

Factors influencing citizens' willingness to co-produce: a study from the perspective of citizens residing in the Brazilian Federal District

Fatores que influenciam a disposição do cidadão para coproduzir: um estudo
na perspectiva de cidadãos residentes no Distrito Federal brasileiro

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Abstract

Co-production emerges as a trend in the relationship between citizens and government, enabling participation in public activities. This study verified factors that influence citizens' willingness to co-produce public safety, health, and environmental services in the Brazilian Federal District (*Distrito Federal brasileiro – DF*), as well as their profile and habits. A survey adapted from the works of Löffler et al. (2008) and Alford and Yates (2016) was performed, with analyses being made from Student's T-Test, Spearman's Correlation Coefficient, and linear regression models. From the responses of 360 inhabitants of the DF, it was found that citizens collaborate more with health, environment, and safety services, in this order, and that in the future they intend to co-produce more than today. It was concluded that the safer a citizen feels, the lower the willingness to co-produce; and the healthier one is, the greater the willingness to co-produce. It was also found that the time devoted to volunteer activities positively influences the willingness to co-produce in these three areas. The study illustrates the behavior of citizens willing to engage in the co-production of public services, gathering information for future researchers on the subject, and exploring variables not yet considered in other Brazilian co-production studies.

Keywords: Co-Production; Public Service; Citizen; Willingness to Co-Produce; Government.

Resumo

A coprodução surge como tendência na relação entre cidadão e governo, propiciando a participação em atividades públicas. Este estudo verificou fatores que influenciam

a disposição do cidadão em coproduzir serviços públicos de segurança, saúde e meio ambiente no Distrito Federal (DF) brasileiro, bem como o perfil e os hábitos desses cidadãos. Foi realizado um *survey* adaptado dos trabalhos de Löffler et al. (2008) e Alford e Yates (2016), assim como análises a partir de Teste T de *Student*, Coeficiente de Correlação de *Spearman* e modelos de regressão linear. Pelas respostas de 360 habitantes do DF, verificou-se que os cidadãos colaboram mais com serviços de saúde, meio ambiente e segurança, nessa ordem, e que no futuro intencionam coproduzir mais do que atualmente. Concluiu-se que quanto mais seguro um cidadão se sente, menor será a disposição à coprodução e quanto mais saudável se considera, maior a disposição para coproduzir. Também se constatou que o tempo dedicado a atividades voluntárias influencia positivamente a disposição para coproduzir nas três áreas. O estudo ilustra o comportamento do cidadão disposto a engajar-se na coprodução de serviços públicos, reunindo informações para futuros pesquisadores do tema e explorando variáveis ainda não consideradas em outros estudos de coprodução brasileiros.

Palavras-chave: Coprodução; Serviço Público; Cidadão; Disposição para Coproduzir; Governo.

Introduction

The concept of co-production creates new parameters for the delivery of public services that, in the traditional view, should be produced exclusively by public agents who are responsible for all the work of creating and providing the service, while the citizen would assume the role of consumer and evaluator (Pestoff, 2006). New Public Governance (NPG) is a recent perspective, among many previous approaches to public administration and governance, and emerged in the first two decades of the 21st century (Osborne, 2010), also spreading in developing economies despite the pitfalls of partially adopting new public management technologies in countries where it is more difficult to deal with complex public problems such as Brazil. Especially in the second decade of the 21st century, Brazil is turning its attention a little more to the need put forward by the NPG to bring together citizens, who were formerly just users of public services, and government – which was formerly just a public service provider.

Co-production has potential applications in almost every kind of public activity (Alford, 2009). At the governmental level, the concept of institutionalized co-production is defined by Joshi and Moore (2004) as “the provision of regular and long-term public services between state agencies and organized citizen groups, in which both make relevant contributions to service generation” (p. 40).

In Scandinavian communities, partly due to the strong presence of the welfare state, co-production among residents and local administrators is most commonly identified. Brazil, however, “did not constitute a social security system close to the model known as the welfare state . . . , but only a few social welfare policies were implemented” (Gomes, 2006, p. 203), such as social and health care programs currently in force in the country (e.g. *Bolsa Família* – an income transfer program for poor families with children in school, *auxílio BPC* – disability and elderly support pension, universal healthcare access via SUS, etc.).

Discussing the co-production of public services is a matter that in 2006 Pestoff concludes, with a sigh of relief, that “at last, the importance of co-production in promoting the development and renewal of democracy and the welfare state is discussed” (Pestoff, 2006, p. 503). If the topic is still relatively recent in Europe, in the case of emerging economies the situation would be no different. Studies on co-production, especially of public services (in some cases, from the perspective of co-production of the public good, the common good, etc.) began to emerge from the middle of the first decade of the 21st century in Brazil.

As part of the historical process of formation of the modern Brazilian state, the engagement of the population specifically in participation through co-production of public services is not yet an intensively observed practice – which does not mean that there are no other forms of citizen participation taking place in Brazil. Some community/municipal councils are examples of social participation; participatory budgeting also serves as an example.

Specific work on the co-production of education, environment, and safety is beginning to emerge in the academic setting. A recent study was published by Soares and Farias (2019) dealing with aspects related to the co-production of public education. This quantitative study is applied to parents (and/or legal guardians) of students.

Soares and Farias (2019) surveyed 269 family members of students from the Brazilian Federal District (*Distrito Federal – DF*), with data analysis based on logistic regression. From the family practices and habits found, the confirmation of forms of co-production proposed by Pestoff (2006) was verified, such as the co-production of the types: pedagogical, social, political, and economic. It was also concluded that the education, habits, and practices of family members influence the forms of co-production studied. It is noteworthy that the authors cited studied the co-production of education and this paper discussed factors influencing the willingness to co-produce in other types of public services: safety, health, and environment. This reinforces the scarcity of studies that discuss the co-production of specific public services in Brazil.

Gomes and Moura (2018) conducted a conceptual discussion aimed at encouraging the co-production of judicial services in Brazil, demonstrating how some judicial services are co-produced and how this process could be enhanced based on the role of judges and managers. Finally, they indicate theoretical propositions to be tested empirically in future studies. This work makes significant theoretical contributions but does not empirically explore the services chosen for this work (safety, health, and environment).

Probably the most robust work ever undertaken on co-production, specifically discussing the environment, and also a study that is the closest to this Brazilian study as it also focused on environmental co-production – which is the perspective adopted in this national article – was performed by Alonso, Andrews, Clifton and Diaz-Fuentes (2019) and presented at the XXII IRSPM Annual Conference, that took place in 2018. It received the best paper award (in its unpublished form) of this conference, in which the authors disclosed the results of their multilevel study, which analyzed factors influencing citizens to co-produce environmental services in Wales, considering at level 1 4,957 respondents on outdoor activities (recreation), and at level 2, interviews with 22 Welsh local authorities.

Taking as the dependent variable environmental co-production, the research considered the following as co-production indicators: 1 = the respondent performed the activity, 0 = the respondent did not perform the activity, which resulted in a co-production index between 0 and 1. The observed behaviors were: recycling, moving to a green energy provider, buying energy-efficient appliances, reducing used energy, buying green products, wildlife gardening, contacts with local parliamentarians or even local environmental assemblies, signing a petition for change, volunteering to help protect the environment, and being a member of an environmental organization/group. According to the authors, “the rationale behind the selection of these activities is to provide a reasonable and approximate proxy for policy-relevant co-productive behaviors” (Alonso et al., 2019, p. 1626).

