possible combinations between dimensions are part of the universe of vignettes. Following the example, I can find females and males with the whole range of given incomes. The vignettes enable us to generate hypothetical cases that are hard to find in the “real world”. Finally, due to its hierarchical structure, I can estimate interactions between dimensions and characteristics of subjects, which is denoted by Ω_2 . Vignettes are randomly assigned, so there is no effect of characteristics of the individual (Π) on dimensions. However, the cross-level interaction shows the heterogeneity treatment effect by respondents’ characteristics (Ω_2).

[Figure 1]

Finally, FSs address the relationality of beliefs in a different and complementary way to relational methods in cultural analysis mentioned above. Relational Class Analysis (RCA, Goldberg 2011) enables to understand the structure of relevance and opposition that make symbols meaningful. This method does not compare individuals on their attitudes or beliefs, but instead on patterns of association among them within and between individuals. For instance, people could disagree with the belief about money or family as making happiness. However, they could evaluate them using the same logic generating different groups based on the heuristic applied. They could be in opposition in one group, but complementary in other. Both RCA and FSs stand in the theoretical understanding of culture as a complex relational network of embodied meanings. Moreover, the latent structure of classes in RCA unfold cultural logics as non-declarative elements of personal culture. FSs also unfold non-declarative causal beliefs by means of evaluation of hypothetical scenarios. Nonetheless, while RCA focuses on the logic of assessment, FSs are useful to understand the beliefs themselves net out

the “noise” of functional interdependence in order those isolate unique effects. Beliefs Networks Analysis (Boutyline and Vaisey 2017) is a novel method to understand the relational structure of beliefs of public culture. However, BNA aggregates declarative forms of personal culture to generate a structure of explicit opinions, attitudes, and beliefs of a population. In factorial survey, FSs generate a public culture by aggregating non-declarative forms of personal culture. In addition, I propose that FSs could be explicitly used to understand the structure of causal beliefs.

Data and Method

Data

As mentioned, I analyze data from the 2015 edition of *El Barómetro de la Felicidad* [The Happiness Barometer], which is unique data set specialized in quality of life and which contains a FS for measuring happiness beliefs in a large probabilistic sample. The sample comprises 2,267 Chileans over the age of 18, who were interviewed face-to-face. With respect to the sampling of interviewees, the probabilistic sample was based on a multistage stratified design. The original sample was further restricted under two conditions. First, respondents with missing data in the vignette module were deleted (N=124), as were respondents who showed no variance in their ratings of the vignettes (N=11). After the deletion of incomplete observations in the variables under analysis, the study used an analytic sample of 1,989 respondents. All the analyses were weighted by population distribution of gender, educational level, region, and age for the year of the data collection according to official national statistics. Coefficients in unweighted models maintain their statistical significance and direction; only slight variations in its magnitude are noticed. Table 1 shows a summary of the statistics of the respondents.

[Table 1]

Factorial survey design

The main characteristic of the FS is that respondents rate a set of fictitious vignettes, which describe plausible cases by different dimensions. The interviewees have to rate each vignette (i.e., happiness evaluation). The design of the FS study consisted of three main stages described in this section: definition of the dimensions, sampling of the vignette population, and design of the questionnaire.

The pretest of the survey suggested the inclusion of up to eight dimensions, which were selected drawing on the literature and previous qualitative fieldwork. Eight characteristics were

included as dimensions: gender, age, partner relationship, family relationships, income, health status, style of life, and intergenerational mobility. Table 2 shows the detail of dimensions and levels. To indicate gender, female and male names considered common according to national statistics were used. Other studies have successfully used naming as an operationalization of vignette dimensions in the same context under study (Castillo, Olivos, and Azar 2019; Mateo Piñones and Valenzuela Carvallo 2017). In the questionnaire, the respondents were asked to evaluate the given description in each vignette on an 11-point scale ranging from completely unhappy (0) to completely happy (10).

[Table 2]

Once the vignettes' dimensions and levels were defined, the number of possible cases (termed vignette population) was calculated based on the fully crossed combination of the levels of dimensions, in this case: $2(\text{sex}) \times 6(\text{age}) \times 5(\text{marital status}) \times 4(\text{family relationship}) \times 8(\text{income}) \times 4(\text{health status}) \times 4(\text{style of life}) \times 5(\text{intergenerational mobility}) = 253,000$ (vignettes). In the second stage of the design, it was necessary to draw a smaller number of representative vignettes that could be answered by the respondents. Neither implausible nor illogical cases were detected. An efficient sample that minimized the covariance of coefficients was obtained with a D-efficient measure (99.6153), which provides the smallest possible sample with the lowest degree of correlation between dimensions (Dülmer 2007; Kuhfeld, Tobias, and Garratt 1994). This procedure was carried out using an algorithm in SAS (Statistical Analysis Software). The procedure generated a (D-efficient) sample of 120 vignettes. Overall, after completion of the sampling design, the correlations between the dimensions remained zero. Therefore, relational endogeneity was overcome. A random selection of vignettes does not ensure this orthogonality.³ A sample of a rated vignette is shown in Figure 2.⁴

[Figure 2]

A common problem in designing FSs is defining the number of vignettes and respondents. Several aspects should be considered. First, in order to conduct multilevel analysis, at least 50 respondents (level 2) are needed to produce unbiased standard errors at the respondent-level (Maas and Hox 2005). Second, the total number of vignettes is indicated by D-efficient. A design with around 7 or 8 dimensions will have an efficient design of around 100 to 200 vignettes (Auspurg and Hintz 2014). Third, methodological studies have shown consistency and fatigue problems with more than 20 vignettes per respondent (Sauer et al. 2011). Finally, each vignette should be rated at least

³ See Dülmer (2007) for a broader discussion of the pros and cons of different FS sampling systems.

⁴ See Shamon, Dülmer and Giza (2019) for a recent discussion of presentation formats (text vs. table) in FSs.

five times (Auspurg and Hintz 2014). The more conservative literature in choice experiments recommends at least 50 rates per vignette (Bennett and Adamowicz 2001). However, this latter criterion has not been statistically probed.

