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Individuals' resistance to saving water: the cases of Argentina and Spain

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ABSTRACT

Water management requires the participation of individuals who still seem to be reluctant to perform water-saving behaviours. Considering their country-specific water contexts, we analyse whether individuals' water-saving behaviours depend on their resistance to change. Argentines and Spaniards (*n* = 1068) participated in two online surveys conducted using two panels and individuals whom interviewers recruited. Both resistance to change and perceived risk positively and significantly affect individuals' water-saving behaviours. By contrast, the country of origin does not moderate water-saving behaviours. We discuss these findings' scholarly and water policy implications at the national and supranational levels.

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Water demand management; water saving; resistance to change; perceived risk; Argentina; Spain

Introduction

Water scarcity is one of the world's greatest challenges today. As predicted by climate change models, it is necessary to adapt water consumption to the new water context (Economic Commission for Europe, 2009; UN Water, 2019). In this situation, planning and management of water resources will be crucial for maintaining the supply of water users. Reducing demand is another essential issue in managing the water problem (Horne, 2020). Even if well managed and planned, available resources are, and will increasingly become, scarce. Therefore, promoting a water-saving culture in individuals, public services and economic sectors is necessary. Although the water for human consumption is a small percentage of the total water used (between 9% and 14%), it is important to promote saving behaviours because they can alleviate the pressure on water reserves, help adapt in the case of droughts in the near future, reduce wastewater and provide indirect protection against future conflicts over water scarcity (Nelson, 2019).

One of the most important factors inhibiting the adoption of conservation and pro-environmental behaviour is the resistance of individuals to changing their consumption habits. This resistance to change (RtC) has been described as the crux for coping with environmental problems (Harich, 2010), applying to all areas where individuals must change their consumption patterns. In terms of water, Dolnicar

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and Hurlimann (2010) point out that those initiatives to save water must have the support of individuals because their resistance could mean that such initiatives fail. Similarly, Gifford (2011) also recognizes that RtC is one of the main obstacles for individuals to develop sustainable behaviours. As Russell and Fielding (2010) and Koh (2020) point out, psychological phenomena directly affect the behaviours of individuals who constitute crucial stakeholders in water management. Thus, understanding how these phenomena influence water saving is vital for breaking down barriers and motivating these saving behaviours. However, the water literature has scarcely addressed the influence of individuals' resistance to adopting water-saving behaviours, although in recent years there has been a greater concern about this influence (Hikkaduwa Liyanage & Vishwanathan, 2020; Sarabia-Sanchez et al., 2021; Si et al., 2022). Hence, we need to understand RtC's role in adopting these saving behaviours, which should lead to the necessary reduction of water demand.

Water-saving factors have been studied mainly at the local and national level (e.g., Aisa & Larramona, 2012), with a few regional studies (e.g., Dworak et al., 2007) and meta-analyses (e.g., Addo et al., 2018a). However, to our knowledge, studies of whether the relationships between relevant factors and water-saving habits are similar across different countries are lacking. This cross-country analysis is relevant because it can offer an understanding of the factors that influence individuals' RtC and can help identify effective interventions that can be scaled up across different countries. Thus, policymakers can combine their ideas with those from other countries or use them as inspiration and learning.

Hence, our aim in this research is to test the highlighted relationships by conducting a two-country study of the influence of RtC on water saving. This study focuses on Spain and Argentina for five reasons. First, both countries exchange information and strategies on water management challenges in the medium and long terms (Banzato, 2021), and after the extreme droughts of 2019–21, they have strengthened their collaboration to increase water security and resilience (Garrote, 2023), which implies further promotion of water saving. Second, they have different availability and sources of water resources and stress (FAO, 2023). Third, Argentines and Spaniards show strong differences in their water consumption levels. Fourth, the two countries have differences in RtC (Boada-Cuerva et al., 2018). Finally, both countries share historical, linguistic and cultural ties, facilitating an understanding of their contexts.

Theoretical background

Water saving

Water saving is a component of water demand management (Brooks, 2006). Considering the user's specific context and situation, it is a multidimensional construct and can be understood as a set of activities to reduce water consumption and maximize savings. These savings can be achieved thanks to water-saving devices and personal or household best practices in water end uses. Thus, saving behaviours should consciously reduce current water demand by creating new consumption routines or habits without negatively affecting actual needs.

