

ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics
Master Thesis - Behavioral Economics

**OPTIMISM IN SELF-ASSESSED ELICITATIONS OF
HABITS PRACTICES - AN INSURANCE APPROACH**

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Date final version: 19/07/2022

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Introduction

Eliciting people's risk behaviors is an essential process for an insurance company as a primary source for pricing, underwriting policies, product development, loyalty schemes, and reward strategies. Driving skills, cellphone use in the car, regular sport practice, nourishment preferences, alcohol, and cigarette consumption, among many others, are examples of relevant behaviors that from the insurance perspective aid to have a better understanding of specific risk profiles within its customer base. Identifying and measuring these patterns, especially in early stages of the underwriting process, allows the insurer to have a more robust pricing structure, using this information as a strong complement for other variables such as claims and losses. From the risk management point of view, describing and potentially predicting individuals' behaviors facilitates the implementation of risk mitigation strategies, with a special focus on highly vulnerable segments according to their risk profile.

In general terms, some of these behaviors can be elicited and described by the insurance company, particularly those that allow for objective verifications through technical or scientific procedures such as smoking or drug addiction, alcohol abuse or professional sport practice. However, the first challenge comes when the purpose is to identify and properly elicit people's patterns and habits that cannot be easily or realistically measured because of its subjective nature or because they rely mostly on personal private views or future intentions. For instance, willingness to have a healthy diet, exercise on a regular basis, vaccination acceptance or driving without having consumed alcohol are examples of habits that are of high importance for the risk profiling aim but cannot be objectively measured by an insurance company.

To identify these subjective behaviors, insurance firms use mostly individuals'-based surveys collecting participants subjective and personal evaluations of these matters. Nevertheless, the flaw with this information is that people's responses could be seriously biased because of an overestimation of their "desirable or potential performance"

regarding the practice of these habits. In particular, individuals tend to think better of themselves when asked about “undesirable behaviors” or can attribute a higher weight on the probability to undergo “socially desirable practices” such as driving completely sober, going to the gym or eating a low-carb diet. By contrast, the academic literature has found that asking people about others and their corresponding predicted behavior, is a more accurate and realistic approach in survey data collection, explained by a lower level of overoptimism and higher sense of objectivity when analyzing others rather than one-self (Helzer & Dunning, 2012).

Embracing the multiple successful findings in the literature regarding the strengths of asking people about their social circle and their respective beliefs, this could in turn become a powerful alternative applicable by an insurance company to complement its current risk profiles elicitation and obtain a more accurate diagnosis of its customer base in terms of habits and social trends incorporation. By means of this practical procedure, the firm could use the refined profile information to robust and strengthen the different application territories previously described in this context.

In specific, the research question that is going to be explored in this thesis is to what extent the elicitation of habits diverges between the individuals’ self-assessments perspective and the one corresponding to their close social-circle. As an extension of this question, a more detailed characterization of this divergence will be addressed in terms of some demographic variables such as age, gender and socio-economic conditions of the collected sample.

Literature Review

Relevance of Habits Elicitation for Insurance Application

From the insurance practice perspective, concepts such as risk and information play a fundamental role as the primary source of information for the industry to exist and continuously develop products and solutions. As defined by Dr. P.K. Gupta in his book *Fundamentals of Insurance*, insurance represents a **social device** that allow a group of individuals to transfer their risks to another party (risk pooling), in order to have a **combined historical experience** which provides the insurer with enough elements to statistically predict potential future losses and cover them by means of the contributed funds (premiums) paid by all the individuals who participated in the risk transferring. In this definition, the combined historical experience conceives the whole set of explanatory variables that could to different extents influence the probability of occurrence of a loss event, and therefore, trigger the usage of an insurance policy as a financial mechanism to cover the affected individuals. These variables usually correspond to qualities, behaviors, and experiences that are representative for the specific risk that is going to be covered, following the assumption that future losses corresponding to that risk will be mostly determined by the same group of factors (Gupta, 2022). In this sense, life insurance lines for example, consider aspects based on age, gender, health status, occupation, genetics, etc. General Insurance lines on the other hand, such as car or fire insurance, rely besides the individual variables in other factors related to the “insured property”, for instance, the type of car, engine power, the characteristics of the house or the building, etc.

Most part of the information regarding these variables could be obtained during the underwriting process, as an essential part of assessing and categorizing the level of risk correspondent to a specific group of individuals (Gupta, 2022), allowing for a better knowledge and risk profiling of the insured customer base. In order to properly collect and evaluate this data, insurers have traditionally relied on two main sources of information. The first one is the historical loss experience of the policyholder or the ones similar to his

risk profile, which is one of the main factors considered within the pricing process of most insurance companies (Störmer, 2014). The second corresponds to the self-reported variables provided by the customers to the insurer to be analyzed and considered also in terms of pricing or other process associated with risk management. Most of them are mandatory under the respective legal framework of the insurer and its customer, these self-reported factors are mainly socio-demographics characteristics and personal behaviors that enable the insurer to compliment the available historical loss experience and predict based on that the level of risk of each client or group of customers. Mechanisms such as entry-level surveys, questionnaires, medical examinations, publicly exposed data (accessible under the legal and ethical framework allowed by the respective authority) or company's own registers accounts for the multiple options available to obtain all this required information.

The challenge arises when the company may not obtain all the desired risk predictors information by means of these traditional sources, considering multiple factors like the reluctance of the customer to provide such data, the difficulty to measure it or the low level of confidence associated with the accuracy of the self-assessed information delivered by the individuals. As insurers feel the pressure to differentiate their product portfolio and enhance the customer experience by acquiring a deeper level of knowledge of their risk profile, some innovative tools have been developed thanks to the advance in technologies related to the Internet of Things (IoT). By means of these tools, namely objects and devices (wearables) that can be connected to the internet, insurers have access to a significant amount of real-time information regarding people's behaviors and habits in their daily life routine, which could give a more accurate perspective of the real risk profile associated to these clients and with this improve their pricing and brand engagement (McCrea & Farrell, 2018). Examples of the application of these tools are the so called "usage based insurance (UBI)" in the car insurance line, where a specialized device allows the continuous transmission of relevant driving information such as driven mileage, breaking frequency, average speed, geo localization, aggressive turns, among many other behaviors that enables

the insurer to better quantify the potential risk of the reporting customers and adjust the premiums according to these parameters (Roel & Antonio, 2016). In Health and Life Insurance, IoT have been successfully used by multiple insurers by encouraging people to wear these devices and engage in reward programs involving receiving discounts, participation in fitness training, gym subscriptions, etc, as long as they achieve specific goals in terms of healthy lifestyle activities, pursued by the insurance company to lower the potential risk and therefore reduce the probability of claims (McCrea & Farrell, 2018).

For those behaviors falling out of the possible reach of technological innovation to be captured and somehow measured within the risk profiling processes, insurance companies must rely on the traditional approaches offered by instruments such as surveys and questionnaires, where most questions focus on the individual self-reported perception of adoption of specific habits and patterns. Without ignoring the many advantages of these traditional mechanisms in terms of costs, data privacy and mass distribution, the main limitation is the information asymmetry derived from the gap between the answer provided by the respondent and the actual state or level of risk of the associated behavior, especially when individuals are predicting themselves. Among the reasons for this asymmetry, one is that people responses could be seriously biased because of an overestimation of their answer on “real or potential performance” regarding the practice of these habits compared to average or historical standards.

According to different experts in psychology and sociology, this tendency to think better of one-self and predict overestimated outcomes respond to a suit of motivated beliefs that make individuals perceive their own actions more attached to personal determinations, goals, and desires and less bounded to previous experiences and external factors (Aarts et al., 2009). This phenomenon is closely related to the experience of self-agency, which as explained by Aarts, Custers and Marien, is a fundamental human feeling to attribute outcomes to one’s own actions and decisions. Additionally, other studies have provided evidence that a person’s self-assessment is usually heavily drawn on intentions rather than

dispositions (Kruger & Gilovich, 2004), which also supports the idea that individuals' expectation of "future selves" in terms of hopes, wishes and fears become the source of standards to be used when predicting or eliciting present behavior, both in terms of actions to be accomplished or avoided (Williams & Gilovich, 2008). By contrast, when it comes to evaluate others and predict their potential behavior, individuals rely less on intentions and future representations, but more on observable experiences and available information. This generate people to be heavily influenced by the optimistic bias (tendency for people to believe that they are propense to more favorable and less negative experiences than the rest) and the so called better-than-average-effect (BTAE), which is the propensity to assess one-self more positively than peers' average (Guenther & Alicke, 2010).

This asymmetry generated from these intrinsic beliefs and the disproportionate level of people who provide an over-rated perspective on their potential behavior and actions compared to the average, can substantially alter the elicitation of relevant habits for the purpose of population knowledges and risk profiling processes in an insurance company. In particular, self-assessment regarding the prediction of behaviors that could be seen by the policyholders as possible undesirable outcomes from the insurance or legal perspective, might be completely under-rated and not reflect the real risk-level of the average population. Examples of these behaviors could include reluctance to get vaccinated, driving after having consumed alcohol, eating a high calorie diet, not practicing sports, etc. In fact, according to the empirical evidence found by Störmer. T in 2014 on the willingness of consumers to approve the usage of non-traditional risk factors for pricing-determining purposes in the UK, Germany, and France, analyzed policyholders in this study disapproved of the use of risk-rating factors related to hobbies (Störmer, 2014).

Considering this potential biases and asymmetrical information limitations derived from the self-reported elicitation of habits by means of a survey or a questionnaire, there are numerous findings in the literature providing a possible solution for such limitations. Instead of relying exclusively on the individual perspective, the academic research has

found that asking people about others and their corresponding predicted behavior, is a more accurate and realistic approach in surveys data collection, explained by a lower level of overoptimism and higher sense of objectivity when analyzing others rather than one-self.