In addition to profile variables such as age, gender, profession, etc., Alonso et al. (2019) considered as independent variables influencers of co-productive behaviors for the environment, and also the variables: altruistic motivation and the sense of self-efficacy. The latter was also used in this Brazilian study. The authors of the Welsh study concluded that:

Individual factors lead people in Wales to engage in pro-environmental behavior, but also factors related to local government. More specifically, caregiver behavior, a sense of self-efficacy, and civic involvement seem to be critical personal motivations for co-production, while local institutional structures, priorities, and performance are organizational factors that seem to make a real difference. And finally, demographic characteristics

are important determinants of co-production, and personal values and motivations of individuals are also important. (Alonso et al., 2019, p. 1621)

Assuming that the co-production of public services improves the quality of the service offered, improving both citizen satisfaction and satisfaction with public agents, as well as benefiting democracy itself (Pestoff, 2006), this study aimed to answer the following question: What factors influence citizens' willingness to co-produce public safety, health, and environmental services, and what are the levels of this influence on co-production predisposition, both nowadays and *ad futurum*?

Given the question, the general objective of the study was: To verify the factors that influence citizens in their willingness to co-produce the delivery of public safety, health, and environmental services in DF, as well as the profile and habits of these citizens. The objective was broken down into the following specific objectives: (1) to verify the perception of safety, environment, and health status of the research participant; (2) verify citizen satisfaction with the public services studied in the three areas mentioned; (3) verify, from the citizen's point of view, what is their sense of effectiveness in contributing to improved safety, environmental quality, and health; (4) raise the average time devoted to volunteering in the co-production of public services, both current and intended in the future; (5) to survey habits manifested by the citizens, related to the co-production in the three studied areas; and (6) identify factors that influence citizens' willingness to co-produce regarding safety, environment, and health services, jointly with the government.

The research contributes to an expansion of the discussion regarding co-production in the public sector in Brazil. This contribution is both theoretical and empirical since the topic has still been treated incipiently in the national public sphere. As mentioned earlier, studies on the co-production of public services in Brazil began to spread in the middle of the first decade of the 21st century.

Some studies make an (institutional) discussion from the perspective of the common good, the *commons* discussed by Ostrom, etc. (Ostrom, Dietz, Dolšak, Stern, Stonich & Weber, 2002). But this is not the focus of this paper, which intends to discuss factors influencing the willingness of the citizen to co-produce, from the individual perspective, the citizen, as to how they see their action and also their predisposition to collaborate more with the production of public services in their surroundings. The work contributes to the public administration, which in order to reach a new perspective of public governance will need to insert the citizen in the process of design, production, and delivery of public services and solutions.

To elucidate in studies how the co-production of public services occurs and what can lead the citizen to co-produce may open space for governments to increase

their levels of discussion and concern with the effectiveness of mechanisms that allow the citizen's real entry into public governance. Co-production goes beyond merely declaring citizen participation in solving public problems. How to attract and provide the citizen with the conditions to co-produce? How to engage it? Thus, by highlighting some factors that influence, from the perspective of the citizen, their predisposition to co-production, it is expected that public entities improve engagement mechanisms, evolving from participation (often consultative, sometimes deliberative) to the deep involvement of the citizen in the design and the provision of public services.

As a major contribution to the production of co-production in Brazil, this study addresses aspects of co-production, such as influencing factors of citizens' willingness to co-produce public safety, health, and environmental services – aspects that have not yet been addressed in the national production about the object.

Theoretical reference

Concept of co-production

The term co-production was first used in the 1970s by Elinor Ostrom, who found that utility organizations depended as much on the community for service delivery as the community relied on those organizations (Osborne, Radnor & Strokosch, 2016). Ostrom (1996) used the concept of co-production to explain why the police needed the community in the same way the community needed the police. Thus, Ostrom exemplified that if citizens do not report criminal occurrences to the police, little can be done to prevent or solve crimes. Thus, the term co-production was coined to refer to the potential relationship between the “regular” service provider and the user for whom the service is intended. Ostrom's studies gave rise to the concept of co-production in the area of public administration and subsequent studies that developed in the United States, Europe, and Australia (Osborne, Radnor & Strokosch, 2016). However, Alford (2014) has a caveat that although generally the term public sector co-production has been credited to Vincent and Elinor Ostrom, the fact is that the pioneers in using the expression – *client/buyer as a co-producer* – whether in the public or private sector, were Gersuny and Rosengren (1973) in their book *The Service Society*.

For Alford and Yates (2016), the term ‘production’ refers to the transformation of an initial tangible or intangible resource into a value-added result. The prefix ‘co’ denotes that this transformation will be performed by two or more parties: the citizen and the government will contribute, devoting time, and effort.

Thus, health, education, environment, safety, etc. are services recurrently marked by the presence of co-production (Alford, 2009).

Client, citizen, volunteer

Several nomenclatures are used to refer to the service user (Alford & Yates, 2016). Often the terms client, citizen, and volunteer are used, and Alford (2002) is dedicated to clarifying the semantic distinction between the terms so that they are correctly used in the co-production scenario. The term client is classified by the author as the individual who relates to the organization in delivering the service. From the organization, the client will receive some private value, which may be goods, a service, or benefit. To be considered a client, this benefit must be consumed individually. Therefore, individuals who are collectively awarded for public benefits are excluded from the classification of clients. Ostrom (1996) criticizes the use of the term 'client' in the context of co-production, claiming that it denotes a passive meaning as if the user had only the function of being the recipient of a service. Thus, Ostrom prefers the term 'citizen' to refer to the co-producer of the public service.

Alford (2002) explains that the term 'voluntary' classifies an individual who will not necessarily play the role of recipient or beneficiary of any public service. The volunteer provides work inputs, however, without necessarily consuming the benefit individually. The discussion about volunteering in co-production processes is controversial. Tõnurist and Surva (2016) point out that "using citizens in co-production is fraught with controversy that influences the very nature of volunteering" (p. 223). Volunteering is a low-cost alternative to deliver services by co-producing them with citizens. For the authors, there is a government movement centered on volunteering through the proposition "government through volunteering" (Haski-Leventhal et al., 2009 cited by Tõnurist & Surva, 2016, p. 225). Thus, voluntary action is increasingly becoming part of co-production. One controversy concerns the fact that paid employment can be replaced by 'voluntary' work by the citizen. If the active participation of the citizen becomes motivated by the government for co-production via volunteering, can it be said that co-production, in this case, would be voluntary? This gives rise to a debate about how far the state can go, involving the citizen in the co-production of public services and yet the provision of the service should be considered voluntary – not compulsory or coercive (Tõnurist & Surva, 2016). In this work, the variable 'volunteering time' was worked out only to know its relationship with the propensity to co-produce in the future or even its current level of collaboration in voluntary activities related to the environment, health, and safety of their neighborhood.

As a citizen, Alford (2002) considers the individual who is part of a collective that expresses their needs together, as in the case of the fight against corruption.

In contrast to the definition of client, they point out that individuals express their individual preferences to receive private values. The citizen receives a public value. His or her relationship with the government is determined by laws, obligations, and accountability, while clients will relate to the government at the point of delivery of a service.

Several authors refer to the co-producer of public services, when related to the government, by the denomination 'citizen' (Linders, 2012; Osborne, Radnor & Strokosch, 2016; Ostrom, 1996; Pestoff, 2006). Alford (2002) made the effort to differentiate each nomenclature, presenting distinctive qualities to the co-producer who Alford classified as a client, volunteer, or citizen. However, later, Alford and Yates (2016) refer to the co-producer of utilities using the term 'citizen'. Thus, the different views of Alford (2002) about the co-producer of services were presented in this present work. However, the term 'citizen' will be adopted when referring to the co-producer user of public services, as prevails in the literature.