Some authors link the achievement of saving behaviours to personal habits (Jorgensen et al., 2009; Su et al., 2021). Habits are learned personal dispositions that drive behaviour to attain specific goals, triggered by the association between a behaviour and a specific context (Neal et al., 2012). These dispositions strengthen over time, developing into automatisms replicating behaviours in stable contexts (Verplanken & Whitmarsh, 2021). Habits offer a strategy to reduce the effort of constant conscious decision-making, which is important in relation to environmental issues. Zhao et al. (2019) report that water consumption habits help predict future behaviour, and Russell and Knoeri (2020) note that the habit of efficiently using water encourages less use and a greater intention to preserve water resources. Thus, habits are a substantial part of water-saving behaviours.

Resistance to change (RtC)

RtC, at the individual level, denotes the tendency to maintain a personal situation, status or acquired behaviours in the face of changes (Oreg, 2003). It is a natural response when changes are unwanted or if a modification produces a psychological clash with the belief system with which individuals are comfortable. Neuroscience has found that our brain interprets changes as a threat and, through the amygdala, releases hormones to regulate decision-making and activate responses to fight against those changes (Šimić et al., 2021). RtC can also be a general barrier that acts differently depending on the type of resistance (individual versus collective, active versus passive, hidden versus overt) and the phenomenon that an individual has to face.

Smollan (2011) describes four dimensions of RtC: apathy, passive resistance, active resistance and ambivalence. Oreg (2003) assimilates resistance to a negative attitude, considering RtC to have a three-dimensional structure. The first dimension is cognitive, expressed through rigidity or a lack of flexibility due to the inability to change or understand change. The second dimension is affective, related to an anticipated emotional reaction to change. Finally, the third dimension is behavioural, derived from a lack of confidence in the expected change outcomes. However, Sarabia-Sanchez et al. (2021) show that this lack of confidence in the outcomes of personal efforts to save water does not influence water-saving habits. Therefore, this study focuses on cognitive and emotional forms of resistance.

Cognitive resistance refers to obstinacy in maintaining a line of thinking (Oreg et al., 2018), limiting individuals' willingness to accept alternatives to cope with new situations (Stanley & Wilson, 2019). It is also understood as the degree to which individuals believe that how they perceive reality is right. This type of resistance refers to a state where individuals believe it is best not to change, either because they do not accept change or because they do not understand that it is necessary (Oreg, 2003). Another reason for cognitive resistance may derive from refusing to make the effort to learn new routines (Kanter, 2012).

Emotional resistance refers to the negative feelings individuals experience when faced with environmental changes. For Oreg (2006), individuals with high RtC are more likely to experience negative emotions when coping with changes in their lives. Coping with change can elicit emotional reactions in the form of stress, anger, or discomfort. These reactions are part of individuals' decision-making processes because preferences and beliefs do not arise solely from conscious, rational thoughts (Ojala, 2013). They are also strategies for maintaining a position and reducing the emotional tension that arises from the need to change (Oreg et al., 2018; Vining & Ebreo, 2002).

Regarding water saving, Addo et al. (2018b) report that RtC might also refer to the propensity to maintain learned behaviours when individuals must change their current consumption patterns. Domestic water consumption constitutes a set of daily practices (household cleaning, personal hygiene, leisure, cooking, etc.) that individuals consider basic and appropriate. Thus, individuals keep performing the same behaviours even if they are inefficient (Dalirazar & Sabzi, 2022). Hence, they develop a resistance that limits water saving (Watson, 2017). This resistance has a sustained effect in the long term, as the observed reductions in water use tend to dissipate (Echeverría, 2020). Sarabia-Sanchez et al. (2021) show that the cognitive dimension of RtC has a significant influence on water-saving intentions but that the emotional dimension does not have such an influence. However, Martínez-Borreguero et al. (2020) and Verplanken et al. (2020) show that feeling negative emotions may limit engagement with environmental issues. Thus, individuals with high emotional negativity tend to display a more limited understanding of their natural environment and maintain their habitual level of use and consumption (Coelho et al., 2017). Regarding water, Rodriguez-Sanchez et al. (2018) find that emotions predict household water use because they can shape routines and influence individuals' perceptions. Specifically, negative emotions are linked to lower perceived benefits of reducing water consumption, discouraging savings. Therefore, following the previous arguments, we propose the following hypotheses:

H_{1a}: Cognitive resistance influences the strength of water-saving behaviour.

H_{1b}: Emotional resistance influences the strength of water-saving behaviour.