Measuring Social Sensitive Behaviors: Difference Between Individual and Social Circle Perspectives

As previously illustrated, the psychological literature suggests that self-predictions people make regarding the likelihood of performing or behaving in a certain way tend to be fraught with bias and overestimation, due among many considerations, to the fact that individuals usually feel the impulse to base their choices on their expectation of successful future scenarios (Helzer & Dunning, 2012). This impulse gives greater weight to people's level of aspiration of engaging in personally or socially desirable behaviors, while resting importance to their own past experiences. On the contrary, the literature has found evidence that predictions made on the base of peer behaviors tend to be less aspirational and therefore more accurate in terms of real outcomes. As opposed to self-prediction, considerations about what other would do or not do, is more weighted on the wisdom of past observations and the influence of external factors in the environment (Williams & Gilovich, 2008), which allows to reduce the "aspirational bias" and the strength of "own intentions" present in individual judgements. In psychological terms, this phenomenon is called agency bias, which explains how people prefer to think of themselves as good planners and achievers. As past experiences tend to be better estimates of future behavior compared to aspirational desires, peer prediction has proven to be more accurate than self-predictions (Helzer & Dunning, 2012).

Multiple lines of research in psychology, sociology, anthropology, and other cognitive sciences have attempted to approach the challenges and benefits of human social judgement and human social sensing to better predict population trends and people conduct. In particular, these branches have tried to understand and confirm the improvement in accuracy of predictions about group dynamics and sensitive social

behaviors made by human social sensors – individuals that can provide essential information about beliefs and patterns of themselves and their immediate social circle based on their ability to perceive and empathically connect with their environment through the general cognitive process of memory, categorization and learning (Galesic et al., 2021). Evidence found throughout many of these lines of research has confirmed a higher level of accuracy in predicting social properties and trends when asking people about their immediate social context, especially in sensitive social situations like predicting election voting intentions. Furthermore, these social-circle oriented questions have proven to be better estimates of individual future behavior in cases such as vaccination acceptance or health-related habits in epidemic outbreaks.

Among the many possible reasons for this increase in accuracy, findings suggest that asking individuals about others significantly widens the representativeness of the sample, considering that the information provided is not only limited to the number of interviewed people but extends to the potential size of the total sum of social circles involved. Additionally, people might be more willing to provide information regarding undesired behaviors about others rather than themselves, which also combines with the fact that individual's estimates about current social dynamics, provide a useful source of signals of their own future behavior due to social contagion. Finally, one important benefit also found in the literature is the advantage to access possible unconsciously or intentionally hidden parts of the society (Krumpal, 2011, Enns et al., 2017) that are usually inaccessible or hard to reach by polls or traditional surveys (Galesic et al., 2021), allowing to a better information quality in terms of diversification and social insights.

In terms of methodology to collect and elicit data related to individuals' perceptions on social circles behaviors, the literature highlights the possibility to use economically and rather simple tools such as surveys or questionnaires (Olsson et al., 2021, Radas & Prelec, 2019). According to some expert researchers on eliciting private information and wisdom of the crowds such as Drazen Prelec, the data obtained through social sensing (Meta

Predictions) could be either directly analyzed by extracting the respondents' views about themselves and their social circles (Radas & Prelec, 2019) or could be further refined by means of scoring systems or personal choice reporting such as the Bayesian Truth Serum (Prelec, 2004), Choice-Matching (Cvitanić et al., 2019) or Bayesian Markets for eliciting private information (Baillon, 2017).

Hypothesis

Considering the theoretical bases found in the review of the academic literature, the objective of this thesis is to conduct a practical comparison exercise to determine the degree of divergence that occurs between the predictions that are obtained when individuals are asked about their own behavior around certain habits (self-assessment) and those that, on the other hand, are obtained when they are asked about their perception of what the people that make up their most usual social group would do. In particular, the hypothesis to be evaluated is the following:

Hypothesis: Eliciting habits practices from the perspective of individuals self-assessment will be on average more optimistic than the elicitation obtained from the individuals' assessment about their social circle behavior.

As an extension of this hypothesis, and with the aim to have a deeper level of understanding of the difference between self-assessment and social circle assessment groups, a more detailed analysis will be done to identify the level of homogeneity in terms of the elicited habits' average likelihood among the different sub-groups representative of the sample defined by age, gender, and socio-economic status. Together with the findings from the literature review, this characterization could provide additional elements to an insurer to have a more accurate risk profiling process.

Research Methodology: Data and Survey Structure

The information necessary to be able to evaluate the hypothesis and carry out the respective analyzes was collected through a survey designed in Qualtrics that has the following characteristics:

Target population: people who reside in Colombia and who are over 16 years of age. There is no restriction on gender, educational level, or any other type. The scope in terms of place of residence (Colombia) and age are necessary to be able to obtain the specific variables for carrying out the analysis. Additionally, and as a point in favor for obtaining information, the

main source of data will be the employees of the Colombian insurance company Seguros SURA, which is the largest insurance company in the country and has a widely diverse employee base in terms of regions, ages, socio-economic status, and gender. Access to this information was possible thanks to my working association with this company, as I am the leader of the Portfolio Design and Development team in the car insurance business unit of Seguros SURA.

Socio-demographic Variables: All survey participants provide information regarding age, gender, size of their social circle, average age of their social circle, place of residence in Colombia (at the level of national departments) and socio-economic status. This last variable can be measured in Colombia through the "Estrato Social", which corresponds to a classification that houses and buildings for residential use have according to their conditions in terms of facade, construction materials, and quality of the urban areas in which they are located. Likewise, the Estrato gives an approximate reference to the average income level of the households that comprise it.

| Estrato | Average Household Income |
|---------|--------------------------|
| 1&2 | Low Income |
| 3&4 | Middle Income |
| 5&6 | High Income |

Elicited Habits: For this practical exercise, the analysis will focus on three habits that, from the perspective of the insurance industry, represent relevant behaviors to learn more about the possible risk profile of the insured population in lines of business such as car insurance, health, or life insurance. The survey participants will be randomly divided into two groups: in one, the respondents will answer about what they consider to be the likelihood to adopt or practice each evaluated habit (self-assessment), while in the other group the people will have to answer about what they consider is the likelihood corresponding to their close social circle.

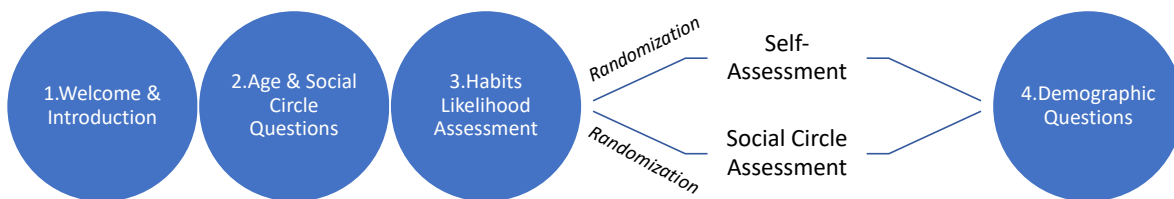
- **Habit 1:** Likelihood of driving after consuming alcoholic beverages

- **Habit 2:** Likelihood of manipulating electronic devices while driving
- **Habit 3:** Likelihood of doing the minimum required physical activity during a week

For each habit the likelihood will be measured using a scale-metric from 1 to 5 to represent the likelihood to engage into a specific behavior, being 1 extremely unlikely and 5 extremely likely.

These three habits have as essential premises two elements. The first is that they are associated with socially sensitive behaviors, meaning that their practice tends to be highly influenced by pressure or references from close people. The second is that their measurement by an insurance company in Colombia like Seguros SURA is generally mainly based on the self-assessment or subjective consideration given by the insured individuals of their own behavior, given that there are usually no objective ways to effectively measure the true level of adoption or risk practices of these habits in the insured population.

Graphic 1 illustrates the structure of the survey and the flow that the participants follow when completing it. *Appendix 1* includes a greater level of detail about the texts and questions included in the survey.



Graphic 1: Structure & Flow of the Survey

Discussion: Results & Analysis

Descriptive Statistics – General View

Sample Size: The total data collected was 3385 responses in a time lapse of approximately 2 weeks, out of which 176 were incomplete answers and 3209 were fully completed, being this last portion of the survey the total sample size that was used for the analysis.

| Sample Size | |
|-------------------------|-------------|
| Incomplete Answers | 176 |
| Complete Answers | 3209 |
| Total | 3385 |

Demographic Composition: In terms of the main demographic variables, the sample is mainly composed by women participants with 2301 responses (72% of the total sample) while 904 responses were from men participants (28%). By age, the sample is represented by different age ranges, being the majority participants between 35 and 45 years old with 1254 responses (39%) and participants between 26 and 34 years old with 1030 responses (32%).

| Sample Age (Years) | Gender | | | Total |
|-----------------------|------------|-------------|----------|-------------|
| | Male | Female | Other | |
| 16 - 25 | 43 | 85 | | 128 |
| 26 - 34 | 275 | 754 | 1 | 1030 |
| 35 - 45 | 331 | 920 | 3 | 1254 |
| 45 - 55 | 170 | 419 | | 589 |
| 55 - 65 | 80 | 116 | | 196 |
| > 65 | 5 | 7 | | 12 |
| Total | 904 | 2301 | 4 | 3209 |

| Sample Age (Years) | Gender | | | Total |
|-----------------------|------------|------------|-----------|-------------|
| | Male | Female | Other | |
| 16 - 25 | 1% | 3% | 0% | 4% |
| 26 - 34 | 9% | 23% | 0% | 32% |
| 35 - 45 | 10% | 29% | 0% | 39% |
| 45 - 55 | 5% | 13% | 0% | 18% |
| 55 - 65 | 2% | 4% | 0% | 6% |
| > 65 | 0,2% | 0,2% | 0% | 0,4% |
| Total | 28% | 72% | 0% | 100% |