Motivation for co-production

In defining citizens' motivation to co-produce, Sharp (1978) classifies three factors that are organizational incentives offered to citizens: material incentives (e.g., goods or services, such as child care, etc.); solidarity incentives (socialization, fun, and sense of belonging to the group, etc.); and expressive incentives (feeling of being able to express an ideology, having contributed to a common cause).

Alford (2002) states that for the volunteer, motivational factors are linked to the user's desire to express humanitarian values and support altruistic causes. As for the willingness of clients to co-produce, motivation based on material rewards will only be effective in performing simple tasks. In complex activities, clients will be motivated to co-produce due to intrinsic rewards, expressive public values, and their ability to perform the task.

Regarding the way the user interacts with the government, Linders (2012) classifies the partnership between government and service users in three dimensions that reflect the distribution of power and responsibility of each party. They are referred to as citizen sourcing (citizen sourcing, C2G), where the citizen is a source and helps the government to be more responsible and effective. The primary responsibility lies with the government, but citizens influence service delivery and can help it daily; government as a platform (G2C) that provides the public with IT services, increasing citizens' productivity and improving their decisions and well-being; and finally, the do-it-yourself government (C2C) in which citizens self-organize and develop activities that can replace government action. It is an informal and proactive union between citizens, in which the government does not play an active role and can facilitate it.

Therefore, there are different levels of interaction and involvement in the government-citizen relationship. In some cases, as Linders argues in his work, citizen-to-citizen action is a potential substitute for traditional government itself. Linders in demonstrating the use of co-production in the United States, considers that the typology applied to major US government implementations is “a plethora of competing labels, models, and concepts for co-production” (p. 446).

In section 4, that covers the results and discussion of this work, it is important to advance that from the assertions in Table 11 regarding actions that denote co-production, the citizens participating in the study pointed out behaviors that demonstrate the willingness for co-production. See the examples: (1) be careful to lock all doors and close all windows of your home when leaving (public safety co-production) type C2C or do it yourself; (2) participates in any group or organization that works to improve the quality of the environment (co-production of the environment in the C2C typology presented by Linders (2012); or (3) adopts a healthier diet, reducing the consumption of alcohol, sugar or cigarettes (co-production of public health, reducing the government budget for expenditures with comorbidity diseases that plague the public healthcare of Brazilian and other emerging countries).

Co-production can be considered as a form of providing citizen assistance to the public agent. This can be crucial for the implementation of certain public policies (Whitaker, 1980). Take, for example, selective waste collection and recycling services, where individual action is indispensable for public waste management policy to achieve its purposes, culminating in greater social benefit.

It should be noted that co-production occurs in the cases mentioned above, as the isolated action of the citizen has repercussions on policies and public budgets. Variations occur in the degree of interaction between government and citizens. This is the perspective adopted in this paper, from Linders (2012). Regardless, Alford and Yates advise on the need for more research to better understand the concept, because:

Coproduction has come a long way since its early rudimentary versions of the early 1980s, so we now have a better theoretical understanding of many of the relevant concepts. But there is still some distance to go. The signs are that this is now beginning (year 2015) to attract the attention of a larger group of researchers than before – a development that can only be welcomed. (Alford & Yates, 2016, p. 171)

For many leaders, one of the benefits of engaging people in public service delivery is increased satisfaction with the service which it co-produces (Löffler, Parrado, Bovaird & Van Ryzin, 2008). However, studies by Löffler et al. indicated that the

relationship between satisfaction with public services is not linear with the involvement of citizens in their production. Danish citizens were satisfied with public services but did not show high levels of co-production, while German citizens were less satisfied with government services but co-produced more.

For Van Eijk and Steen (2016) dissatisfaction motivates co-productive behavior, such as citizens who watch the neighborhood houses because they believe that the police do not do this satisfactorily. The various interpretations of the effect satisfaction have on co-production show that the theme has sometimes antagonistic perspectives.

Definition of study variables

This study was based on five variables, four independent and one dependent variable, chosen based on Löffler et al. (2008) and Alford and Yates (2016), who investigated the relationship between citizens' willingness to co-produce and these same independent variables. The first independent variable refers to the citizen's sense of safety ("How safe do you feel about walking alone at night in the Administrative Region (AR) where you live?"), The perception of the environment ("Overall, how good do you consider the environment of the AR in which you live?") and the perception of health ("Overall, how good would you consider your health to be lately?"). This variable was named **Sensation/Perception** (of safety, health, environment).

The second independent variable is formed by individuals' satisfaction with local government services, called **Satisfaction**. The third independent variable corresponds to the perceived difference that citizens believe their actions can play in improving public services ("How much of a difference do you think ordinary citizens can play in improving the safety of the place where they live, the quality of the environment where they live, their health or the health of others?"), being called **Sense of Effectiveness**. The fourth independent variable refers to the time that the citizen devotes or would dedicate in the future to perform activities related to the co-production of public services, called **Time that would be devoted to voluntary activities**.

The dependent variable refers to actions (behaviors) that demonstrate the willingness of the citizen to co-produce, such as the habit of recycling, watching the neighbor's house when they are away, and taking care of someone who is sick. This was called **Willingness to Co-produce** (health services, environmental services, and safety services).

Note that the independent variables: Sensation, Satisfaction, Sense of Effectiveness, and Time that would be dedicated to voluntary activities denote the (favorable/unfavorable) attitude of the subject concerning the action. Only the

dependent variable **Willingness to Co-produce** portrays, in the items/assertions of the applied questionnaire the intentional/attitudinal aspects and some behaviors/actions. In this study, the willingness to co-produce did not dispense with the survey of some actions (behaviors) of studied citizens. It could not be, for example, just a sensation/satisfaction or propensity. Thus, individual, group, or collective action was considered in this paper as its willingness for co-production.

According to Pestoff (2006), often the citizen acts individually to “improve the quality or quantity of the services they receive” (p. 506). This can be characterized as individual co-production. Rich (1991 cited by Pestoff, 2006) stated that “co-production can be active and passive as well as individual and collective. Co-production does not require the formal organization of citizens, although organizations are a critical variable as they increase co-production levels” (p. 507).

Method

The study was conducted in the DF, which has no municipalities but 31 ARs. The DF is inhabited by 2,570,160 people, according to the 2010 demographic census of the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, 2019), with an estimated current population of 3,015,268.

Because the DF contains more than 100,000 inhabitants, the population is considered infinite, and therefore it was expected to collect about 400 questionnaires for a confidence level of 95%, $z = 1.96$, and a margin of error of 5% (Gil, 2002). Four hundred and fifteen questionnaires were distributed and 360 valid questionnaires were returned, constituting the sample (N). The research is descriptive, quantitative, and adapted the questionnaire developed and applied by Löffler et al. (2008) in Denmark, France, Germany, the United Kingdom, and the Czech Republic, and by Alford and Yates (2016) in Australia. The survey was applied both online, through SurveyMonkey, and in person, with the distribution of printed questionnaires. The collection considered the convenience and accessibility of the participants. Therefore, this is a non-probabilistic sample, conducted with a specific population of the DF, who have high income and high education – which may constitute a limitation of the study, not allowing the generalization of its results to other Brazilian cases that may be studied.

The sampling process is non-probabilistic since although it is a specific segment of the DF, with a certain profile, the data were not obtained in a probabilistic manner since not all members of this segment had equal and non-zero opportunity to participate in the study. Data were collected from people who allowed access, at their convenience, to answer the questionnaire. According to Antunes (2011),

in “a probabilistic sampling process, all subjects included in the sample are equally (non-zero) likely to be chosen to join the sample” (p. 1).