The final step was the distribution of the vignettes into questionnaires. The total of 120 cases was still too large to be rated by each respondent; in such situations, allocating the vignettes to different questionnaires called decks is recommended. Vignettes were randomly assigned to 10 decks, each containing 12 vignettes. Thus, all the criteria described above were fulfilled. The decks were randomly assigned to respondents. With the original sample of 2,267 respondents, it was possible to calculate the total number of vignettes to be evaluated: $2,267 \text{ (respondents)} \times 12 \text{ (vignettes)} = 27,204$. As mentioned, the final sample of respondents after constraints was restricted to 1,989. Therefore, a total of 23,868 vignettes were rated and considered in the analysis.

The random combination of the levels of the dimensions enables us to estimate all the main effects independently of each other. As mentioned, the correlation among dimensions is zero after D-efficient sampling. In addition, Table 3 shows the correlation matrix of the dimensions for the final sample of respondents. Although they are not zero, the correlations are low. The orthogonality of the final sample of rated vignettes is supported. The slightly correlated dimensions are explained by the unbalanced application of decks. Therefore, each multivariate model includes dummy variables by deck.

[Table 3]

Several scholars indicate that the main advantage of FSs is the combination of the causality of experiments and the external validity of surveys (Auspurg and Hintz 2014; Jasso 2006; Wallander 2009). However, despite the care taken in designing the evaluations, there is a significant risk of cognitive bias (Sauer et al. 2011). A body of methodological literature with best practices in FSs has emerged in recent years (Atzmüller and Steiner 2010; Auspurg and Hintz 2014; Dülmer 2007; Eifler 2010; Lang 2018; Liebe et al. 2017; Sauer et al. 2011). Validations have been conducted in European countries with evidence supporting their application (Atzmüller and Steiner 2010; Eifler 2010; Sauer et al. 2011). However, there has been a noteworthy lack of discussion on the feasibility of applying FSs in less developed countries. FS applications in developing countries are recent (Castillo et al. 2019; Liebe et al. 2017; Mateo Piñones and Valenzuela Carvallo 2017; Olivos 2015). In particular, Latin American countries are characterized by lower educational levels (Barro and Lee 2013), high levels of institutional mistrust (Zmerli and Castillo 2015), and high levels of social disorganization

and fearful communities (Valenzuela et al. 2008). Therefore, the feasibility of applying FSs in Chile cannot be taken for granted.

In addition, an analysis of reliability and cognitive bias was conducted using a measurement of the perceived difficulty of the vignette module at the end of the module. As is shown in Table A1 in the appendix, a small group of respondents considers the vignette module difficult or very difficult (4.56% and 1.08%). Although this is a small fraction of respondents, the X^2 test suggests an association of age and educational level with perceived difficulty (Tables A1 and A2 in the appendix). However, Cramer's V indicates that these associations are weak. Similar evidence is reported by Saeur et al. (2014) for the case of the FS module of the German Socio-Economic Panel. Furthermore, a straightforward measure of consistency was conducted with the squared residual of the vignette dimensions predicting the rating task as the dependent variable. Following Sauer, Auspurg, Hinz, and Liebig, the “*inconsistency of responses was measured by the squared level-one residuals from random intercept regressions with the vignette rating serving as dependent variable and all vignette dimensions as predictors*” (2011:94). As shown in Table A3 in the appendix, education and age are not related to the consistency of the judgments. Moreover, the effect of the vignette position (linear, quadratic, and cubic effects) is significant. These are indicators of a learning effect because the U-shape shows a decreasing inconsistency while moving forward in the vignette module. In sum, the analysis suggests a high degree of robustness of the FS module.

Individual-level measurements

In order to test the influence of the personal experience on causal beliefs, several individual-level measures are included in the analyses. The questionnaire provides objective measurements for every dimension of the vignettes:

Gender. Respondents reported their gender in a binary indicator where 1 signifies male and 0 female.

Age. It is measured as the self-reported age in a continuous measurement.

Marital status. It is measured by three binary variables. First, a dummy indicator of single status (1 “yes” and 0 “no”). Second, a binary indicator for divorced or widowed (1 “yes” and 0 “No”). And third, an indicator for married (1 “yes” and 0 “No”). I include only the first two indicators to avoid multicollinearity.

Family relationships. The quality of family relationships is measured by a 9-item index (Cronbach's $\alpha = 0.82$). Each item was answered in a range from 1 "Never" to 5 "Always." It includes questions such as "Do you feel that your family like you?", "Do you talk about your problems at home?", "Are you satisfied with the time that you and your family spend together?", among others.

Subjective economic situation. Straightforward measurement of the family financial situation: "Overall, how do you evaluate your economic situation and the one of your family." Respondents answered on a 3-categories scale: good, neither bad nor good, bad. I dichotomized each category and used the first two as binary indicators.

Health. It is measured by self-reported health status: "Overall, how do you evaluate your current health status." Respondents rated it in a range from 1 "very bad" to 5 "very good."

Stressful Lifestyle. The questionnaire provides a single measurement of perceived stress in people's life. Respondents were asked "Thinking in the last years, you describe your life as..." They could answer in a range from 1 "very stressful" to 4 "nothing stressful."

Intergenerational Mobility. The questionnaire includes a comparison with parents in terms of the economic situation. Interviewees compare with the economic situation of their parents at the same age in a range from 1 "worse economic situation" to 10 "better economic situation."

Analytical strategy

For a straightforward interpretation, Auspurg and Hinz (2014) recommend linear models when using 11-points rating scales, being a common practice in FS studies (Wallander 2009). In addition, as mentioned above, FSs have a hierarchical structure of at least two levels: vignettes and respondents. Thus, the assumption of independent observations of OLS models is violated. In this case, each respondent rated 12 vignettes, which leads to correlated errors. Moreover, an FS analysis aims to estimate the effect of two kinds of independent variables. First are the vignette dimensions and their levels, which could include interaction terms, and second, how these coefficients vary according to respondents' characteristics. The former effects are causal beliefs, while the latter represents the variation of those beliefs across individuals. Therefore, hierarchical linear models are used to simultaneously estimate coefficients at vignette and respondent levels (Auspurg and Hintz 2014; Hox, Kreft, and Hermkens 1991; Lyons 2008). Two equations are estimated: one for vignette effects within respondents and another for respondents' effects between respondents. The within-respondent equation is defined as follows:

$$Y_{ij} = \beta_{0i} + \beta_{i1}X_{ij1} + \beta_{i2}X_{ij2} + \dots + \beta_{in}X_{ijn} + e_{ij} \quad (1)$$

where Y_{ij} is the happiness rating of the respondent i (for $i = 1, \dots, 2,103$) corresponding to the vignette (fictitious person) j (for $j = 1, \dots, 12$); X_{ijn} is the value of the vignette characteristics for vignette j and respondent i (for $n = 1, \dots, 8$); β_{in} is the causal belief (regression coefficient) within respondent i for n vignette dimensions; and e_{ij} is the random error. Each vignette characteristic could be interacted with each other to understand their relationality. However, it is omitted from the formula for the sake of simplicity.