Tables 1 & 2: Composition of the sample by gender and age

Considering other demographic variables, the sample is represented by participants from different geographic locations of Colombia, being Antioquia, Bogotá D.C., Valle del Cauca, Cundinamarca, and Atlántico, the regions contributing with most part of the responses with an accumulated participation of almost 90% of the total sample. In terms of socio-economic

levels, the sample is represented by participants from all 6 Estratos, with most of the responses associated to individuals living in Estratos 3 & 4 (in average Middle-Income segment) with 1904 answers (59% of the total sample).

| Sample | Estrato | | | Total |
|-----------------|------------|-------------|------------|-------------|
| Departamento | 1&2 | 3&4 | 5&6 | |
| Antioquia | 217 | 973 | 540 | 1730 |
| Bogotá D.C | 118 | 332 | 42 | 492 |
| Valle del Cauca | 57 | 161 | 76 | 294 |
| Cundinamarca | 40 | 128 | 14 | 182 |
| Atlántico | 56 | 101 | 23 | 180 |
| Other | 29 | 70 | 16 | 115 |
| Santander | 9 | 51 | 13 | 73 |
| Risaralda | 6 | 43 | 21 | 70 |
| Bolivar | 10 | 23 | 6 | 39 |
| Caldas | 4 | 22 | 8 | 34 |
| Total | 546 | 1904 | 759 | 3209 |

| Sample | Estrato | | | Total |
|-----------------|------------|------------|------------|-------------|
| Departamento | 1&2 | 3&4 | 5&6 | |
| Antioquia | 7% | 30% | 17% | 54% |
| Bogotá D.C | 4% | 10% | 1,3% | 15% |
| Valle del Cauca | 2% | 5% | 2% | 9% |
| Cundinamarca | 1,2% | 4% | 0,4% | 6% |
| Atlántico | 2% | 3% | 0,7% | 6% |
| Other | 0,9% | 2% | 0,5% | 4% |
| Santander | 0,3% | 2% | 0,4% | 2% |
| Risaralda | 0,2% | 1,3% | 0,7% | 2% |
| Bolivar | 0,3% | 0,7% | 0,2% | 1,2% |
| Caldas | 0,1% | 0,7% | 0,2% | 1,1% |
| Total | 17% | 59% | 24% | 100% |

Tables 3 & 4: Composition of the sample by Estrato and National Departments

Descriptive Statistics - Assessment Approach

Regarding the composition of the data by the two assessment classifications defined for this analysis, the sample is almost equally distributed between the answers corresponding to the Self-Assessment perspective (1620 – 50.5%) and the ones corresponding to the Social-Circle perspective (1589 – 49.5%). It is important to highlight the fact that participants were automatically and randomly distributed into one of these groups within the survey, addressing and mitigating a potential selection bias within the sample.

| ASSESSMENT CATEGORY | Responses | |
|---------------------|-------------|---------------|
| | # | % |
| Self-Assessment | 1620 | 50,5% |
| Social Circle | 1589 | 49,5% |
| Total | 3209 | 100,0% |

Table 5: Composition of the sample by Assessment Categories

Additionally, the internal composition of the data related to each specific assessment classification, maintains almost the same distribution in terms of gender and age ranges as the one corresponding to the total sample. In both self-assessment and social-circle

assessment, women represent most part of the population with 72% and 71% of the answers respectively (72% for the total sample), while in age terms, all ranges are in similar proportions in both classifications, with the range between 35 and 45 years old representing most part of the answers with approximately 32% participation out of the total respective group (the same proportion of the total sample).

| Self-Assessment Age (Years) | Gender | | | Total |
|--------------------------------|------------|-------------|----------|-------------|
| | Male | Female | Other | |
| 16 - 25 | 15 | 45 | | 60 |
| 26 - 34 | 140 | 387 | 1 | 528 |
| 35 - 45 | 158 | 462 | 2 | 622 |
| 45 - 55 | 90 | 210 | | 300 |
| 55 - 65 | 40 | 62 | | 102 |
| > 65 | 3 | 5 | | 8 |
| Total | 446 | 1171 | 3 | 1620 |

| Self-Assessment Age (Years) | Gender | | | Total |
|--------------------------------|--------------|--------------|-------------|---------------|
| | Male | Female | Other | |
| 16 - 25 | 0,9% | 2,8% | 0,0% | 3,7% |
| 26 - 34 | 8,6% | 23,9% | 0,1% | 32,6% |
| 35 - 45 | 9,8% | 28,5% | 0,1% | 38,4% |
| 45 - 55 | 5,6% | 13,0% | 0,0% | 18,5% |
| 55 - 65 | 2,5% | 3,8% | 0,0% | 6,3% |
| > 65 | 0,2% | 0,3% | 0,0% | 0,5% |
| Total | 27,5% | 72,3% | 0,2% | 100,0% |

Tables 6 & 7: Composition of the Self-Assessment Category by age and gender

| Social Circle Age (Years) | Gender | | | Total |
|------------------------------|------------|-------------|----------|-------------|
| | Male | Female | Other | |
| 16 - 25 | 28 | 40 | | 68 |
| 26 - 34 | 135 | 367 | | 502 |
| 35 - 45 | 173 | 458 | 1 | 632 |
| 45 - 55 | 80 | 209 | | 289 |
| 55 - 65 | 40 | 54 | | 94 |
| > 65 | 2 | 2 | | 4 |
| Total | 458 | 1130 | 1 | 1589 |

| Social Circle Age (Years) | Gender | | | Total |
|------------------------------|--------------|--------------|-------------|---------------|
| | Male | Female | Other | |
| 16 - 25 | 1,8% | 2,5% | 0,0% | 4,3% |
| 26 - 34 | 8,5% | 23,1% | 0,0% | 31,6% |
| 35 - 45 | 10,9% | 28,8% | 0,1% | 39,8% |
| 45 - 55 | 5,0% | 13,2% | 0,0% | 18,2% |
| 55 - 65 | 2,5% | 3,4% | 0,0% | 5,9% |
| > 65 | 0,1% | 0,1% | 0,0% | 0,3% |
| Total | 28,8% | 71,1% | 0,1% | 100,0% |

Tables 8 & 9: Composition of Social-Circle Assessment Category by age and gender

Hypothesis Analysis

Habits likelihood practice elicitation from the perspective of individuals self-assessment will be on average more optimistic than the elicitation obtained from the individuals' assessment about their social circle behavior.

Elicited Habits - Descriptive Data & Discussion

Habit 1: Likelihood of driving after consuming alcoholic beverages

To elicit this habit, participants were asked the following question depending on the assessment group they were randomly assigned in the survey:

| Habit 1: Driving After Drinking | |
|--|---|
| Self-Assessment | Social-Circle Assessment |
| <i>How likely are you to drive (car, motorcycle, or bicycle) after consuming alcoholic beverages? For your reference, think of equal or higher doses of alcoholic beverages such as 2 beers, 2 glasses of wine, 1 cocktail, etc.</i> | <i>How likely are people in your close social circle to drive (car, motorcycle, or bicycle) after consuming alcoholic beverages? For your reference, think of equal or higher doses of alcoholic beverages such as 2 beers, 2 glasses of wine, 1 cocktail, etc.</i> |

In both cases, responses were given using a qualitative ordered scale from Extremely Unlikely to Extremely Likely. To provide a clearer understanding of the meaning of the possible likelihood choices for this question, the following frequencies references were given to the participants in both groups:

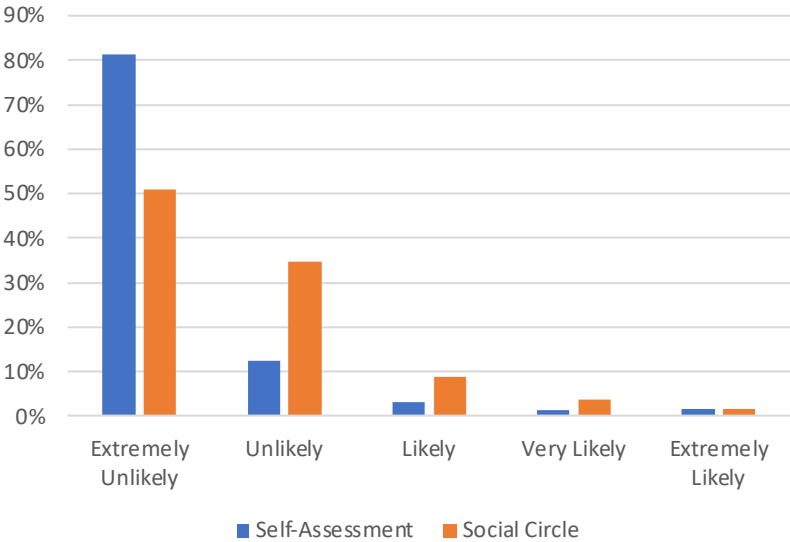
| Likelihood | Reference |
|---------------------------|----------------------------------|
| Extremely Unlikely | Between 0 and 1 out of 10 times |
| Unlikely | Between 2 and 3 out of 10 times |
| Likely | Between 4 or 6 out of 10 times |
| Very Likely | Between 7 and 8 out of 10 times |
| Extremely Likely | Between 9 and 10 out of 10 times |

For example, if a participant in the Self-Assessment group considered that his reference frequency for driving after having drunk is between 2 and 3 times out of 10 times, this person would then have to answer “Unlikely” in this question. The same analogy applies to the people assigned to the Social-Circle Assessment group.