The study focused on three areas of public services, namely: safety, the environment, and health, according to Löffler et al. (2008) and Alford and Yates (2016). All questions were formulated on Likert scales of 1 to 4 points or 1 to 3 points, depending on the question/objective. This instrument was translated from English into Portuguese and some of its terms were changed to make sense in the Brazilian context. For example, the word neighborhood has been replaced by AR and the term local council has been replaced by local authorities.

Data collection occurred through a survey adapted from the works of Löffler et al. (2008) and Alford and Yates (2016), as mentioned above, being the analyses made from Student's T-Test, Spearman's Correlation Coefficient, and linear regression models, respecting the distribution normality assumptions for the viability of the regression tests.

Results and discussion

Description of the sampling profile

Regarding the profile of the survey participants, more than half (65.1%) are up to 40 years old: 30.3% from 18 to 25 years old, 14.2% from 25 to 30 years old, and 20.6% from 30 to 40 years old. Regarding gender, females predominated (60.8%). Regarding the degree of education, those with a postgraduate degree (41.9%), and with complete (29.7%) or incomplete (18.1%) higher education predominated. More than half (55.6%) have a monthly family income of over R\$ 10,000.00, with a prevalence of individuals with an income above R\$ 20,001.00 (24.2%), and with a monthly family income of R\$ 5,001.00 to R\$ 10,000.00 (22.2%). Regarding the percentage distribution of the sample by AR, we have: AR I Pilot Plan (28.3%); AR XX Águas Claras (11.4%); AR XXII Southwest/Octogonal (*Sudoeste/Octogonal*) (9.2%); AR XVI South Lake (*Lago Sul*) (8.6%); and AR X Guar (8.1%), being the most populated by survey respondents.

Therefore, the respondents of this research make up a predominantly high household income population with a high educational level, living in the most central regions of the DF and up to 40 years old.

Factors influencing willingness for co-production

To study the influence that different factors play on co-production willingness, linear regression models were performed relating the four independent variables of the study with the dependent variable, and the normality of distribution assumptions for the feasibility of these regression tests was respected. Thus, the authors expected to identify how the actions that approach the co-producing behavior of the citizen can be explained by the citizen's satisfaction with public services, their sense of safety, their perception about environment and health, the sense of the effectiveness of their actions on co-production activities, the time they currently devote and the time they are willing to devote to the future as a volunteer for government activities.

Regarding safety (Table 1), the set of independent variables explain 19.9% of the willingness for co-production. As for the variable sensation of safety, there is a negative effect generated in the willingness to co-produce, indicating that the greater the sense of safety, the less willingness to co-produce ($\beta = -.202$; $p < .001$). In contrast, volunteer time in the future ($\beta = .157$; $p = .003$) and currently devoted time ($\beta = .289$; $p < .001$) have a positive effect on willingness to co-produce, indicating that the more a citizen volunteers or intends to volunteer in the future, the greater the willingness to co-produce. Neither the satisfaction variable ($p = .125$) nor the sense of effectiveness variable ($p = .125$) had any effect on the willingness to co-produce safety services.

Table 1 – Regression model – safety (N = 360)

| Independent variables | Standardized coefficient (β) | Non-standardized coefficient (B) | p |
|------------------------------------|--------------------------------------|----------------------------------|--------|
| Sense of safety | – .202 | – .514 | < .001 |
| Satisfaction – safety | .079 | .310 | .125 |
| Sense of effectiveness | .078 | .209 | .131 |
| Future volunteering time – Safety | .157 | .372 | .003 |
| Current volunteering time – safety | .289 | 1.094 | < .001 |

Dependent variable: **Willingness for co-production of safety services**
 Model adjusted for gender, age, educational background, and family income;
 F (9.350) = 9.640; $p < .001$; $R^2 = 19.9\%$

Source: Developed by the authors.

Regarding the environment (Table 2), the set of independent variables explains 19.8% of the willingness for co-production. In this case, only current ($\beta = .192$; $p < .001$) and future ($\beta = .224$; $p < .001$) volunteer time have a significant effect

on this willingness, resulting in an increase in participation in environmental activities when there is increased citizen dedication time to co-produce.

In health (Table 3), the set of independent variables explains 29.2% of willingness to co-produce. In this area, the current ($\beta = .241$; $p = .001$) and future ($\beta = .108$; $p = .028$) volunteer time also positively influence the occurrence of actions related to co-production. Also, the perception of health status has a positive influence, indicating that the healthier the citizen is, the greater their contribution to the co-production of health services ($\beta = .202$; $p = .001$).

Willingness to co-produce health services when citizens consider themselves healthier is an important finding. Knowing that people who are interested in being healthier can co-produce much more, local authorities may, for example, promote campaigns that encourage physical activity and the adoption of a balanced diet. The benefit of actions such as these for the government is the tendency for healthier residents to generate less public spending on health, saving resources (Löffler et al., 2008).

Table 2 – Regression model – environment (N = 360)

| Independent variables | Standardized coefficient (β) | Non-standardized coefficient (B) | p |
|---|--------------------------------------|----------------------------------|--------|
| Perception about the environment | .026 | .058 | .635 |
| Satisfaction – environment | – .030 | – .093 | .565 |
| Sense of effectiveness | .063 | .181 | .229 |
| Future volunteering time – environment | .224 | .491 | < .001 |
| Current volunteering time – environment | .192 | .450 | < .001 |

Dependent variable: **Willingness for the co-production of environmental services**
 Model adjusted for gender, age, educational background, and family income;
 F (9.350) = 9.589; $p < .001$; $R^2 = 19.8\%$

Source: Developed by the authors.

Table 3 – Regression model – health (N = 360)

| Independent variables | Standardized coefficient (β) | Non-standardized coefficient (B) | p |
|------------------------------------|--------------------------------------|----------------------------------|------|
| Health perception | .202 | .476 | .001 |
| Satisfaction – health | .036 | .092 | .457 |
| Sense of effectiveness | – .015 | – .034 | .760 |
| Future volunteering time – health | .108 | .225 | .028 |
| Current volunteering time – health | .241 | .398 | .001 |

Dependent variable: **Willingness to co-produce health services**
 Model adjusted for gender, age, educational background, and family income;
 F (9.350) = 16.036; $p < .001$; $R^2 = 29.2\%$

Source: Developed by the authors.

It was observed that the satisfaction and sense of efficacy variables did not explain co-production-related behaviors in any of the areas ($p > .05$). As for satisfaction, it can be stated that the willingness to co-produce occurs regardless of whether the citizen is satisfied with the service. This is an important finding, as satisfaction is sometimes seen as an important catalyst for co-production (Alford, 2002). We will further discuss this topic in light of the findings by Alford and Yates (2016) and Löffler et al. (2008).

Feeling of safety, perception of the environment, and perception of health

Figure 1 shows the responses regarding the independent variable **sensation/perception** of safety, health, and environmental quality. As for the feeling of safety, 70% of respondents said they do not feel as safe or not in the least safe in the AR where they live, in contrast to 1.7% who feel very safe. Regarding the environment in which they live, most consider it to be “Good” (49.7%) or “Very Good” (23.3%). The results of perception of health status were similar, with 53.9% of participants having considered their health “Good” and 23.1% “Very Good.”