Furthermore, individual happiness ratings on the respondent level are predicted by the values of vignette dimensions. Thus, for each within-respondent coefficient, the between-respondent equation can be expressed as:

$$\beta_{im} = \gamma_{0m} + \gamma_{1m}Z_{1i} + \dots + \gamma_{rm}Z_{ri} + \delta_{im} \quad (2)$$

where β_{im} refers to the within-respondent regression coefficient for vignette dimension m and respondent i ; Z_{ri} is the values of the individual characteristics for respondent i ; γ_{rm} represents the regression coefficients describing the effect of respondent's characteristics on β_{im} ; and δ_{im} the random error. This second equation enables to understand how the causal beliefs vary between individuals.

Results

Single causal beliefs

Table 4 presents the effects of vignette dimensions only. As Model 1 suggests, the dimensions of the vignette explain 12% of the happiness judgment variance (Vignette-level $R^2 = 0.118$). The main effects do not change substantially when including respondent-level variables into the model, which supports effective randomization. The unstandardized effects of each dimension on the rating task are reported, which could be considered as the beliefs of the Chilean population over 18 years about determinants of happiness. This analysis untangles the causal attribution of each determinant in the belief system. According to the respondents, females ($B=0.073$, $p<.01$) are happier than men. This

belief is consistent with the objective difference that suggests women are happier than men across countries from different regions and in different stages of development, including Chile (Zweig 2015).

[Table 4]

The second dimension is age. It is a factor usually omitted in studies of beliefs about happiness determinants, although its relevance is increasing with the aging of the population. For the Chilean case, there is a lasting discussion about the current pension system and the precarity of elders after retirement (Castillo et al. 2019), which suggests a negative effect of age on happiness. Table 4 indicates the opposite; the older the fictitious person is, the happier ($B=0.021$, $p<.01$). When examining in detail the linear prediction of age as a categorical variable (Table A4), it exhibits a non-linear pattern. The difference between persons at the age of 70 and persons at the age of 20 is not statistically different, $X^2(1) = 3.84$, $p>.05$. However, the linear prediction indicates that persons at the age of 40 are less happy than persons at age 70, $X^2(1) = 15.34$, $p>.000$. Thus, according to the beliefs of Chileans, middle-age people have the lowest level of happiness. It is important to emphasize that this belief could be driven by an attitude toward the past, instead of the current conditions. The older generation could be rated as happier because of a nostalgic judgment about the past.

Regarding partner relationships, Chileans believe that persons with a recent breakup ($B=-0.130$, $p<.001$) are less happy than those who have had a partner for five years. In addition, persons will be happier in a 1-year relationship ($B=0.099$, $p<.01$) or single for a year ($B=0.117$, $p<.01$), compared to a 5-year relationship. There are no differences in the happiness belief regarding individuals who have been single or in a relationship for 5 years. The linear prediction (Table A4) confirms that Chileans believe that persons with a recent breakup are the less happy, $X^2(1) = 16.74$, $P<.000$. A breakup is considered as a shock that disrupts people's well-being. This belief could have important implications for decision-making in partner relationships. From a rational perspective, people will decide to leave a relationship based on the costs and benefits of the dissolution as an alternative state (Rusbult, Martz, and Agnew 1998). If breakups are believed having negative consequences on the happiness level, couples could tend to stay together as an avoidance strategy. The other differences are also confirmed by Wald tests.

As mentioned in the framework, the belief in family relationships is one of the most relevant dimensions across cultures and a key explanatory variable of objective happiness in Latin America. The effect of family relationships supports the logical idea that better family relationships increase the happiness level ($B=0.168$, $p<.001$). The linear prediction (Table A4) and Wald tests confirm that

subjects with good family relationships or very good family relationships are happier than bad and very bad relationships. It is important to notice that fictitious individuals with good family relationships are slightly happier than individuals with very good family relationships. However, the Wald test is significant only at 95 percent of confidence, $X^2(1) = 4.85$, $p > .05$.

Moreover, the two more individualistic determinants are also significant predictors of happiness, according to Chileans: income and health. The belief about a positive impact of income on happiness ($B=0.142$, $p<.001$) is strong. Nevertheless, Table 4A indicates that the effect is non-linear. It is a substantive finding that contradicts a narrative found by Hyman (2014) and also different from other non-linear effects recently found for a large number of countries (Jebb et al. 2018). In Hyman's (2014) study, British interviewees consider wealth as an important predictor of happiness, but at a certain point, an increase in the income level does not increase the level of happiness. In the case of Chile, as suggested by Wald tests, an increase from 600000 to 800000 Chilean pesos does not increase happiness, $X^2(1) = 1.65$, $p > .1$. However, the increase in the lower and higher levels is statistically significant. Regarding health, Chileans believe that bad health decreases the level of happiness ($B=-0.451$). An interpretation of the relevance of this dimension in lay theories of happiness is provided by Delle Fave et al. (2016). They argue that it is prominent in countries such as Croatia and Hungary, due to stress and lower availability of health services. As a matter of fact, Chile is one of the countries with lower levels of trust in the health system among the countries included in the International Social Survey Program (Zhao, Zhao, and Cleary 2019). Both income and health are individual domains in opposition to the idea of collectivistic happiness related to family and social relationships.

Chileans also believe in a positive effect of intergenerational mobility on the level of happiness ($B=0.095$, $p<.001$). It is another important dimension in the Chilean context, which shows both high levels of unequal and intergenerational mobility among non-elite classes (Torche 2005). Thus, a possible explanation is the generation of a narrative of hope associated with social mobility, which is fulfilled by the fictitious cases who are better-off than their parents. Finally, the lifestyle of the fictitious persons described is believed to generate specific happiness levels. Persons with an exciting life were considered happier than persons with a boring ($B=-0.561$, $p<.001$), $X^2(1) = 187.47$, $p<.000$, or with a stressful life ($B=-0.657$, $p<.001$), $X^2(1)= 279.80$, $p<.000$. Nevertheless, there is no significant difference between having an exciting or quiet life, $X^2(1)= 0.09$, $p > .1$.