The following are the results for this habit elicitation:

| Habit 1 - Driving after Drinking - Self-Assessment | | | Habit 1 - Driving after Drinking - Social Circle | | |
|--|-------------|---------------|--|-------------|---------------|
| Likelihood | # | % | Likelihood | # | % |
| Extremely Unlikely | 1316 | 81,2% | Extremely Unlikely | 809 | 50,9% |
| Unlikely | 203 | 12,5% | Unlikely | 552 | 34,7% |
| Likely | 52 | 3,2% | Likely | 142 | 8,9% |
| Very Likely | 22 | 1,4% | Very Likely | 61 | 3,8% |
| Extremely Likely | 27 | 1,7% | Extremely Likely | 25 | 1,6% |
| Total | 1620 | 100,0% | Total | 1589 | 100,0% |

Tables 10 & 11: Driving after Drinking - Elicitation Results by Assessment Category



Graphic 2: Driving after Drinking Elicitation – Assessment Comparison

As it can be visualized in the elicitation results for this habit, participants of the total sample acknowledged a rather low likelihood of themselves or their social-circle driving after having consumed alcoholic beverages, with most of the responses being concentrated between Extremely Unlikely and Unlikely in both groups (93,7% in the self-assessment group and 85,6% in the Social-Circle assessment group).

Nevertheless, assuming an elicitation in which the lowest the likelihood to engage in this behavior the better from a risk point of view (undesired habit), when comparing the two groups it is possible to evidence a more optimistic perception in the Self-Assessment elicitation than the one corresponding to the Social-Circle Assessment. While in the first one 81% of the responses were concentrated in the lowest possible likelihood scale (Extremely Unlikely), this proportion is reduced by 30 p.p. to 51% in the second group. By contrast, in the Self-Assessment elicitation a rather low proportion of the participants acknowledged an Unlikely or even Likely scenario, with these categories representing just the 16% of the total responses for this group. On the other hand, the Social-Circle perspective respondents gave a higher weight to these categories in their answers, representing 44% of the total responses and showing a less optimistic elicitation compared to the Self-Assessment group. In general terms, these results imply that the proportion of individuals that consider a low or almost non-existent possibility of driving after having consumed alcohol (therefore a more optimistic perception of expected behavior) is significantly higher from the self-assessment perspective than from the Social-Circle expected practice.

This increased optimism, can be further verified by translating the previous qualitative elicitation into a quantitative average. As explained in the methodology section, for each habit the qualitative likelihood scales can be also represented on scale-metric from 1 to 5 according to the following conversion:

| Likelihood | Quantitative Conversion |
|---------------------------|-------------------------|
| Extremely Unlikely | 1 |
| Unlikely | 2 |
| Likely | 3 |
| Very Likely | 4 |
| Extremely Likely | 5 |

Based on this, Table 12 illustrates the habit elicited average likelihood for both assessment groups.

| Habit 1 - Likelihood Averages | |
|-------------------------------|--------------------------|
| Self-Assessment | Social-Circle Assessment |
| 1,3 | 1,7 |

Table 12: Driving after Drinking - Average Likelihoods by Assessment Category

According to these results, it is possible to identify that the self-assessment group reported a lower average likelihood (1,30) than the Social-Circle Assessment group (1,70). Considering again that a lower likelihood elicitation represents a more optimistic view in terms of risk behavior, we could therefore evidence that **in average individuals have a more optimistic expectation of their own propensity to not drive under the effects of alcoholic beverages than the expected behavior of their social circle.** Using the Mann-Whitney U Test to validate the statistical significance of the difference in distributions between the two assessments groups, it was obtained a p value = 0.000, meaning that **the difference is statistically significant with a 5% significance level.**

Habit 2: Likelihood of manipulating electronic devices while driving

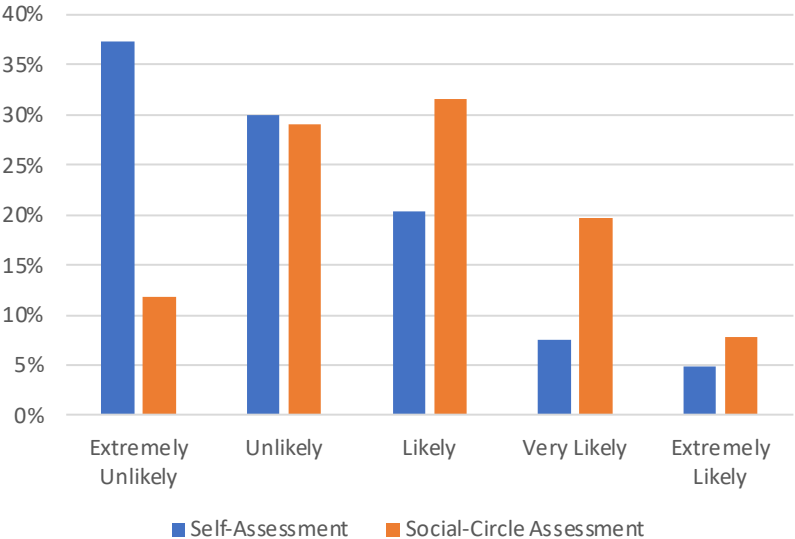
To elicit this habit, participants were asked the following question depending on the assessment group they were randomly assigned by the survey:

| Habit 2: Driving while Manipulating Electronics | |
|--|---|
| Self-Assessment | Social-Circle Assessment |
| <p><i>How likely is it that while you are driving and moving (car, motorcycle, or bicycle), you simultaneously use your cell phone or some other electronic device? Usage includes acts such as viewing the screen, dialing a number or text message, consulting apps, playing music, etc. The use of the vehicle's built-in screen is excluded.</i></p> | <p><i>How likely is it that while driving and moving (car, motorcycle, or bicycle), the people in your close social circle simultaneously use the cell phone or some other electronic device? This includes acts such as viewing the screen, dialing a number or text message, consulting applications, playing music, etc. The use of the vehicle's built-in screen is excluded.</i></p> |

Using the same elicitation logic previously explained for *Habit 1: Driving After Drinking*, responses were given using a qualitative ordered scale from Extremely Unlikely to Extremely Likely. The following are the results for this habit elicitation:

| Habit 2 - Driving while Manipulating Electronics Self-Assessment | | | Habit 2 - Driving while Manipulating Electronics Social-Circle Assessment | | |
|---|-------------|---------------|--|-------------|---------------|
| Likelihood | # | % | Likelihood | # | % |
| Extremely Unlikely | 604 | 37,3% | Extremely Unlikely | 187 | 11,8% |
| Unlikely | 485 | 29,9% | Unlikely | 462 | 29,1% |
| Likely | 331 | 20,4% | Likely | 502 | 31,6% |
| Very Likely | 122 | 7,5% | Very Likely | 313 | 19,7% |
| Extremely Likely | 78 | 4,8% | Extremely Likely | 125 | 7,9% |
| Total | 1620 | 100,0% | Total | 1589 | 100,0% |

Tables 13 & 14: Driving while Manipulating Electronics - Elicitation Results by Assessment Category



Graphic 3: Driving while Manipulating Electronics Elicitation – Assessment Comparison

Responses for this habit evidence an increased level of heterogeneity between the assessments of the two elicited groups. On one hand, most of the individuals answering from the self-assessment perspective considered a rather low likelihood to manipulate electronic devices while driving, with 67% of their responses corresponding to Extremely Unlikely and Unlikely scenarios, while the remaining third of the participants recognized a higher propensity to engage in this behavior. On the other hand, individuals answering from the social circle expected likelihood presented quite the opposite trend, with most part of

the participants acknowledging a likely or higher possibility to practice the elicited habit with 59% of the responses corresponding to the Likely, Very Likely and Extremely Likely scales. Even though 41% of this last assessment group considered a low likelihood, in general we could see that Self-Assessment perception is once again more optimistic compared to the expected behavior of the Social-Circles. Important to highlight that as in Habit 1, a lower likelihood assessment could be associated to a better expected practice in terms of risk and safe driving standards.

| Habit 2 - Likelihood Averages | |
|-------------------------------|--------------------------|
| Self-Assessment | Social-Circle Assessment |
| 2,13 | 2,83 |

Table 15: Driving while Manipulating Electronics - Average Likelihoods by Assessment Category

Complementing this analysis with the quantitative measurement of the elicited average likelihoods illustrated in Table 15, it is possible to ratify the higher optimistic level from the self-assessment participants with a 2,13 average likelihood compared to a 2,83 average corresponding to the Social-Circle assessment perspective. **These results support the view that in average, individuals consider from a self-assessment approach to have a better expected behavior with regards to this habit**, meaning that they consider to be less likely to manipulate electronic devices when driving **compared to the potential behavior of the persons belonging to their close social circle**. Using the Mann-Whitney U Test to validate the statistical significance of the difference in distributions between the two assessments groups, it was obtained a p value = 0.000, meaning that **the difference is statistically significant with a 5% significance level**.