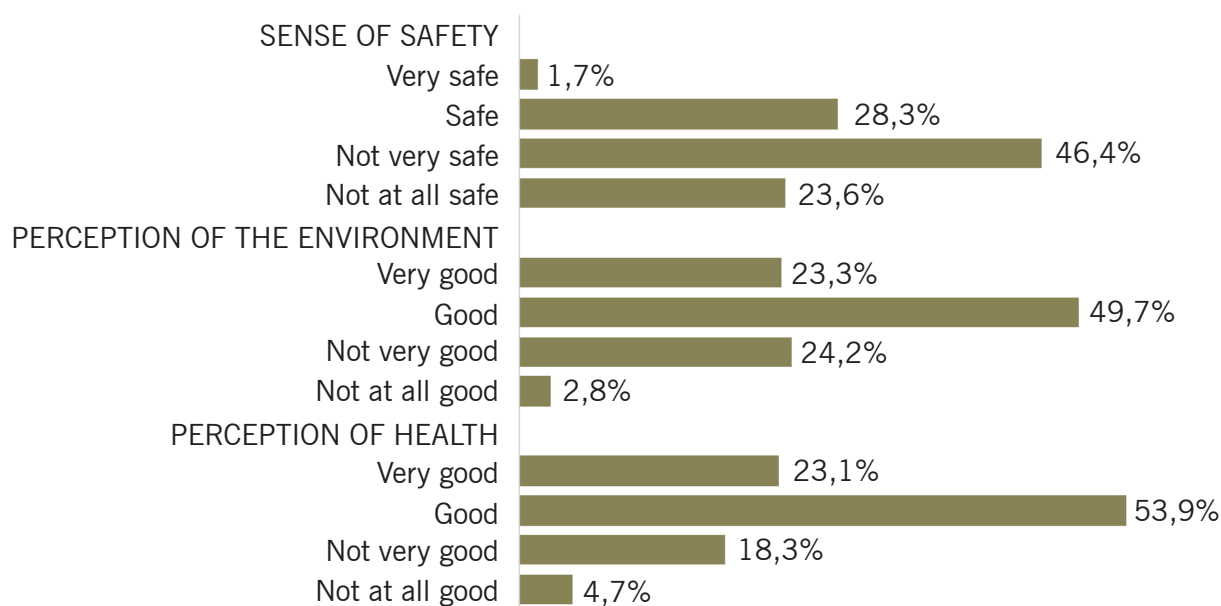


Figure 1 – Feeling of safety, perception of the environment, and perception of health (N = 360)

Source: Developed by the authors.

Table 4 shows that the feeling of safety has the lowest average. Citizens feel safe to a lesser extent but tend to regard the environment in which they live as close to good (average 2.9) and their health as being good health (average 3.0).

Table 4 – Characterization of total and area co-production scores (N = 360)

| | Minimum | Maximum | Median | Mean | Standard deviation |
|-------------------------------|---------|---------|--------|------|--------------------|
| Sense of safety | 1.0 | 4.0 | 2.0 | 2.1 | 0.8 |
| Perception of the environment | 1.0 | 4.0 | 3.0 | 2.9 | 0.8 |
| Perception of health | 1.0 | 4.0 | 3.0 | 3.0 | 0.8 |

Source: Developed by the authors.

One of the factors that leads to co-production is the need unmet by the public sector (Thijssen & Van Dooren, 2016). This mobilizes citizens individually or collectively to meet the demand. Thus, a citizen who feels less or more safe or healthy may have different levels of co-production. For Löffler et al. (2008) the citizens' sense of safety and their perception of the environment and their health explain little about co-production. Their studies showed that unhealthy or unsafe Europeans tend to co-produce more but with poor statistical correlation, suggesting that there are more important factors that justify participation in public services.

As shown in Table 1, the willingness to co-produce is discouraged as respondents feel safer. It follows that when the safety of a particular community increases, its inhabitants feel safe and engage less in community protection activities. But the opposite interpretation can be made in the case of health, because in Table 3 it was seen that the more a citizen considers themselves healthy, the greater the willingness to co-produce health services.

Citizen satisfaction with public services in the three areas studied

Table 5 shows the satisfaction of citizens with public services in the three areas studied.

Items that refer to the interaction between the public servant and the citizen, such as the opportunities offered to the citizen to participate in public activities and the consultation of citizens' opinions on public affairs, are the least satisfied in the three areas. Encouraging residents to participate in activities considered to be of public responsibility is relevant (Alford & Yates, 2016) because it intrinsically motivates the individual and increases their sense of social belonging – factors that may induce co-production.

Table 5 – Frequency of answers to satisfaction questions (N = 360)

| | Disatisfied | Somewhat satisfied | Satisfied | Very satisfied |
|--|-------------|--------------------|-----------|----------------|
| SAFETY | | | | |
| The information you generally receive from the police and other public officials about community crimes and safety. | 46.7% | 39.7% | 12.8% | 0.8% |
| The work performed by the police in the AR where you live. | 27.8% | 45.3% | 26.4% | 0.6% |
| The opportunities offered by the police or other public officials so that people like you can improve public safety in your AR. | 62.8% | 29.4% | 6.9% | 0.8% |
| How often you can work with police or other public officials to improve the public safety of the AR in which you live. | 65.0% | 26.4% | 7.2% | 1.4% |
| How often police and other public officials use their knowledge and experience to improve public safety in your AR. | 57.2% | 32.5% | 9.4% | 0.8% |
| The frequency with which police and other public officials ask your opinion on crime and safety issues in your AR. | 80.3% | 15.0% | 3.3% | 1.4% |
| ENVIRONMENT | | | | |
| The work performed by the public entities and workers responsible for taking care of the environment of the AR where you live. | 23.6% | 42.8% | 31.1% | 2.5% |
| The information you generally receive from local authorities about environmental issues that affect your AR. | 53.6% | 33.1% | 12.2% | 1.1% |
| The frequency with which public officials and other public institutions ask your opinion about environmental issues that affect your AR. | 77.5% | 17.2% | 4.7% | 0.6% |
| HEALTH | | | | |
| The quality of work performed by health professionals, such as the doctors you consult with, and local hospitals. | 28.1% | 35.8% | 30.6% | 5.6% |
| The information you usually receive from healthcare providers, such as the doctors you consult with and local hospitals. | 23.3% | 38.9% | 31.7% | 6.1% |
| How often health care providers, such as your doctor and local hospitals, ask your opinion about issues that affect your health. | 52.5% | 31.7% | 13.1% | 2.8% |

Source: Developed by the authors.

Table 6 illustrates the satisfaction per item answered according to a scale whose maximum limit was 4.0. All scores demonstrate low satisfaction in all areas concerned.

Table 6 – Characterization of the total satisfaction scores and by areas (N = 360)

| | Minimum | Maximum | Median | Mean | Standard deviation |
|----------------------------|---------|---------|--------|------|--------------------|
| Satisfaction – Safety | 1.0 | 4.0 | 1.5 | 1.6 | 0.5 |
| Satisfaction – Environment | 1.0 | 4.0 | 1.7 | 1.7 | 0.5 |
| Satisfaction – Health | 1.0 | 4.0 | 2.0 | 2.0 | 0.7 |
| Satisfaction – Total | 1.0 | 3.2 | 1.7 | 1.7 | 0.4 |

Source: Developed by the authors.

Sense of effectiveness

Regarding the citizen's perception of the improvement that they believe their actions can produce for safety, the quality of the environment, and the quality of their health or other people's health, most believe it can make a positive difference. The environment stands out for being where it is believed that a major difference can be made, with 78.3% of respondents claiming that their contributions would make a big difference, compared to 59.2% in health and 41.9% in safety. Table 7 elucidates the sense of effectiveness.