However, this analysis does not indicate which dimensions are most important in the belief structure of Chileans. Thus, following a common practice in FS research (Liebig and Mau 2016;

Shepelak and Alwin 1986; Shlay 2010), Model 1 is estimated considering standardized coefficients and plotted in Figure 3. In the case of nominal dimensions (partner relationship and lifestyle), each level is recoded into a dummy variable, and the original reference category in the unstandardized model is omitted to avoid collinearity. Since dimensions explain rating across individuals, they are standardized over the entire sample, and not within each respondent. The standardized coefficients indicate that health is the most important predictor of happiness for Chileans, followed by income and lifestyles. Despite being significant predictors, gender, age, and partner relationships showed lower relevance. It is consistent with the individualistic understanding of happiness instead of collectivistic, which contradicts the traditional classification of Chile as a collectivistic country (Hofstede et al. 2010).

[Figure 3]

The relationality of beliefs about income

From a relational perspective, it is crucial to understand how these causal beliefs related to each other. Figure 4 reports the effect of income on the rating task, namely “belief about income,” across the levels of the other dimensions. As discussed, income is one of the most contested predictors of happiness research and a recurrent explanation of happiness in the popular culture and lay theories of happiness. This finding is an outstanding contribution to happiness studies. In this analysis, I examine whether this belief is contingent upon other factors. Could money alone make us happy? Overall, the interactions indicate that the belief in income is contingent upon several of the dimensions considered in the vignettes.

[Figure 4]

The belief about income varies by age, partner relationships, family relationships, health, stressful lifestyle, and intergenerational mobility. The interaction with age (B) shows an intricate pattern, with an evident decline in old age. This finding suggests that the income adequacy of the elderly found in aging studies in different contexts (Gildner et al. 2019; Litwin and Sapir 2009) is shared by the Chilean population. Scholars have explained this adequacy by three reasons (Stoller and Stoller 2003). First, households headed by elders require less income than younger families. Second, they require just a fraction of their preretirement income to maintain their living standard. Third, they adjust their living standard downward. This adequacy itself is a mechanism to ensure a higher level of life satisfaction (Gildner et al. 2019).

A recent breakup (E), bad health (H), and a stressful lifestyle (K) show a common pattern. The belief about income as a determinant of happiness decreases upon these detrimental factors. Income cannot compensate for the negative effect on life satisfaction of a breakup and bad health. Regarding a stressful lifestyle, it could be understood as a counterproductive effect of earning a higher income. If the cost of having a higher income is a stressful life, its effect on the happiness level will be smaller.

Chileans also believe in a stronger effect of income on happiness when persons are in a recent relationship (F). Scholars in economic psychology (e.g. Powdthavee 2009) have pointed out that partner relationships provide higher real income per partner. The literature has also shown that spending money in another person increases the level of happiness, and even more than in oneself (Dunn et al. 2008). Thus, having a relationship generates the opportunity for this increased effect of income. This interpretation could also be applied to the U-shape described by the interaction with the family relationship dimension (G). The belief about income has a higher effect when family relationships are in the best state. Nevertheless, income can compensate for bad family relationships as well. Finally, the interaction with intergenerational mobility (L) is intricate and challenging to interpret substantively. This pattern could be explained because the indicator of mobility is not domain-specific and provides difficulties to judge in interaction with income. However, it confirms the contingency of the belief about income.

Availability heuristics

Finally, a third analysis enables us to discuss the availability hypothesis, where more remarkable experiences of the observer may increase the effect of each dimension. Thus, I interact the vignette dimension with similar or related indicators at the respondent-level. These results suggest heterogeneity treatment effects. Table 5 shows only significant interactions. Random effects indicate that the effects of without partner for one year, and quiet and stressful lifestyles vary between respondents. The variations of these dimensions are significantly explained by respondents' experience of these dimensions. Single respondents are more likely to increase the positive effect of being without a partner for one year ($B=0.125$, $p<.05$) in comparison to 5 years with a partner. In contrast, divorced or widowed respondents ($B=-0.181$, $p<.05$) are less likely. Moreover, stressed respondents report a stronger positive of quietness belief ($B=0.064$, $p<.05$), and make the stress more salient as a negative determinant of happiness ($B=-.062$, $p<.05$). For every other individual-level characteristic, such as income or health, there was no heterogeneity of treatment effect by individual

characteristics/conditions. This might suggest that these causal beliefs are culturally widespread and not contingent on respondents' characteristics⁵.

[Table 4]

As mentioned, FSs are useful tools to identify non-declarative components of personal culture through an evaluative exercise. The cultural learning associated with this mode of culture is slow and through long exposures to specific circumstances (Lizardo 2017; Lizardo et al. 2016; Patterson 2014). Thus, lifestyles and marital status could be understood as these circumstances that could be stored in the non-declarative memory affecting implicit beliefs about happiness determinants⁶. Income, family relationships, social mobility, and health are more dynamic processes that are harder to be internalized.

Conclusions and Discussion

This study documented a *folk theory* of happiness determinants. Previous studies have used semi-structured interviews or non-experimental surveys to identify the conceptualization of happiness and beliefs about its determinants (Chiasson et al. 1996; Delle Fave et al. 2016; Lu and Gilmour 2004; Pflug 2009). With FSs, this study enabled causal beliefs to be identified as part of practical consciousness. In this regard, Chileans believe health and income are the most significant predictors of happiness. This finding suggests that Chileans' beliefs are on the individualistic side of the collectivistic-individualistic axis. Therefore, regarding beliefs about sources of happiness, Chile cannot be considered a collectivistic country as recognized in the past (Hofstede et al. 2010).

Moreover, another conceptualization of value systems enables us to classify the Chilean case. Welzel and Inglehart (2010) defined survival versus self-expression values. The former emphasizes economic and physical security, which is consistent with the prominence of health and income as determinants of happiness in this study. Thus, self-expressive elements such as interpersonal relations and lifestyle are relegated to a second tier. Therefore, Chileans' beliefs are consistent with a survival value system. These findings compel us to re-evaluate other once-believed collectivistic countries that have gone through structural changes like Chile.

In previous studies, the prominence of health has been only found for Italy and Cuba using elderly samples (Sotgiu et al. 2011), which could be explained by the salience of health in old age.

⁵ I thank one of the reviewers for suggesting this interpretation of non-significant interactions.