Habit 3: Likelihood of doing the minimum required physical activity during a week

To elicit this habit, participants were asked the following question depending on the assessment group they were randomly assigned by the survey:

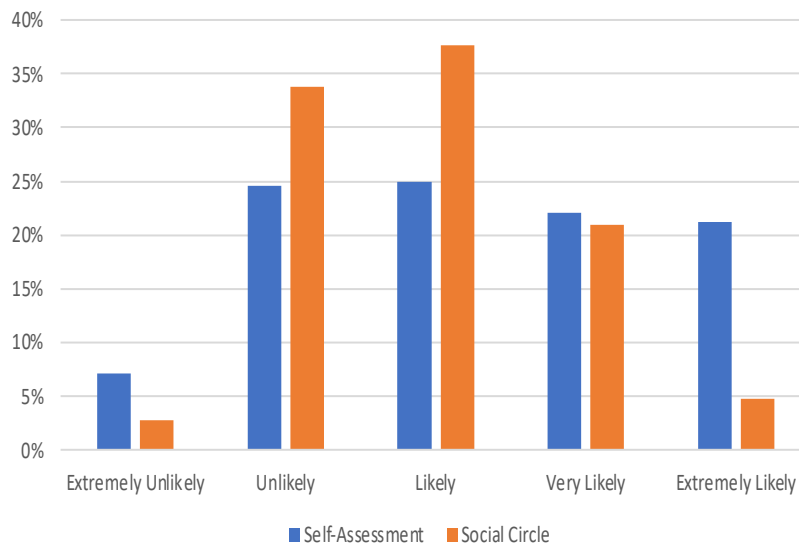
| Habit 3: Doing the Minimum Required Physical Activity During a Week | |
|---|--|
| Self-Assessment | Social-Circle Assessment |
| <i>How likely are you to get the minimum recommended amount of physical activity during the week?</i> | <i>How likely is it that people in your close social circle get the recommended minimum amount of physical activity during the week?</i> |

Using the same elicitation logic explained for previous habits, responses were given using a qualitative ordered scale from Extremely Unlikely to Extremely Likely. The following are the results for this habit elicitation:

| Habit 3 - Doing the Minimum Required Physical Activity Self-Assessment | | |
|---|-------------|---------------|
| Likelihood | # | % |
| Extremely Unlikely | 115 | 7,1% |
| Unlikely | 399 | 24,6% |
| Likely | 405 | 25,0% |
| Very Likely | 358 | 22,1% |
| Extremely Likely | 343 | 21,2% |
| Total | 1620 | 100,0% |

| Habit 3 - Doing the Minimum Required Physical Activity Social-Circle Assessment | | |
|--|-------------|---------------|
| Likelihood | # | % |
| Extremely Unlikely | 45 | 2,8% |
| Unlikely | 536 | 33,7% |
| Likely | 598 | 37,6% |
| Very Likely | 334 | 21,0% |
| Extremely Likely | 76 | 4,8% |
| Total | 1589 | 100,0% |

Tables 16 & 17: Doing the Minimum Required Physical Activity During a Week - Elicitation Results by Assessment Category



Graphic 4: Doing the Minimum Required Physical Activity During a Week Elicitation Assessment Comparison

First, it is important to highlight that contrary to the previous elicited habits, in this case a higher Likelihood response assumes a better expected behavior in terms of risk, considering that engaging in the minimum amount of weekly physical activity is a well-being recommended practice by expert international institutions such as the WHO (Physical Activity, 2020).

Second, based on the results illustrated in Tables 16 and 17, it is possible to see that both Self-Assessment and Social-Circle Assessment individuals converge to have most part of their responses on a likelihood level of Unlikely or higher, with just a small proportion in each group reporting an Extremely Unlikely practice (7,1% and 2,8% respectively). Furthermore, also the two groups coincided in having the biggest proportion of answers concentrated between the Unlikely and Very Likely scales, with 72% for the self-assessment and 92% for the social-circle perspective. However, once again individuals from the Self-Assessment group acknowledged a rather high optimism with a fifth of its participants (21%) reporting an Extremely Likelihood of accomplishing the minimum recommended amount of exercise during a week, while the Social-Circle responders associated with this Likelihood were less than 5% of the group sample.

| Habit 3 - Likelihood Averages | |
|-------------------------------|--------------------------|
| Self-Assessment | Social-Circle Assessment |
| 3,26 | 2,91 |

Table 18: Doing the Minimum Required Physical Activity During a Week - Average Likelihoods by Assessment Category

Complementing the analysis with the average likelihood for both groups, there is additional supportive evidence **that in average, individuals answering from a self-assessment point of view express a higher propensity to engage in the recommended minimum amount of weekly physical activity than the individuals answering from the perspective of their social circles expected behavior**, therefore being the first group more optimistic than the second one. Using the Mann-Whitney U Test to validate the statistical significance of the

difference in distributions between the two assessments groups, it was obtained a p value = 0.000, meaning that **the difference is statistically significant with a 5% significance level.**

Elicited Habits – Homogeneity Analysis Among Representative Demographics

The difference between self-assessment and social circle assessment groups in terms of the elicited habits' average likelihood is homogeneous among the different sub-groups representative of the sample defined by age, gender, and socio-economic status.

Homogeneity – Difference in Average Likelihoods

Considering the Likelihood Averages presented in the previous analysis section of this chapter, it is possible to establish for each habit the exact difference between both groups respective reported average as illustrated in Table 19.

| Average Likelihoods | | | |
|---------------------|-----------------|--------------------------|--------------------|
| Habits | Self-Assessment | Social-Circle Assessment | Absolut Difference |
| Habit 1 | 1,3 | 1,7 | 0,41 |
| Habit 2 | 2,13 | 2,83 | 0,70 |
| Habit 3 | 3,26 | 2,91 | 0,34 |

Table 19: Average Likelihoods & Absolut Difference Comparison

Although this computed absolute difference has no statistical meaning or relevancy, it can be interpreted as the **relative distance between the reported average likelihoods of the Self-Assessment and Social-Circle Assessment for each elicited habit.** This relative distance can also be computed for each representative sub-group level of the sample. The main assumption for this analysis is that the closer these sub-group relative distances are to the total sample value, the more homogeneous is the difference in perspectives between a self-assessment and a social-circle assessment of the different individuals composing the total sample. By contrast, the bigger the difference between the sub-group relative distance and the one corresponding to the total sample, the higher level of heterogeneity in perceptions for those respective sub-groups in relation to the general sample results.

To establish a standard quantitative measurement of homogeneity in terms of the previously explained difference in relative distances, its relevant to consider that for all the habits, the elicited likelihood is a discrete variable with a minimum scale-distance of 1 between likelihood alternatives. Following this logic, it is possible to assume for each habit that if the difference in relative distances between a given sub-group and the total sample is equal or higher than 1, then it would imply that in average the individuals representing that particular sub-group diverge at least 1 scale or more from the total sample in the difference between the self-assessment and the social-circle elicitation, therefore evidencing a non-homogeneous consensus. Based on this premise, Table 20 presents the proposed measurements for the levels of homogeneity associated to the different ranges of difference in relative distances between sub-groups and the total sample:

| Absolute Difference in Relative Distances (Sub-Group vs. Total Sample) | Level of Homogeneity |
|--|----------------------|
| ≥ 0 and $< 0,5$ | High |
| $\geq 0,5$ and < 1 | Medium |
| ≥ 1 | Low |

Table 20: Levels of Homogeneity

An intermediate level of homogeneity is proposed (Medium) to identify those possible differences that are lower than 1 but are within a range higher than half the minimum-scale unit (0,5). Although the groups falling in this category might not be considered as totally divergent from the total sample consensus, a significant portion of the individuals belonging to those sub-groups might be diverging from the general assessment and therefore could provide starting point to further understand the possible characteristics or causes for this divergence. For the sake of simplicity, the main variables that will be used to categorize the main representative sub-groups are age, gender, and socio-economic status. Tables 21 to 26 resume for all 3 habits the elicited average likelihoods of the Self-Assessment and Social Circle Assessment for each of these subgroups.

Elicited Average Likelihoods – Classification by Age and Gender

| Elicited Average Likelihoods | | | | | | |
|------------------------------|-----------------|--------|-----------|--------------------------|--------|-----------|
| Habit 1 | Self-Assessment | | | Social-Circle Assessment | | |
| Age | Male | Female | Sub-Total | Male | Female | Sub-Total |
| 16 - 34 | 1,50 | 1,33 | 1,37 | 1,95 | 1,76 | 1,82 |
| 35 - 45 | 1,34 | 1,28 | 1,29 | 1,75 | 1,69 | 1,71 |
| 45 - 55 | 1,21 | 1,18 | 1,19 | 1,61 | 1,52 | 1,54 |
| 55 or more | 1,33 | 1,13 | 1,21 | 1,55 | 1,52 | 1,53 |
| Sub Total | 1,37 | 1,27 | 1,30 | 1,78 | 1,68 | 1,70 |

Table 21: Habit 1 – Elicited Average Likelihood by Assessment Category, Age and Gender

| Elicited Average Likelihoods | | | | | | |
|------------------------------|-----------------|--------|-----------|--------------------------|--------|-----------|
| Habit 2 | Self-Assessment | | | Social-Circle Assessment | | |
| Age | Male | Female | Sub-Total | Male | Female | Sub-Total |
| 16 - 34 | 2,45 | 2,18 | 2,25 | 2,96 | 2,89 | 2,91 |
| 35 - 45 | 2,27 | 2,11 | 2,15 | 2,99 | 2,84 | 2,88 |
| 45 - 55 | 2,06 | 1,91 | 1,95 | 2,66 | 2,62 | 2,63 |
| 55 or more | 2,07 | 1,58 | 1,77 | 2,55 | 2,64 | 2,60 |
| Sub Total | 2,27 | 2,07 | 2,12 | 2,88 | 2,81 | 2,83 |

Table 22: Habit 2 – Elicited Average Likelihood by Assessment Category, Age and Gender

| Elicited Average Likelihoods | | | | | | |
|------------------------------|-----------------|--------|-----------|--------------------------|--------|-----------|
| Habit 3 | Self-Assessment | | | Social-Circle Assessment | | |
| Age | Male | Female | Sub-Total | Male | Female | Sub-Total |
| 16 - 34 | 3,61 | 3,17 | 3,28 | 2,98 | 2,88 | 2,91 |
| 35 - 45 | 3,41 | 3,10 | 3,18 | 2,93 | 2,81 | 2,84 |
| 45 - 55 | 3,43 | 3,26 | 3,31 | 3,01 | 3,06 | 3,04 |
| 55 or more | 3,56 | 3,33 | 3,42 | 3,02 | 2,91 | 2,96 |
| Sub Total | 3,50 | 3,17 | 3,26 | 2,97 | 2,89 | 2,91 |

Table 23: Habit 3 – Elicited Average Likelihood by Assessment Category, Age and Gender