Table 7 – Frequency of answers to questions of the sense of effectiveness (N = 360)

| | No difference | Little difference | Some difference | Big difference |
|--|---------------|-------------------|-----------------|----------------|
| SAFETY | | | | |
| How much of a difference do you believe normal citizens can make to increase the safety of their homes? | 2.2% | 9.2% | 46.7% | 41.9% |
| ENVIRONMENT | | | | |
| How much of a difference do you believe normal citizens can make to increase the quality of their environment? | 0.6% | 5.6% | 15.6% | 78.3% |
| HEALTH | | | | |
| How much of a difference do you think ordinary citizens can play in improving the quality of their health or the health of others? | 2.2% | 10.8% | 27.8% | 59.2% |

Source: Developed by the authors.

Table 8 shows that the average environmental score almost reaches the maximum score of 4 points (3.7), followed by an average of 3.4 for health and then an average of 3.3 for safety.

Table 8 – Characterization of the sense of effectiveness scores by area and total (N = 360)

| | Minimum | Maximum | Median | Mean | Standard deviation |
|-------------------------|---------|---------|--------|------|--------------------|
| Attitudes – Safety | 1.0 | 4.0 | 3.0 | 3.3 | 0.7 |
| Attitudes – Environment | 1.0 | 4.0 | 4.0 | 3.7 | 0.6 |
| Attitudes – Health | 1.0 | 4.0 | 4.0 | 3.4 | 0.8 |
| Attitudes – Total | 1.0 | 4.0 | 3.7 | 3.5 | 0.5 |

Source: Developed by the authors.

For Alford and Yates (2016) the citizen's sense of effectiveness is a motivating factor for co-production. Interestingly, Löffler et al. (2008) found that European citizens currently co-producing with the government are generally unsure that their actions will yield results, but are willing to continue to be co-producers and to do more. In Denmark, more citizens believe that their actions may represent positive differences in the quality of public services, while in Germany this indicator is the least pronounced. Germany's result is interesting because the country has citizens who are active in co-production, even when they are not convinced that they can make a difference. Therefore, based on Löffler et al. (2008), it is not possible to conclude that citizens' sense of effectiveness is a preponderant factor for co-production.

Alford and Yates (2016) found that 89% of Australians believed in generating some difference in public safety services, 92% thought the same for the environment and 93% for their health or the health of others. However, Australians' high sense of effectiveness did not significantly impact co-production levels, indicating that believing or not believing that their actions generate change does not necessarily lead to co-production. In this study, we saw that citizens' sense of effectiveness does not justify co-production (Tables 1, 2, and 3), converging with the results found by Löffler et al. (2008) and Alford and Yates (2016). In the recent study by Alonso et al. (2019), with about 5,000 Welsh citizens, the authors found that with regard to factors influencing environmental co-production, individuals with high levels of self-efficacy are more likely to co-produce environmental outcomes.

The time that is devoted, or that would in the future be devoted to volunteering action

As for the time citizens devote or could devote to volunteer activities, most respondents do not currently devote any time to safety and environmental activities. In health, less than half (40.6%) do not volunteer at any time. Only 3.4% spend at least a few hours a month on safety and 8.9% on the environment. A percentage of 33.6% devotes at least a few hours a month to health care. It is important to highlight that in all areas citizens are more willing to dedicate themselves in the future than they currently do. Table 9 shows the current time of citizen's voluntary dedication and their future intention.

In Europe, Löffler et al. (2008) found that 19% of citizens were willing to spend a few hours a week to improve their health or the health of others. In this study, 12.8% of the respondents from the DF showed the same willingness. On improving community safety, 17% of Europeans would invest a few hours a week to try to improve it, while 9.4% of respondents to this survey would do the same in their AR. Finally, the willingness to actively participate in environmental causes was 13% in Europe and 10% among participants in this study. Comparing the results of Alford

and Yates (2016) with this survey, Australians are less willing to co-produce activities in the future, while participants in this study intend to increase their participation in all three areas.

Table 9 – Frequencies of answers to questions regarding time devoted or that could be devoted to volunteering activities (N = 360)

| | No time | A little time | A few hours per month | A few hours per week or more |
|---|---------|---------------|-----------------------|------------------------------|
| SAFETY | | | | |
| How long would you be willing to volunteer in the future to make your living safer by working closely with local police and other citizens? | 11.4% | 40.0% | 39.2% | 9.4% |
| How much time do you currently dedicate to volunteer with your neighbors and local police to help make your locality safer? | 81.7% | 15.0% | 2.8% | 0.6% |
| ENVIRONMENT | | | | |
| How much time would you be willing to volunteer in the future to improve the environment in which you live by working closely with local public officials and other citizens? | 7.8% | 32.5% | 49.7% | 10.0% |
| How much time do you currently volunteer, whether working with your neighbors or local authorities, to improve the environment in which you live? | 64.2% | 26.9% | 6.7% | 2.2% |
| HEALTH | | | | |
| How much time would you be willing to devote in the future to volunteering in partnership with other people or local health workers to help improve your health or the health of others? | 13.3% | 34.7% | 39.2% | 12.8% |
| How much time do you currently spend taking care of your health or the health of others, working in partnership with other people or public health officials? | 40.6% | 25.8% | 17.2% | 16.4% |

Source: Developed by the authors.

Table 10 below shows that the current average time devoted to voluntary safety activities is lower than in the other two areas. It is noted that respondents intend to devote almost the same average time to all areas (safety = 2.5, environment = 2.6, health = 2.5) in the future, which represents a dedication between “A little time” and “A few hours a month.”

Table 10 – Characterization of the scores for the time respondents devoted or intended to devote in the future, to volunteering actions, by area, and total (N = 360)

| | Minimum | Maximum | Median | Mean | Standard deviation |
|---------------------------------------|---------|---------|--------|------|--------------------|
| Volunteered time – Safety | | | | | |
| In the future | 1.0 | 4.0 | 2.0 | 2.5 | 0.8 |
| Currently | 1.0 | 4.0 | 1.0 | 1.2 | 0.5 |
| Volunteered time – Environment | | | | | |
| In the future | 1.0 | 4.0 | 3.0 | 2.6 | 0.8 |
| Currently | 1.0 | 4.0 | 1.0 | 1.5 | 0.7 |
| Volunteered time – Health | | | | | |
| In the future | 1.0 | 4.0 | 3.0 | 2.5 | 0.9 |
| Currently | 1.0 | 4.0 | 2.0 | 2.1 | 1.1 |
| Volunteered time – Total | | | | | |
| In the future | 1.0 | 4.0 | 2.7 | 2.5 | 0.7 |
| Currently | 1.0 | 3.3 | 1.7 | 1.6 | 0.6 |

Source: Developed by the authors.

It is observed that the time to be volunteered in the future does not depend on the type of service analyzed. The environment receives subtle elevation in future intent. In contrast, in the European context, Löffler et al. (2008) found that there is a difference between the areas that citizens choose to dedicate themselves to, with health being the most prone. Australians, on the other hand, focus more on safety and the environment (Alford & Yates, 2016).

This research shows that people are willing to spend more time in the future than they currently do on co-production activities, which is a valuable signal for the government, but it does not relieve it of many challenges such as knowing how to identify these people, recruit them, and what kind of work they would be willing to do, as well as how to keep them motivated and engaged so they can continue to co-produce.