⁶ Although important life events could be embodied, only a small proportion of singles (8.5 percent), divorced (13.9 percent), and widowed (18.2 percent) had transited to these states within six months in the sample.

The belief about income is a surprising finding in the Chilean case. A public opinion poll in the United States indicates that only 6 percent of the population thinks that money does not buy happiness (CNN/ORC 2014). This finding has been rarely documented by studies of lay theories of happiness sources as prominent. Two possible interpretations of this finding could be provided. First, although contingent upon other domains of life, Chile is a unique case of study where money plays an essential role in explaining happiness according to the people's beliefs. Economic development and neoliberal policies could be internalized, fostering materialistic beliefs.

Second, FSs enabled the estimation of non-declarative dispositions unaffected by social desirability. Social desirability is defined as the “*tendency of people to deny socially undesirable traits and to ‘admit’ socially desirable ones*” (Phillips and Clancy 1970:504). This style of response is an inherent problem in survey- and interview-based studies, which are used the most in happiness belief studies. It has been acknowledged as a severe source of bias in quality of life studies because a large component of the variance of well-being scales is related to social desirability (Carstensen and Cone 1983; Pavot and Diener 2009). The problem of social desirability is solved by FSs (Auspurg et al. 2015). FSs are an indirect questioning technique. Instead of asking what people think about a particular dimension, they evaluate it in a fictitious scenario. According to Lusk and Nordwood (2010), the assumption underlying indirect questioning is that when answering direct questions, people want to make themselves look good. Still, they are not concerned with making others look good. For instance, answering the direct question “*Does money make you happy?*” could be affected by the avoidance of seeming materialistic. This strategy leads us to reconsider and re-evaluate the scope of previous studies. The relevance of connectedness and inner harmony (e.g. Delle Fave et al. 2011, 2016; Kim et al. 2007) found by previous studies could be explained by unsolved social desirability biases.

However, a possible argument is that previous studies addressed different modes of culture. In interviews, people make sense of circumstances (Swidler 2001), while in FSs, I unveil a practical consciousness that drives decision-making. In a dual-process of culture (Lizardo et al. 2016; Vaisey 2009), both methodologies are compatible and enable us to understand different modes of personal culture (Lizardo 2017; Patterson 2014). Namely, non-declarative and declarative forms. In the first case, people internalize a public culture, while in the later, they use it to make sense of certain situations. Therefore, a cultural analysis of happiness beliefs might consider both conclusions as valid and complementary. The result suggesting an interaction between a specific belief and long-exposure conditions indicates that the causal beliefs identified are part of the non-declarative culture. Against

the argument of salience indicated by the Availability Theory (Thaler and Sunstein 2008), the evidence supports a process of cognitive learning via enculturation.

This study has also made methodological contributions to cultural analysis. Several methodological issues should be addressed when studying beliefs. Theories of human cognition and cultural sociology suggest that beliefs are highly endogenous. The identification of causal beliefs should overcome the potential bias brought about by the relationality of beliefs. Applying FSs to the study of causal attributions of happiness, this article showed how endogeneity bias could be addressed. The orthogonality of dimensions in the vignette sample and the random assignment of decks to respondents provide unbiased causal beliefs. What has been done throughout this article is to introduce a method that answers an important question about happiness beliefs. Moreover, unlike lab experiments, FSs seek causation in general population surveys. Therefore, a good generalizable answer about happiness beliefs is also provided. In addition, a broad discussion about the relationality of beliefs in social cognition and sociology offers a theoretical ground for using this survey method. FSs have been posited as a theoretically guided tool.

Further research could extend this analysis beyond happiness beliefs. The study of culture and cognition could be enriched by applications of FSs to understand configurations of cultural systems and causal beliefs. It is the case of a longstanding research agenda in social stratification that has discussed beliefs about poverty determinants (Homan, Valentino, and Weed 2017; Kluegel and Smith 1981). This question raises the same methodological challenges. Concepts such as “welfare queen” or “culture of poverty” are highly contested by both laypeople and scholars. FSs, as a form of indirect questioning, could be a strategy to overcome social desirability in this field and provide unconfounded estimations. This strategy could help to overcome current limitations in cultural analysis. For instance, Joslyn and Haider-Markel (2016) attempted to estimate the causal beliefs of homosexuality. However, endogeneity and social desirability two limitations of their findings due to the use of traditional survey methods. Another opportunity is to reexamine classical theories such as cultural omnivorousness (Peterson and Kern 1996). The evaluation of multidimensional fictitious scenarios could unfold the complexities of tastes, preferences, and consumption in a way that has not been explored before.

In sum, beliefs are both motivations and justifications for decision-making. For cultural studies, defining accurately causal attributions of happiness is a pivotal contribution to the understanding of life satisfaction attainment. If life is understood as a decision tree where life satisfaction is the goal, each node is a decision that considers conscious evaluations of objective

conditions and culture in its conscious and unconscious dimensions. FSs are a useful tool to unveil those unconscious elements of judgment in the pursuit of happiness.

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Table 1
Descriptive statistics

Variable	Mean	Standard Deviation	N	Min	Max
Male	0.50	0.50	1989	0	1
18-35	0.36	0.48	1989	0	1
36-52	0.34	0.47	1989	0	1
53-95	0.31	0.46	1989	0	1
Primary education	0.32	0.47	1989	0	1
High school	0.33	0.47	1989	0	1
Higher education	0.36	0.48	1989	0	1
Family Index	3.27	0.44	1989	1	5
Stressful lifestyle	2.72	1.02	1989	1	4
Subjective economic situation (Good)	0.33	0.47	1989	0	1
Subjective economic situation (Neither bad nor good)	0.55	0.50	1989	0	1
Subjective economic situation (Bad)	0.12	0.32	1989	0	1
Single	0.43	0.50	1989	0	1
Married	0.43	0.49	1989	0	1
Divorced or widowed	0.14	0.35	1989	0	1
Intergenerational mobility	4.67	1.99	1989	1	10
Health	3.73	0.88	1989	1	5
Deck 1	0.10	0.30	1989	0	1
Deck 2	0.08	0.27	1989	0	1
Deck 3	0.06	0.24	1989	0	1
Deck 4	0.08	0.27	1989	0	1
Deck 5	0.09	0.28	1989	0	1
Deck 6	0.14	0.35	1989	0	1
Deck 7	0.13	0.33	1989	0	1
Deck 8	0.11	0.31	1989	0	1
Deck 9	0.10	0.30	1989	0	1
Deck 10	0.12	0.33	1989	0	1
Perceived difficulty	4.14	1.25	1989	1	9

Note: Calculations based on weighted data.