Elicited Average Likelihoods – Classification by Age and Estrato

| Elicited Average Likelihoods | | | | | | | | |
|------------------------------|-----------------|---------------|---------------|-----------|--------------------------|---------------|---------------|-----------|
| Habit 1 | Self-Assessment | | | | Social-Circle Assessment | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Sub-Total | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Sub-Total |
| 16 - 34 | 1,34 | 1,36 | 1,46 | 1,37 | 1,73 | 1,78 | 2,03 | 1,82 |
| 35 - 45 | 1,22 | 1,30 | 1,34 | 1,29 | 1,64 | 1,74 | 1,63 | 1,70 |
| 45 - 55 | 1,14 | 1,19 | 1,21 | 1,19 | 1,82 | 1,44 | 1,67 | 1,54 |
| 55 or more | 1,00 | 1,15 | 1,29 | 1,21 | 1,60 | 1,41 | 1,66 | 1,53 |
| Sub Total | 1,27 | 1,29 | 1,34 | 1,30 | 1,71 | 1,68 | 1,76 | 1,70 |

Table 24: Habit 1 – Elicited Average Likelihood by Assessment Category, Age and Estrato

| Elicited Average Likelihoods | | | | | | | | |
|------------------------------|-----------------|---------------|---------------|-----------|--------------------------|---------------|---------------|-----------|
| Habit 2 | Self-Assessment | | | | Social-Circle Assessment | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Sub-Total | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Sub-Total |
| 16 - 34 | 1,59 | 2,25 | 3,11 | 2,25 | 2,53 | 2,84 | 3,60 | 2,91 |
| 35 - 45 | 1,56 | 2,12 | 2,75 | 2,16 | 2,25 | 2,91 | 3,25 | 2,88 |
| 45 - 55 | 1,21 | 1,81 | 2,47 | 1,95 | 2,27 | 2,49 | 2,98 | 2,63 |
| 55 or more | 1,20 | 1,60 | 2,00 | 1,77 | 2,40 | 2,39 | 2,86 | 2,60 |
| Sub Total | 1,53 | 2,08 | 2,68 | 2,13 | 2,41 | 2,78 | 3,24 | 2,83 |

Table 25: Habit 2 – Elicited Average Likelihood by Assessment Category, Age and Estrato

| Elicited Average Likelihoods | | | | | | | | |
|------------------------------|-----------------|---------------|---------------|-----------|--------------------------|---------------|---------------|-----------|
| Habit 3 | Self-Assessment | | | | Social-Circle Assessment | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Sub-Total | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Sub-Total |
| 16 - 34 | 3,12 | 3,25 | 3,61 | 3,28 | 2,75 | 2,87 | 3,25 | 2,91 |
| 35 - 45 | 2,93 | 3,20 | 3,29 | 3,18 | 2,64 | 2,83 | 3,05 | 2,84 |
| 45 - 55 | 3,14 | 3,20 | 3,58 | 3,31 | 3,27 | 3,02 | 3,03 | 3,04 |
| 55 or more | 2,80 | 3,28 | 3,62 | 3,42 | 2,60 | 2,90 | 3,07 | 2,96 |
| Sub Total | 3,05 | 3,22 | 3,49 | 3,26 | 2,75 | 2,88 | 3,11 | 2,91 |

Table 26: Habit 2 – Elicited Average Likelihood by Assessment Category, Age and Estrato

Tables 27 to 32 show the results for the computation of the relative distance in average likelihoods between the Self-Assessment and Social Circle Assessment for each subgroup and the corresponding absolute difference of these relative distances with respect to the one of the total samples in each habit.

Relative Distance in Average Likelihoods – Classification by Age and Gender

| Relative Distance (RD) in Average Likelihoods | | | |
|---|------|--------|-------|
| Habit 1 | | | |
| Age | Male | Female | Total |
| 16 - 34 | 0,45 | 0,44 | 0,44 |
| 35 - 45 | 0,41 | 0,41 | 0,41 |
| 45 - 55 | 0,40 | 0,34 | 0,35 |
| 55 or more | 0,22 | 0,38 | 0,32 |
| Total | 0,41 | 0,40 | 0,41 |

| Absolute Difference With Respect to Sample RD | | | |
|---|-------|--------|-------|
| Habit 1 | | | |
| Age | Male | Female | Total |
| 16-34 | 0,05 | 0,03 | 0,04 |
| 35 - 45 | 0,002 | 0,003 | 0,004 |
| 45 - 55 | 0,01 | 0,07 | 0,05 |
| 55 or more | 0,19 | 0,02 | 0,09 |
| Total | 0,004 | 0,003 | 0,00 |

| Relative Distance (RD) in Average Likelihoods | | | |
|---|------|--------|-------|
| Habit 2 | | | |
| Age | Male | Female | Total |
| 16 - 34 | 0,51 | 0,71 | 0,66 |
| 35 - 45 | 0,72 | 0,73 | 0,73 |
| 45 - 55 | 0,61 | 0,71 | 0,68 |
| 55 or more | 0,48 | 1,06 | 0,83 |
| Total | 0,61 | 0,74 | 0,70 |

| Absolute Difference With Respect to Sample RD | | | |
|---|------|--------|-------|
| Habit 2 | | | |
| Age | Male | Female | Total |
| 16-34 | 0,19 | 0,004 | 0,05 |
| 35 - 45 | 0,02 | 0,02 | 0,03 |
| 45 - 55 | 0,10 | 0,01 | 0,02 |
| 55 or more | 0,22 | 0,36 | 0,13 |
| Total | 0,09 | 0,03 | 0,00 |

| Relative Distance (RD) in Average Likelihoods | | | |
|---|------|--------|-------|
| Habit 3 | | | |
| Age | Male | Female | Total |
| 16 - 34 | 0,63 | 0,28 | 0,37 |
| 35 - 45 | 0,47 | 0,29 | 0,34 |
| 45 - 55 | 0,42 | 0,20 | 0,27 |
| 55 or more | 0,53 | 0,42 | 0,46 |
| Total | 0,53 | 0,28 | 0,35 |

| Absolute Difference With Respect to Sample RD | | | |
|---|------|--------|-------|
| Habit 3 | | | |
| Age | Male | Female | Total |
| 16-34 | 0,28 | 0,06 | 0,03 |
| 35 - 45 | 0,13 | 0,05 | 0,01 |
| 45 - 55 | 0,07 | 0,15 | 0,08 |
| 55 or more | 0,19 | 0,07 | 0,11 |
| Total | 0,18 | 0,07 | 0,00 |

Tables 27 to 32: Relative Distances Comparison by Age and Gender

Relative Distance in Average Likelihoods – Classification by Age and Estrato

| Relative Distance (RD) in Average Likelihoods | | | | |
|---|---------------|---------------|---------------|-------|
| Habit 1 | | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Total |
| 16 - 34 | 0,39 | 0,42 | 0,57 | 0,45 |
| 35 - 45 | 0,42 | 0,44 | 0,28 | 0,41 |
| 45 - 55 | 0,68 | 0,25 | 0,46 | 0,35 |
| 55 or more | 0,60 | 0,26 | 0,37 | 0,32 |
| Total | 0,44 | 0,39 | 0,42 | 0,41 |

| Relative Distance (RD) in Average Likelihoods | | | | |
|---|---------------|---------------|---------------|-------|
| Habit 1 | | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Total |
| 16 - 34 | 0,01 | 0,02 | 0,16 | 0,04 |
| 35 - 45 | 0,02 | 0,04 | 0,13 | 0,00 |
| 45 - 55 | 0,27 | 0,16 | 0,05 | 0,05 |
| 55 or more | 0,19 | 0,15 | 0,04 | 0,09 |
| Total | 0,03 | 0,01 | 0,01 | 0,00 |

| Relative Distance (RD) in Average Likelihoods | | | | |
|---|---------------|---------------|---------------|-------|
| Habit 2 | | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Total |
| 16 - 34 | 0,94 | 0,58 | 0,50 | 0,66 |
| 35 - 45 | 0,69 | 0,79 | 0,50 | 0,73 |
| 45 - 55 | 1,06 | 0,67 | 0,51 | 0,68 |
| 55 or more | 1,20 | 0,78 | 0,86 | 0,83 |
| Total | 0,88 | 0,70 | 0,56 | 0,70 |

| Relative Distance (RD) in Average Likelihoods | | | | |
|---|---------------|---------------|---------------|-------|
| Habit 2 | | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Total |
| 16 - 34 | 0,24 | 0,12 | 0,20 | 0,04 |
| 35 - 45 | 0,01 | 0,09 | 0,20 | 0,024 |
| 45 - 55 | 0,36 | 0,03 | 0,19 | 0,02 |
| 55 or more | 0,498 | 0,08 | 0,16 | 0,13 |
| Total | 0,18 | 0,00 | 0,14 | 0,00 |

| Relative Distance (RD) in Average Likelihoods | | | | |
|---|---------------|---------------|---------------|-------|
| Habit 3 | | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Total |
| 16 - 34 | 0,38 | 0,38 | 0,35 | 0,37 |
| 35 - 45 | 0,29 | 0,38 | 0,24 | 0,33 |
| 45 - 55 | 0,13 | 0,18 | 0,55 | 0,27 |
| 55 or more | 0,20 | 0,39 | 0,55 | 0,46 |
| Total | 0,30 | 0,34 | 0,38 | 0,34 |

| Relative Distance (RD) in Average Likelihoods | | | | |
|---|---------------|---------------|---------------|-------|
| Habit 3 | | | | |
| Age | Estrato 1 & 2 | Estrato 3 & 4 | Estrato 5 & 6 | Total |
| 16 - 34 | 0,03 | 0,04 | 0,01 | 0,03 |
| 35 - 45 | 0,05 | 0,03 | 0,10 | 0,01 |
| 45 - 55 | 0,21 | 0,16 | 0,20 | 0,08 |
| 55 or more | 0,14 | 0,04 | 0,20 | 0,11 |
| Total | 0,05 | 0,00 | 0,04 | 0,00 |

Tables 33 to 38: Relative Distances Comparison by Age and Estrato

Based on these results, it is possible to evidence a high level of homogeneity in terms of the relative distance reported by the different configurations of sub-groups and the one obtained for the total sample. This means that, for all the 3 considered habits in this research, the difference between the average elicited likelihood of the Self-Assessment and the Social-Circle Assessment perspectives converges towards the same relative likelihood distance across all the multiple representative segments of the population.