It was not the purpose of this study to explain the controversy inherent in volunteering and co-production activity. The controversy is known to exist, and Alford (2002) clarifies that volunteering connotes citizen charity or philanthropic contributions. Thus, when volunteers contribute resources to their communities, they do not personally consume the services. The client is not necessarily the citizen, the co-producer is not necessarily the volunteer. However, sometimes the co-producer citizen is a beneficiary of the public service that they help to co-produce, at other times they co-produce by the simple fact that their action may better the surroundings, the neighborhood, i.e., the benefit is of the group or the community, but not necessarily something immediately consumed by the co-producer individual. Checking how much time a citizen could devote to volunteer activities can be an indicator of how much he or she will be willing to participate in co-productive actions in the future, where altruism weighs much more than just the pursuit of individual benefits, material

rewards (Alford, 2002), etc. Community empowerment and democratic governance can be driving factors for the action of a citizen who does not seek, in isolation (as a client/consumer) benefits for themselves, but for the collectivity. Solidarity rewards can be a motivator of the voluntary action of the citizen, according to this same author.

Habits related to willingness to co-produce

Table 11 presents the frequencies of habits related to the willingness to co-produce in the areas of safety, environment, and health, demonstrated by the DF citizens who participated in this study. In safety, 85.6% never “ask the police for advice on how to best protect their residence” and 85.6% never “participate in any group or organization working to improve safety in their AR.” In contrast, in relation to the activity “attempt to lock all doors and close all windows of their home when leaving,” 84.2% claimed to do so frequently.

Regarding the environment, most (80.8%) never “participate in any group or organization that works to improve the quality of the environment.” However, most stated that they “try to save water and electricity in their home” (75.6%). In the study by Alonso et al. (2019), it was found that:

Pro-environmental behaviors can replace the provision of low-quality environmental services and the provision of risk-averse “producer aversion” public services. However, they also indicate that participatory structures may be associated with positive involvement with environmental issues. (p. 1622)

This is a high rate and it is worrying that, in this case in the DF, almost 80.8% of the study participants had never participated in a group or organization aimed at improving the quality of the environment.

Finally, in health, the majority (75.6%) never “participate in any group or organization that deals with health issues.” However, this is the area in which citizens engage in more frequent activities, with over 50% saying that they often “adopt a healthier diet – for example, reducing their consumption of alcohol, sugar, or cigarettes” (64.2%), “try to exercise” (56.4%) and “go to the doctor for a check-up and have blood tests” (50.8%).

Table 11 – Frequency of answers to questions related to willingness to co-produce (N = 360)

Never, Sometimes, Frequently

| | Never | Sometimes | Frequently |
|--|-------|-----------|------------|
| SAFETY | | | |
| Ask the police for advice on how to best protect their residence. | 85.6% | 11.9% | 2.5% |
| Are careful to lock all doors and close all windows of their residence when leaving. | 2.5% | 13.3% | 84.2% |
| Ask a neighbor to guard their home when they are away. | 56.4% | 28.9% | 14.7% |
| Watch a neighbor's property when they are away. | 53.3% | 32.2% | 14.4% |
| Participate in any group or organization working to improve safety in their AR. | 85.6% | 10.6% | 3.9% |
| ENVIRONMENT | | | |
| Warns others not to litter the streets and/or to let their dogs foul the pavement. | 27.8% | 50.0% | 22.2% |
| Try to recycle their household waste. | 16.4% | 34.2% | 49.4% |
| Try to save water and electricity in their home. | 0.8% | 23.6% | 75.6% |
| Walk, ride, or use public transportation. | 26.1% | 50.3% | 23.6% |
| Participate in any group or organization that works to improve the quality of the environment. | 80.8% | 14.4% | 4.7% |
| HEALTH | | | |
| Adopt a healthier diet – for example, reducing alcohol, sugar, or cigarette consumption. | 3.9% | 31.9% | 64.2% |
| Try to exercise. | 5.8% | 37.8% | 56.4% |
| Go to the doctor for a check-up and have blood tests. | 7.5% | 41.7% | 50.8% |
| Take care of a family member or friend who is sick. | 23.3% | 53.9% | 22.8% |
| Participate in any group or organization that deals with health issues. | 75.6% | 14.7% | 9.7% |

Source: Developed by the authors.

The score for the analysis of the co-production variable was calculated slightly differently from the previous scores. The coding used was 1 = "Never," 2 = "Sometimes" and 3 = "Often." Each of the areas of public services studied was represented by five behaviors that denote the willingness to co-produce. The score for each area was formulated considering that at least 5 points could be scored by the respondent (if they answered "Never" for all items) and at most 15 (if he answered "Frequently" for all items). A willingness score for total co-production was also calculated, consisting of the sum of responses from each area, which may range from a minimum of 15 points (a citizen who does not co-produce with the government at all) to a maximum of 45 points (a citizen very engaged in co-production efforts).

The lowest score observed was 20 points and the highest score was 41 points, showing different profiles regarding willingness to co-produce.

Table 12 shows that citizens' willingness to co-produce is higher in health, followed by environment and safety. In the case of Europe, Löffler et al. (2008) found that co-production behavior is more frequent in environmental services, followed by health and safety. The Australian reality is similar to the European reality, with little difference between areas (Alford & Yates, 2016).

Table 12 – Characterization of the scores for the willingness to co-produce, by area, and total (N = 360)

| | Minimum | Maximum | Median | Mean | Standard deviation |
|-----------------------------|---------|---------|--------|------|--------------------|
| Co-production – Safety | 5 | 15 | 8 | 8.4 | 1.9 |
| Co-production – Environment | 6 | 15 | 10 | 10.2 | 1.7 |
| Co-production – Health | 6 | 15 | 11 | 10.9 | 1.8 |
| Co-production – Total | 20 | 41 | 29 | 29.5 | 3.5 |

Source: Developed by the authors.

Regarding behavior in co-production activities, citizens contribute more regularly to activities that do not require much effort or contact with third parties, whether with neighbors, local agents, or outsiders, just as in Europe (Löffler et al., 2008) and Australia (Alford & Yates, 2016). This conclusion is realized by analyzing that the activities that depend on interaction with at least one other person are at the end of the ranking, being the least practiced.

Löffler et al. (2008) concluded that considering simple and individual activities, 80% of European citizens perform them frequently. Decreasingly, 50% of Europeans are adherents of activities that require some lifestyle change, and even fewer claim to engage in activities that require some contact with third parties (percentage not disclosed by the authors).

As for the type of value that comes from performing those activities, in the most frequently adopted behaviors, the main value produced is private, which benefits the individual – which was also highlighted by Alford and Yates (2016) in the Australian study. For example, by adopting a healthier diet, the values generated are personal. In contrast, the least accomplished activities involve high public value and little private benefit.

The correlation between sociodemographic variables and the dependent variable willingness to co-produce (Table 13) shows that the willingness to co-produce, both in its total and in each of the three areas, is positively correlated with age, indicating that the older the participants, the higher the willingness levels to co-produce

($p < .05$). As for gender, there are only significant differences in willingness to co-produce health services ($p < .001$) and willingness to total co-produce ($p = .009$), with women having higher levels of willingness to co-produce. Willingness to co-produce in health and overall are also positively correlated with educational level ($p < .05$), and household income is positively correlated with willingness to co-produce health services ($R = .228$; $p < .001$) and negatively related to the willingness to co-produce environmental services ($R = -.201$; $p < .001$). Concerning the environment, the work of Alonso et al. (2019) considered as critical factors demographic variables such as gender, age, living in urban areas, etc. However, it did not consider the variable income, which makes it impossible to compare with our result in this specific aspect.