Table 2
Dimensions and levels of vignettes

#	Dimension	Levels
1	Gender	Male/Female
2	Age	20/30/40/50/60/70
3	Partner relationship	Without partner for 5 years/Without partner for 1 year/Recent break up/ With partner for 1 year/With partner for 5 years
4	Family relationships	Very bad/Bad/Good/Very good
5	Income	\$210,000/\$400,000/ \$600,000/ \$800,000/\$1,000,000/ \$2,000,000/ \$3,000,000/\$5,000,000
6	Health ¹	Very bad/Bad/Good/Very good
7	Life style	Exciting/Quiet/Boring/Stressful
8	Intergenerational mobility	Much worse/Worse/Same/Better/Much better

Note: ¹ This dimension is reversed in the multilevel analyses and re-labeled as bad health.

Table 3**Orthogonality of vignettes' dimensions**

	Sex	Age	Partner relationship	Family relationships	Income	Health	Lifestyle	Inter. Mobility
Sex	1							
Age	0.022	1						
Partner relationship	0.036	-0.041	1					
Family relationships	-0.055	0.045	0.045	1				
Income	0.013	-0.002	-0.002	-0.049	1			
Health	0.020	0.009	0.026	0.018	0.043	1		
Lifestyle	0.016	0.061	0.004	-0.053	0.000	-0.036	1	
Inter. Mobility	0.023	-0.016	-0.043	0.000	-0.015	-0.010	-0.024	1

Note: Polychoric correlations reported. Calculations based on weighted data.

Table 4.
Results of multilevel linear models for happiness evaluation

VARIABLES	Model 1	
	B	SE
Female	0.073**	(0.025)
Age	0.021**	(0.007)
Partner relationship		
Without partner for 5 years	-0.053	(0.042)
Without partner for 1 year	0.117**	(0.038)
Recent break up	-0.130***	(0.039)
With partner for 1 year	0.099**	(0.038)
Family relationships	0.167***	(0.013)
Income	0.143***	(0.007)
Bad health	-0.456***	(0.016)
Lifestyle		
Quiet	-0.006	(0.036)
Boring	-0.566***	(0.040)
Stressful	-0.659***	(0.039)
Intergenerational mobility	0.093***	(0.010)
Constant	2.824***	-0.11
Vignette-level variance	0.828	-0.04
Respondent-level variance	3.083	-0.055
Vignette-level R^2	0.118	
Vignette-level observations	25,236	
Respondent-level observations	2,103	

Note: Robust standard errors in parentheses. Age, family relationships, income, health and intergenerational mobility are assumed to be continuous for the sake of simplicity. With partner for 5 years and exciting lifestyle are omitted to avoid multicollinearity. Dummies for decks and all the individual-level predictors included, but not reported. Restricted maximum likelihood estimation. R^2 shown is the proportional reduction of the mean squared error of prediction for the level 1 modeled proportion of variance, defined as: $1 - [\text{var}(Y_{ij} - X_{ij}) / \text{var}(Y_{ij})]$ (Snijders and Bosker 2012:352). Calculations based on weighted data. *** $p < .001$, ** $p < .01$, * $p < .05$.

Table 5.
Random Effects and Cross-level Interactions of Multilevel Linear Models for Happiness Evaluation

VARIABLES	Model 1 B	Model 2 B	Model 3 B	Model 4 B
<i>Fixed effects</i>				
Without partner for 1 year#R.Single	0.125* (0.058)			
Without partner for 1 year#R.Divorced or widowed		-0.181* (0.074)		
Quiet#R.Lifestyle			0.064* (0.030)	
Stressful#R.Lifestyle				-0.062* (0.029)
<i>Random effects (Variance)</i>				
Without partner for 1 year	0.780 (0.039)	0.78 (0.039)		
Quiet			0.869 (0.041)	
Stressful				0.854 (0.043)
Constant	4.518*** (0.297)	4.490*** (0.297)	4.666*** (0.301)	4.378*** (0.308)
Vignette-level observations	23,868	23,868	23,868	23,868
Respondent-level observations	1,989	1,989	1,989	1,989

Note: Unstandardized regression coefficients are reported. Unstructured covariance not allowed for factor variables. Robust standard errors in parentheses. Calculations based on weighted data. *** p<.001, ** p<.01, * p<.05.

Table A1
Perceived difficulty by age (%)

	Age			
	18-35	36-52	53-95	Total
Very easy	1.16	1.43	0.59	1.08
Easy	3.61	4.19	6.09	4.56
Fair	14.32	14.72	23.57	17.29
Difficult	46.71	54.07	51.98	50.8
Very difficult	34.2	25.6	17.77	26.27
Total	100	100	100	100
Pearson $X^2(8)$	85.996 Pr = 0.000			
Cramer's V	0.033			

Note: Calculations based on weighted data.

Table A2
Perceived difficulty by educational level

	Educational Level		
	Primary Education	High School	Higher Education
Very easy	33.95	25.8	19.97
Easy	45.23	52.43	54.22
Fair	15.4	15.36	20.68
Difficult	3.71	4.85	5.05
Very difficult	1.71	1.56	0.09
Total	100	100	100
Pearson $X^2(8)$	68.699 Pr = 0.000		
Cramer's V	0.111		

Note: Calculations based on weighted data.

Table A3
Regression on squared residuals

VARIABLES	Model 1	
	B	SE
Vignette position (1-12)	4.362***	(0.176)
Squared vignette position (1-12)	-0.687***	(0.030)
Cubic vignette position (1-12)	0.033***	(0.002)
Ref. Cat.: Higher education		
High school	-0.078	(0.092)
Primary school	-0.139	(0.108)
Ref. Cat.: 18-35 years		
36-52 years	0.079	(0.421)
53-95 years	-0.047	(0.663)
Constant	20.049***	(0.307)
Vignette-level variance	3.01e-14 ***	(7.29e-08)
Respondent-level variance	65.150***	(0.588)
Vignette-level R^2	0.040	
Vignette-level observations	23,868	
Respondent-level observations	1,989	

Note: Unstandardized regression coefficients are reported. Robust standard errors in parentheses. Restricted maximum likelihood estimation. R^2 shown is the proportional reduction of the mean squared error of prediction for level 1 modeled proportion of variance, defined as: $1 - [\text{var}(Y_{ij} - X_{ij})/\text{var}(Y_{ij})]$ (Snijders and Bosker 2012:352). Calculations based on weighted data. *** $p < .001$, ** $p < .01$, * $p < .05$.