Limitations

The first limitation of this thesis is regarding the scope of the research proposal and the results analysis. The findings of this study do not intend to elicit aspects such as the level of truthfulness in responses or provide any sort of scoring criterion to weight answers from either assessment category. Additionally, the lack of incentives for doing the survey, might also affect the willingness to report truthfully. Nevertheless, according to the academic literature this limitation is mitigated to some extent by the privacy and anonymity of the survey. As found in studies on socially desirables behaviors from Ong and Weiss (2000), the intention to misreport answers in questionnaires proved to be reduced as the the privacy settings of the survey were stronger. In the case of the survey conducted for the thesis, complete anonymity was assured to the participants and non-traceable data was requested as part of the responses.

The second limitation is related to some differences between the sample composition and the one corresponding the total Colombian population. Specifically, the composition of the sample in terms of age, region (departments) and socio-economic status (Estrato) does not necessarily reflect the same proportion of the latest national demographic census (see Appendix 2 to have more detail on the Colombian population composition). These differences could limit to some extent the external validity of the findings of this research if it would be replicated on a larger scale and reaching more segments of the population. Nevertheless, this limitation is partially mitigated in this thesis thanks to a large sample size, a widely diversified sources of responses and the representativeness of each variable segment within the different analysis, reducing the potential impact of this limitation.

The third limitation comes from the potential differences in the individual understanding of the questions of the survey by the participants. Specifically, the likelihood elicitation based on qualitative scales could be to some degree biased by the subjective understanding of and personal circumstances of each respondent. Nevertheless, this limitation was mitigated by the randomization of the participants within the two assessment-approach groups and

additionally by the reference measurements of the likelihood scales provided in the survey to ensure a more homologated interpretation of the questions and the possible answers.

Finally, and as part as the research preliminary definitions, the sample and the data collected from the survey is almost entirely correspondent to individuals residing in Colombia. This means that the results and the analysis of this research thesis are significantly influenced by the Colombian context in terms of culture, socio-economic conditions, and idiosyncrasy, which might limit tom some extent the incorporations of the findings and the conclusions to other countries.

Conclusions

The main goal of this thesis research was to conduct a practical exercise that allowed the measurement of the difference between self-assessed and social circles predictions of specific habits practices that are relevant from the insurance risk profiling point of view. Across the multiple conducted comparison analysis, it was possible to evidence for all three elicited habits a higher average level of optimism associated to self-assessed likelihoods of adopting the questioned behavior and additionally, it was proven a high level of homogeneity in the relative distances between assessments for the different representative sub-groups of the sample, therefore confirming in both cases the proposed hypotheses. These findings are aligned with an extensive academic literature that attributes the found overoptimism in self-assessed approaches to a set of motivated beliefs and biases that encourage individuals to rely more on desires, intentions, and desired future, while the assessment from a social circle perspective is usually supported on previous experiences and objective observations.

The results of this research provide an additional reference point for an insurance company to better understand the real impact of adjusting the risk profiles by adding other people beliefs to the traditional individual-based surveys. In fact, the findings on this thesis recommend the implementation of a practical elicitation like the one developed in this research, considering that by doing this, an insurance company could further complement and strengthen the accuracy of the risk profiling in multiple insurance lines. Additionally, this elicitation constitutes an initial baseline that could be compared in future developments with the real observed behaviors of the studied population. Finally, further extensions of this research could encourage a deeper understanding in the difference between assessments and the accuracy of habits adoption predictions by incorporating methodologies for truth-verification and response-scoring in surveys such as the Bayesian Truth Serum also introduced in the literature review.

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Appendix

Appendix 1 – Survey Structure and Questionary Flow

Link:

https://erasmusuniversity.eu.qualtrics.com/jfe/form/SV_6QYIpBGCmyyNiNE

First Block – Welcome Message, Age and Social Circle General Information

Visualization: All participants

Welcome Message - Original Display

¡Hola y bienvenid@ a esta encuesta!

El propósito de este cuestionario es obtener información relevante para la medición del nivel general de adopción de algunos hábitos asociados a nuestra vida cotidiana. No tomará más de 3 minutos y tus respuestas me ayudarán a desarrollar mi tesis de Maestría en Economía del Comportamiento en Erasmus University Rotterdam.

Para un correcto análisis de los resultados, te invito a que respondas de la manera más honesta cada pregunta. Es importante resaltar que todas tus respuestas son recibidas de manera totalmente anónimas, no podré hacer rastreo de tu identidad y tu privacidad estará respaldada según la Ley de Protección de Datos Personales Habeas Data.

Agradezco mucho tu participación y en caso de que quieras tener más información acerca de este ejercicio y sus resultados, me puedes escribir al siguiente correo electrónico: 617352ao@student.eur.nl

Si aceptas continuar voluntariamente con este cuestionario, por favor inicia dando clic en la flecha ubicada en la parte inferior derecha de la pantalla.

Welcome Message - English Translation

Hello and welcome to this survey!

The purpose of this questionnaire is to obtain relevant information for measuring the general level of adoption of some habits associated with our daily lives. It will not take more than 3 minutes and your answers will help me to develop my Master thesis in Behavioral Economics at Erasmus University Rotterdam.

For a correct analysis of the results, I invite you to answer each question as honestly as possible. It is important to highlight that all your answers are received completely anonymously, I will not be able to track your identity and your privacy will be supported according to the Habeas Data Personal Data Protection Law.

*I really appreciate your participation and if you want to have more information about this exercise and its results, you can contact to me at the following email:
617352ao@student.eur.nl*

If you voluntarily agree to continue with this questionnaire, please start by clicking on the arrow located at the bottom right of the screen.

Age Information**Type of Question: Multiple choice with only one answer allowed****Original Display**

¿A qué grupo de edad perteneces?

- Menor de 16 años
- 16 - 25
- 26 - 34
- 35 - 45
- 45 - 55
- 55 - 65
- Mayor de 65 años

English Translation

To what age group do you belong?

- Younger than 16 years old*
- 16 – 25*
- 25 – 34*
- 35 – 45*
- 45 – 55*
- 55 – 65*
- Older than 65 years old*

Social Circle General Information – Social Circle Size**Type of Question: Text entry****Content type: Number****Original Display**

¿Aproximadamente cuántas personas conforman tu círculo social cercano, entendido este como el conjunto de amigos (pueden ser incluso aquellos con vínculos familiares como hermanos, primos o sobrinos) con quienes pasas la mayor parte del tiempo o frecuentas más seguido?

English Translation

Approximately how many people make up your close social circle, understood as the set of friends (they can even be those with family ties such as siblings, cousins, or nephews) with whom you spend most of the time or visit more often?

Social Circle General Information – Social Circle Average Age

Type of Question: Multiple choice with only one answer allowed

Original Display

¿Cuál es el promedio de edad de las personas de tu círculo social cercano?

- Menor de 16 años
- 16 - 25
- 26 - 34
- 35 - 45
- 45 - 55
- 55 - 65
- Mayor de 65 años

English Translation

What is the average age of the people in your close social circle?

- Younger than 16 years old*
- 16 – 25*
- 25 – 34*
- 35 – 45*
- 45 – 55*
- 55 – 65*
- Older than 65 years old*

Second Block – Individual Self-assessment of Specific Habit’s Level of Adoption

Visualization: Randomly assigned participants

Habit 1 – Driving after having consumed alcoholic drinks

Type of Question: Multiple choice with only one answer allowed

Original Display

¿Qué tan probable es que conduzcas (carro, moto o bicicleta) después de haber consumido bebidas alcohólicas? Para tu referencia, piensa en dosis iguales o superiores de bebidas alcohólicas tales como 2 cervezas, 2 copas de vino, 1 coctel, etc.

- Extremadamente improbable (0 ó 1 de 10 veces que manejas)
- Poco probable (2 ó 3 de 10 veces que manejas)
- Probable (Entre 4 y 6 de 10 veces que manejas)
- Muy probable (7 u 8 de 10 veces que manejas)
- Extremadamente probable (9 ó 10 de 10 veces que manejas)

English Translation

How likely are you to drive (car, motorcycle, or bicycle) after consuming alcoholic beverages? For your reference, think of equal or higher doses of alcoholic beverages such as 2 beers, 2 glasses of wine, 1 cocktail, etc.

- Extremely unlikely (0 or 1 out of 10 times you drive)*
- Unlikely (2 or 3 out of 10 times you drive)*
- Likely (Between 4 and 6 out of 10 times you drive)*
- Very likely (7 or 8 out of 10 times you drive)*
- Extremely likely (9 or 10 out of 10 times you drive)*

Habit 2 – Driving while manipulating electronic devices

Type of Question: Multiple choice with only one answer allowed

Original Display

¿Qué tan probable es que mientras estés conduciendo y en movimiento (carro, moto o bicicleta), uses simultáneamente el celular o algún otro dispositivo electrónico? El uso incluye actos tales como la visualización de la pantalla, la marcación de algún número o mensaje de texto, la consulta de aplicaciones, poner música, etc. Se excluye el uso de la pantalla incorporada del vehículo.