Table 13 – Correlation between willingness to co-produce and sociodemographic variables (N = 360)

| | Willingness to co- Produce | | | |
|---------------------------|-------------------------------|-------------------------------|-----------------------------|-------------------------------|
| | Safety | Environment | Health | Total |
| GENDER | | | | |
| Female – mean (DP) | 8.4 (1.9) | 10.3 (1.7) | 11.2 (1.7) | 29.9 (3.5) |
| Male – mean (DP) | 8.4 (2.0) | 10.1 (1.7) | 10.4 (1.8) | 28.9 (3.5) |
| Student T test | $p = .942$ | $p = .329$ | $p < .001$ | $p = .009$ |
| AGE | | | | |
| Spearman correlation | R = .129 ($p = .015$) | R = .157 ($p = .003$) | R = .225 ($p < .001$) | R = .281 ($p < .001$) |
| EDUCATIONAL LEVEL | | | | |
| Spearman correlation | R = -.049 ($p = .355$) | R = .020 ($p = .700$) | R = .252 ($p < .001$) | R = .128 ($p = .015$) |
| FAMILY INCOME | | | | |
| Spearman correlation | R = - 0.068 ($p = .197$) | R = - 0.201 ($p < .001$) | R = 0.228 ($p < .001$) | R = - 0.003 ($p = .950$) |

Source: Developed by the authors.

Thus, it was possible to know the profile of the citizen who is willing to co-produce public services, and who lives in the DF. Older people are more willing to co-produce ($p < .05$), which converges with the study by Löffler et al. (2008), who found the same in Europe, also because the most co-producing public are women who are no longer part of the labor market, indicating that the aging of the population may also mean increased participation of citizens in public services.

Also, people with a higher educational level tend to co-produce more with DF public services, which is different from the findings of Alford and Yates (2016), who confirmed that in Australia there is no significant correlation between the degree of education and the level of co-production. Indeed, Alford and Yates (2016) found

no significant correlations between any sociodemographic factors and the level of co-production, and it is not possible to define the profile of the Australian co-producer. However, the authors point out that there are low-intensity correlations that indicate that women tend to co-produce more with health services and that age may express some behavioral differences between groups, with younger people more likely to use public transport, and elders to participate in group co-production activities.

Willingness to co-produce health services is significantly related to all sociodemographic variables ($p < .001$) and it is possible to define the profile that is most willing to co-produce this type of service: older women, educated citizens, and higher household income people.

Regarding the profile of the citizen willing to co-produce environmental services, there is a predominance of older and lower-income people who engage in environmental preservation and conservation activities. Finally, on the co-producer of safety services, it was found that older citizens are more willing to engage in community protection activities ($p = 0.015$). These results corroborate some results found by Alonso et al. (2019) when they found that middle-aged people are more likely to co-produce environmental results, however, they do not corroborate the work of these authors when dealing with gender, since, in the cited work of the authors, women present significant results when analyzing co-production activities of actions focused on the environment. In this study, carried out in the DF, there is no significant relationship ($p = .329$) between willingness to co-produce activities in the environmental area and gender.

Conclusion

The objective of this study was to verify the factors that influence citizens in their willingness to co-produce the delivery of public safety, health, and environmental services in the DF, as well as their profile and habits.

As for the willingness to co-produce, citizens were found to collaborate most often with public health services, followed by the environment and safety. We have shown that citizens show more willingness to contribute in the future than in the present.

A profile of the citizen willing to co-produce public services in the DF was also drawn. Correlations showed that the older, female audience – not including gender in the co-production of safety and environment – and those with the highest educational level represent the most frequent citizens among the sample analyzed. The analyses also indicate that the citizen who is more likely to co-produce in the future has lower

family income and is female, when gender is related to co-production in general or co-production of specific health activities.

Satisfaction with public services, the sense of effectiveness perceived by citizens, the time they would be willing to devote to voluntary activities, and the feeling of safety and perception of the environment and health were the factors predicted by the study that could influence the level of citizen co-production. The regressions showed that in the context of the DF, the sense of citizen safety negatively affects the willingness of citizens to co-produce, and the perception of their health in a positive way. It was also found that when the citizen participates as a volunteer in actions related to the co-production of public services, the fact of acting voluntarily enhances their performance in these actions both at present, as well as their predisposition to act in the future in the co-production of safety, environment, or health.

The study showed that, regarding citizen satisfaction and willingness to co-produce, there is no significant relationship between satisfaction and willingness to co-produce. It is noteworthy that it is a valid answer only for the sample of research subjects resident in the DF, and there may be similar or diverging conclusions depending on the city or country where co-production is studied.

Finally, the study found that the citizens in the study contribute more regularly to activities that do not require much effort or contact with third parties, whether with neighbors, local agents, or strangers. Sometimes the citizen acts individually to “improve the quality or quantity of the services they receive” (Pestoff, 2006, p. 506) and in the case of health, environment, and safety co-production activities – services analyzed in this study – it was verified that this orientation towards individual activities rather than collective seems to be key when the subject is co-producing, for example, with the public health levels of their locality, by acting individually in the personal care with their health.

As for the type of value that comes from performing activities, in the most frequently adopted behaviors, the main value produced is private, which benefits the individual – which was also highlighted by Alford and Yates (2016) in the Australian study.

For future studies, it is recommended to further investigate the reasons that lead the citizen to co-produce. Studies should be expanded on readiness (predisposition) and even behavioral aspects of citizens in other areas, such as education, where only the work in Brazil of Soares and Farias (2019), urban mobility, and participation are known. In politics or even in the formulation of public policies it would also be relevant and valuable to further understand the profile and willingness of the Brazilian citizen to co-produce. In the case of the co-production of education, it was found that Honingh, Bondarouk, and Brandsen (2020) performed a systematic review of

the literature produced on co-production in primary schools and one of the criteria of analysis was the country of publication/research. Of 122 documents analyzed, none were Brazilian or even Latin American, with the sample predominantly concentrated in the US and European countries. This reinforces our argument that co-production, despite being widely studied externally, has not been the focus of attention in Brazil and perhaps throughout Latin America, and we are referring to a gigantic continent with precarious and failed public services, in which the population could assist in their improvement, design, delivery, and evaluation through co-production – which, if not the panacea for the solution of all management problems in the Latin public sphere, could be a possible strategy or alternative, among other equally important forms of democratic governance.

It is salutary to finish the work presenting, as its main limitations, the fact that it is a study with non-probabilistic sampling, which does not authorize the generalization of the results to other Brazilian or international loci. The generalization cannot even be made to other demographic and economic segments of the DF, since the discrepancy in per capita income in the FD is very evident and significant, ranging from R\$ 500 to R\$ 8,000 (Companhia de Planejamento do Distrito Federal, 2015). The knowledge produced by this study is limited to a specific population of the DF, which has high income and high education – which may constitute a limitation of the study, not allowing the simple comparison of results with other population profiles of the DF or Brazilian regions that may be studied in the future. This, however, does not call into question its internal validity. The instrument applied in this research was applied in 2008 by Löffler et al. (2008) to the following individual samples (N): United Kingdom (N = 988); Germany (N = 1,000); Denmark (N = 1011); France (N = 988); Czech Republic (N = 1000); and later in 2015, Alford and Yates (2016) applied the instrument with 1,000 citizens in Australia (N = 1000).

The instrument was applied in the DF to 415 residents, returning 360 valid questionnaires, representing the first national effort in this subject. As for comparing different realities, this is not the focus of this still incipient and exploratory task in Brazil. Moreover, if the objective of those interested in the subject were cross-border comparison, surely Australia, Denmark, the Czech Republic, or Wales could not compose the same work, except to highlight the great cultural, economic, institutional differences that portray each different researched country. Therefore, the focus of the study was not a comparison between different countries, but rather an understanding of the reality of a small region of the country as an initial exploration of the object in Brazil.

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