Table A4
Linear Predictions of Multilevel Linear Models for Happiness Evaluation

Dimension	Level	Happiness rating	Std. Err.	[95% Conf. Interval]	
Sex	Male	5.21	0.03	5.15	5.26
	Female	5.25	0.03	5.20	5.31
Age	20	5.22	0.04	5.14	5.30
	30	5.22	0.04	5.15	5.30
	40	5.13	0.04	5.06	5.21
	50	5.29	0.04	5.22	5.37
	60	5.20	0.04	5.13	5.27
	70	5.31	0.04	5.23	5.38
Partner relationships	Without couple for 5 years	5.20	0.04	5.12	5.27
	Without couple for 1 year	5.31	0.03	5.25	5.38
	Recent break up	5.08	0.04	5.01	5.15
	With couple for 1 year and	5.33	0.04	5.26	5.40
	With couple for 5 years	5.24	0.04	5.17	5.31
	Very bad	5.04	0.03	4.97	5.10
Family relationships	Bad	4.97	0.03	4.90	5.03
	Good	5.49	0.03	5.43	5.55
	Very good	5.42	0.03	5.35	5.49
	Income	210000	4.41	0.04	4.32
Income	400000	5.03	0.04	4.95	5.11
	600000	5.29	0.04	5.21	5.37
	800000	5.22	0.04	5.14	5.30
	1000000	5.37	0.04	5.29	5.45
	2000000	5.44	0.04	5.35	5.52
	3000000	5.49	0.05	5.40	5.58
	5000000	5.63	0.05	5.54	5.72
	Health	Very good	5.78	0.04	5.71
	Good	5.78	0.03	5.71	5.85
	Bad	4.73	0.04	4.66	4.80
Lifestyle	Very bad	4.60	0.04	4.53	4.67
	Exciting	5.52	0.03	5.46	5.59
	Quiet	5.51	0.03	5.45	5.58
	Boring	4.97	0.03	4.90	5.04
	Stressful	4.89	0.04	4.83	4.96
Intergenerational mobility	Much worse	5.03	0.04	4.96	5.10
	Worse	5.05	0.03	4.99	5.12
	Same	5.37	0.03	5.30	5.44
	Better	5.34	0.04	5.26	5.41
	Much better	5.36	0.04	5.29	5.43

Note: Linear prediction from multilevel model with all the predictors as factors. Estimations with covariates at the means. Robust standard errors. Dummies for decks and all the individual-level predictors included. Calculations based on weighted data.

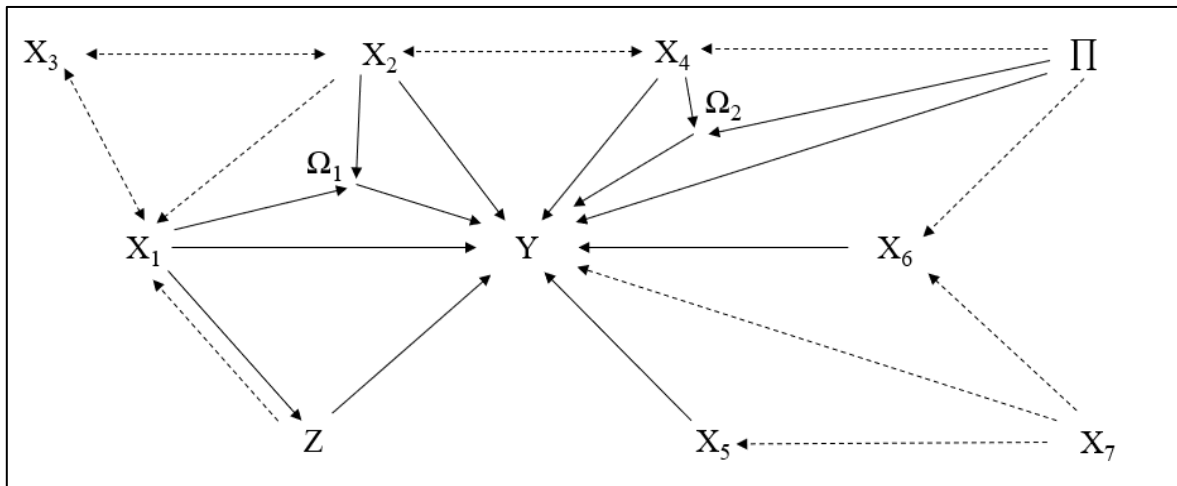
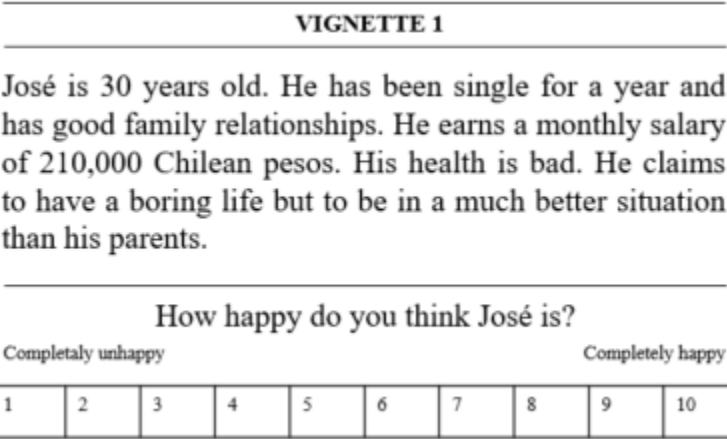
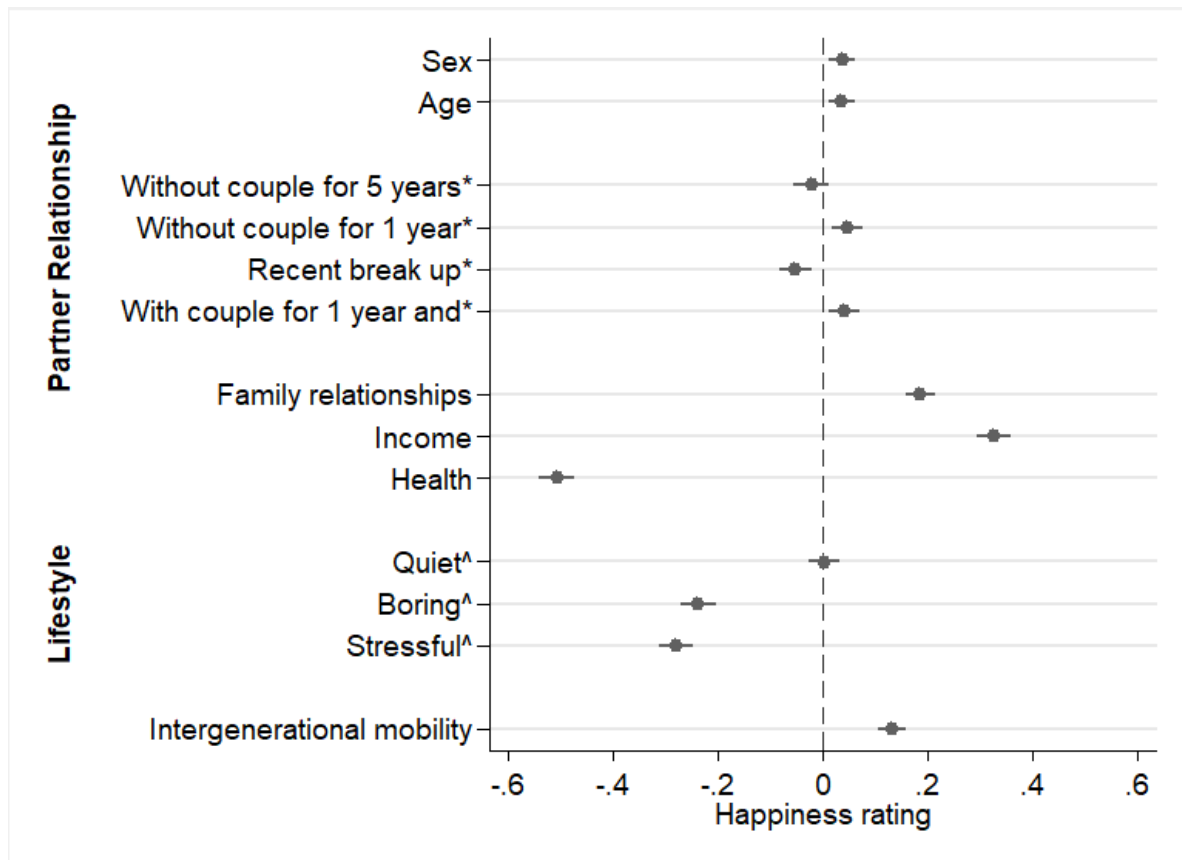