- Extremadamente improbable (0 ó 1 de 10 veces que manejas)
- Poco probable (2 ó 3 de 10 veces que manejas)
- Probable (Entre 4 y 6 de 10 veces que manejas)
- Muy probable (7 u 8 de 10 veces que manejas)
- Extremadamente probable (9 ó 10 de 10 veces que manejas)

English Translation

How likely is it that while you are driving and moving (car, motorcycle, or bicycle), you simultaneously use your cell phone or some other electronic device? Usage includes acts such as viewing the screen, dialing a number or text message, consulting apps, playing music, etc. The use of the vehicle's built-in screen is excluded.

- Extremely unlikely (0 or 1 out of 10 times you drive)*
- Unlikely (2 or 3 out of 10 times you drive)*
- Likely (Between 4 and 6 out of 10 times you drive)*
- Very likely (7 or 8 out of 10 times you drive)*
- Extremely likely (9 or 10 out of 10 times you drive)*

Habit 3 – Practicing Regular Physical Activity

Type of Question: Multiple choice with only one answer allowed

Original Display

Según la Organización Mundial de la Salud, para un adulto se recomienda realizar actividades físicas aeróbicas moderadas durante al menos 150 minutos a lo largo de la semana (por ejemplo 30 minutos caminando 5 días a la semana) para ayudar a prevenir y controlar enfermedades y mejorar la calidad de vida de las personas. Entre las actividades físicas mas comunes cabe mencionar caminar, montar en bicicleta, practicar deportes, entre otros.

¿Qué tan probable es que realices la cantidad mínima recomendada de actividad física durante la semana?

- Extremadamente improbable
- Poco probable
- Probable
- Muy probable
- Extremadamente probable

English Translation

According to the World Health Organization, for an adult it is recommended to perform moderate aerobic physical activities for at least 150 minutes throughout the week (for example 30 minutes walking 5 days a week) to help prevent and control diseases and improve people's quality of life. Among the most common physical activities, it is worth mentioning walking, riding a bicycle, practicing sports, among others.

How likely are you to get the minimum recommended amount of physical activity during the week?

- Extremely unlikely*
- Unlikely*
- Likely*
- Very likely*

- *Extremely likely*

Third Block – Individual assessment of Specific Habit’s Level of Adoption from Social Circle perspective

Visualization: Randomly assigned participants

General Explanation

Original Display

A continuación se te plantearán unas preguntas que deberás responder desde la perspectiva de lo que consideras harían las personas de tu círculo social cercano. Teniendo en cuenta que no todos los amigos de tu círculo social actúan estrictamente igual, piensa en lo que haría la mayoría o el promedio de estos.

English Translation

Next, you will be asked some questions that you must answer from the perspective of what you consider the people in your close social circle would do. Keeping in mind that not all friends in your social circle act the same, think about what the majority or average of your friends would do.

Habit 1 – Driving after having consumed alcoholic drinks

Type of Question: Multiple choice with only one answer allowed

Original Display

¿Qué tan probable es las personas de tu círculo social cercano conduzcan (carro, moto o bicicleta) después de haber consumido bebidas alcohólicas? Para tu referencia, piensa en dosis iguales o superiores de bebidas alcohólicas tales como 2 cervezas, 2 copas de vino, 1 coctel, etc.

- Extremadamente improbable (0 ó 1 de 10 veces que manejan)
- Poco probable (2 ó 3 de 10 veces que manejan)
- Probable (Entre 4 y 6 de 10 veces que manejan)
- Muy probable (7 u 8 de 10 veces que manejan)
- Extremadamente probable (9 ó 10 de 10 veces que manejan)

English Translation

How likely are people in your close social circle to drive (car, motorcycle, or bicycle) after consuming alcoholic beverages? For your reference, think of equal or higher doses of alcoholic beverages such as 2 beers, 2 glasses of wine, 1 cocktail, etc.

- *Extremely unlikely (0 or 1 out of 10 times they drive)*
- *Unlikely (2 or 3 out of 10 times they drive)*
- *Likely (Between 4 and 6 out of 10 times they drive)*
- *Very likely (7 or 8 out of 10 times they drive)*
- *Extremely likely (9 or 10 out of 10 times they drive)*

Habit 2 – Driving while manipulating electronic devices

Type of Question: Multiple choice with only one answer allowed

Original Display

¿Qué tan probable es que mientras están conduciendo y en movimiento (carro, moto o bicicleta), las personas de tu círculo social cercano usen simultáneamente el celular o algún otro dispositivo electrónico? Esto incluye actos tales como la visualización de la pantalla, la marcación de algún número o mensaje de texto, la consulta de aplicaciones, poner música, etc. Se excluye el uso de la pantalla incorporada del vehículo.

- Extremadamente improbable (0 ó 1 de 10 veces que manejan)
- Poco probable (2 ó 3 de 10 veces que manejan)
- Probable (Entre 4 y 6 de 10 veces que manejan)
- Muy probable (7 u 8 de 10 veces que manejan)
- Extremadamente probable (9 ó 10 de 10 veces que manejan)

English Translation

How likely is it that while driving and moving (car, motorcycle, or bicycle), the people in your close social circle simultaneously use the cell phone or some other electronic device? This includes acts such as viewing the screen, dialing a number or text message, consulting applications, playing music, etc. The use of the vehicle's built-in screen is excluded.

- Extremely unlikely (0 or 1 out of 10 times they drive)*
- Unlikely (2 or 3 out of 10 times they drive)*
- Likely (Between 4 and 6 out of 10 times they drive)*
- Very likely (7 or 8 out of 10 times they drive)*
- Extremely likely (9 or 10 out of 10 times they drive)*

Habit 3 – Practicing Regular Physical Activity

Type of Question: Multiple choice with only one answer allowed

Original Display

Según la Organización Mundial de la Salud, para un adulto se recomienda realizar actividades físicas aeróbicas moderadas durante al menos 150 minutos a lo largo de la semana (por ejemplo 30 minutos caminando 5 días a la semana) para ayudar a prevenir y controlar enfermedades y mejorar la calidad de vida de las personas. Entre las actividades físicas más comunes cabe mencionar caminar, montar en bicicleta, pedalear, practicar deportes, entre otros.

¿Qué tan probable es que las personas de tus círculo social cercano realicen la cantidad mínima recomendada de actividad física durante la semana?

- Extremadamente improbable
- Poco probable
- Probable
- Muy probable
- Extremadamente probable

English Translation

According to the World Health Organization, for an adult it is recommended to perform moderate aerobic physical activities for at least 150 minutes throughout the week (for example 30 minutes walking 5 days a week) to help prevent and control diseases and improve people's quality of life. Among the most common physical activities, it is worth mentioning walking, riding a bicycle, practicing sports, among others.

How likely is it that people in your close social circle get the recommended minimum amount of physical activity during the week?

- Extremely unlikely*
- Unlikely*
- Likely*
- Very likely*
- Extremely likely*

Fourth Block – Demographic and Socio-Economic Information

Visualization: All Participants

Socio-Economic Category

Type of Question: Multiple choice with only one answer allowed

Original Display

¿A que estrato socioeconómico perteneces?

- Estrato 1
- Estrato 2
- Estrato 3
- Estrato 4
- Estrato 5
- Estrato 6

English Translation

To what socio-economic Estrato do you belong?

- Estrato 1*
- Estrato 2*
- Estrato 3*
- Estrato 4*
- Estrato 5*
- Estrato 6*

Department of Residence

Type of Question: Multiple choice with only one answer allowed

Original Display

¿En que departamento vives?

Bogotá D.C

English Translation

In which department do you live?

Gender Information

Type of Question: Multiple choice with only one answer allowed

Original Display

¿Con qué género te identificas?

- Hombre
- Mujer
- Otro

English Translation

What gender do you identify with?

- Male*
- Female*
- Other*

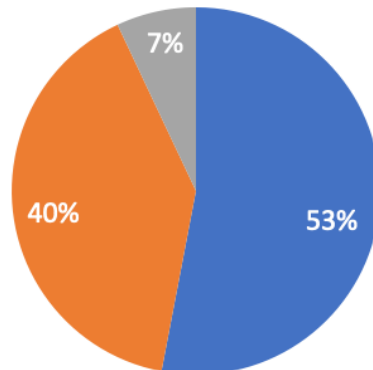
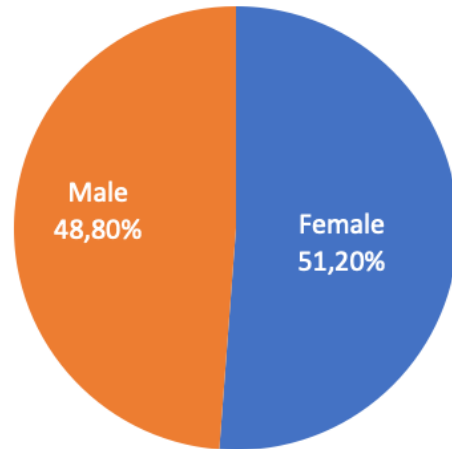
Fifth Block- End of the Survey

Visualization: All Participants

Appendix 2 – Colombia Main Demographics

Sources: Departamento Administrativo Nacional de Estadística (DANE), Departamento Administrativo de Planeación de Antioquia and La República.

| Colombian Population by Departamento | | |
|--------------------------------------|-------------------|-------------|
| Departamento | Population | % |
| Bogotá D.C | 7.412.566 | 15% |
| Antioquia | 6.407.102 | 13% |
| Valle del Cauca | 4.475.886 | 9% |
| Cundinamarca | 2.919.060 | 6% |
| Atlántico | 2.535.517 | 5% |
| Santander | 2.184.837 | 5% |
| Bolivar | 2.070.110 | 4% |
| Caldas | 998.255 | 2% |
| Risaralda | 943.401 | 2% |
| Other | 18.311.760 | 38% |
| Total | 48.258.494 | 100% |



■ Estrato 1 & 2 ■ Estrato 3 & 4 ■ Estrato 5 & 6

Main Representative Age Groups