Figure 1
Diagram of a hypothetical structure of beliefs and its methodological challenges



Note: 210,000 Chileans pesos was equivalent to 320 USD at the time of the survey and is the minimum legal wage in Chile.

Figure 2
Sample vignette translated into English.



Note: Linear predictions at the means of covariates. *Reference category “With couple for 5 years”. ^Reference category “Exciting”. The model includes respondent-level predictors.

Figure 3

Standardized coefficients from multilevel model for Happiness Evaluation.

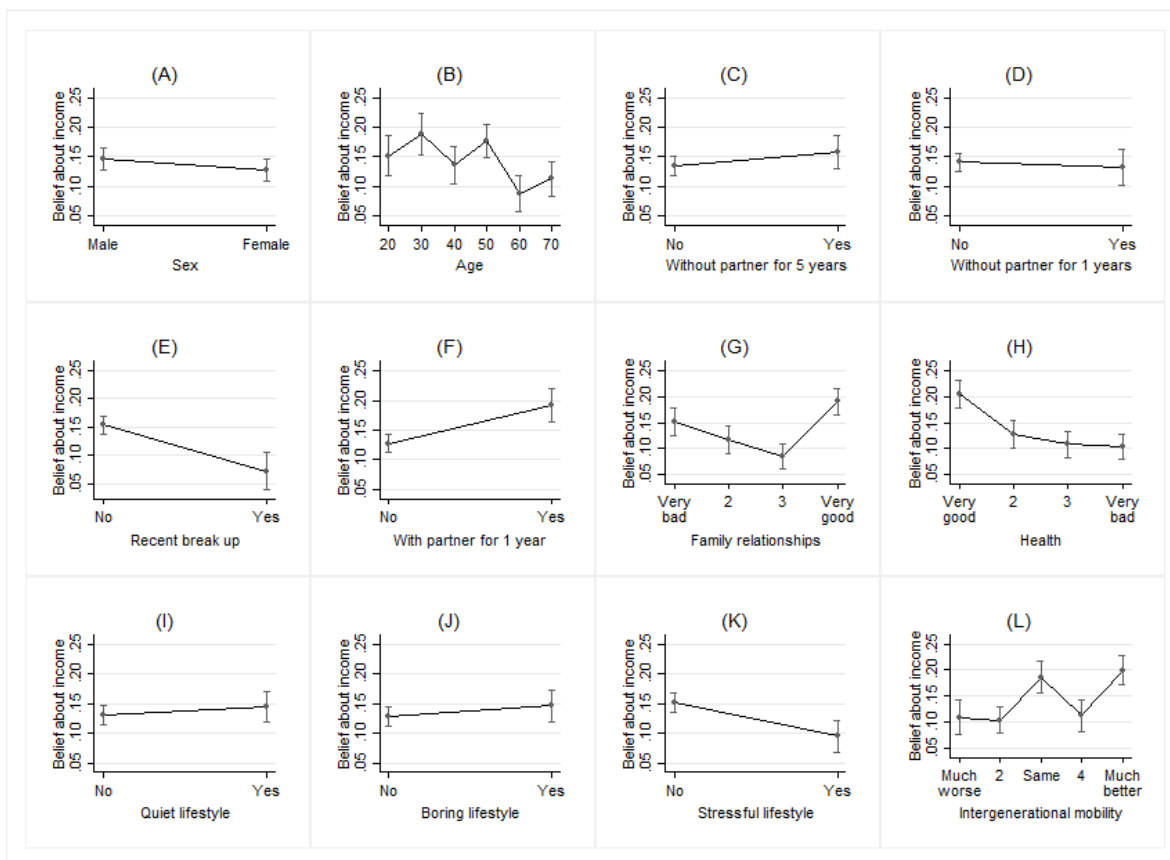


Figure 4
Interaction of income dimension with other vignette's dimensions.