Perceived risk

Perceived risk is a key concept in the environmental domain. It may refer to concern about the occurrence of a hazard and its potential negative consequences (Sjöberg et al., 2004). It may also refer to a personal assessment of the likelihood of an unknown fear of facing a threat and how this fear may affect individuals (Xu et al., 2017). Skuras and Tyllianakis (2018) show that the likelihood of participating in such risk-reduction strategies correlates positively with the level of risk individuals perceive.

In the context of natural hazard risks, the more perceived risk there is, the more risk reduction behaviours are performed to cope with the unease caused by that risk. The economic literature denotes this phenomenon as 'precautionary behaviour', which means that the main reason for savings-related strategies is individuals' concern about the availability of future resources (Bommier & Grand, 2019). Thus, perceived risk is important in triggering mitigation behaviours (de França Doria, 2010), including water-saving behaviours (Skuras & Tyllianakis, 2018). The cited authors report a positive relationship between risk perceptions of the water environment and Europeans' everyday water-saving practices. Accordingly, the influence of perceived risk on the intention and behaviour to save water can be both indirect and direct. Si et al. (2022) suggest that attitudes, subjective norms, and perceived control mediate the relationship between these two variables. In contrast, a direct relationship is also possible, as such a relationship has been extensively studied in the fields of purchasing decisions (Li et al., 2019) and pro-environmental behaviour (Zeng et al., 2020).

Therefore, we expect the perceived risk of water scarcity or drought to be related to water conservation and saving development. Consequently, we propose the following hypothesis:

H_2: Perceived risk (that drought or water scarcity will have consequences) influences the strength of water-saving behaviour.

Individuals who tend to be resistant to change are also less likely to innovate and have an associated personal trait of being more risk-averse (Oreg, 2003). These personal traits predispose individuals to overestimate the possible negative consequences of an uncertain situation (e.g., future water shortages) and the changes that may result from it; that is, they are predisposed to perceive greater risks in uncertain situations (Mandrick & Bao, 2005). Specifically, earlier works on personality and consumer behaviour suggest different psychological mechanisms by which RtC may increase the perceived risks of future water scarcity through its relation with intolerance for ambiguity and with information processing capacity (Schaninger & Sciglimpaglia, 1981). First, RtC may negatively influence water scarcity perceived risks by amplifying the perceived threat (United Nations Development Programme, 2022). Thus, individuals with cognitive rigidity may be more inclined to perceive water scarcity as an overwhelming and imminent threat. Their RtC and adaptability could lead them to exaggerate the consequences of water scarcity and perceive it as a more severe problem than it might be objectively. As a result, they may view water scarcity as an insurmountable challenge, exacerbating their anxiety and apprehension about the future. Second, cognitive rigidity may hinder individuals from accepting and adopting adaptive and new strategies to address water scarcity (Sarabia-Sanchez et al., 2021). These individuals might resist implementing water-saving measures or adopting new technologies aimed at sustainable water management. Their reluctance to embrace change could impede the widespread adoption of water conservation practices, potentially aggravating the water scarcity situation. Third, cognitive rigidity might also restrict individuals' ability to recognize innovative solutions and opportunities for water resource management (which may limit the perception of alternatives and opportunities). They may overlook alternative approaches and fail to explore novel ideas to address water scarcity challenges. This would be a consequence of the 'Einstellung effect' (Barlach & Plonski, 2021), a cognitive bias whereby individuals consider that the solutions they have experienced are the correct ones and prevent them from considering new or better solutions. Consequently, potential solutions that require flexibility and open-mindedness may not be considered, hindering progress in dealing with water scarcity. Finally, cognitive rigidity could lead to heightened emotional reactivity (Zmigrod & Goldenberg, 2021) towards water scarcity issues. Individuals with this trait may experience increased negative emotions such as feelings of fear, anxiety, and frustration, amplifying their perception of risk and urgency surrounding the water crisis. Such emotional responses might interfere with rational decision-making and hinder constructive actions to mitigate water scarcity risks. Thus, both cognitive and emotional rigidity, which characterize RtC, are expected to positively influence the perceived risk of future water scarcity. We, therefore, posit the following:

H_{3a}: Cognitive resistance influences the perceived risk that drought or water scarcity will have consequences.

H_{3b}: Emotional resistance influences the perceived risk that drought or water scarcity will have consequences.

Moderation by country of origin

Although water problems are becoming global in scope, different countries have different environments, water cultures, and RtC contexts, offer varying managerial and individual responses to water problems, and present diverse levels of water use efficiency (Wendling et al., 2020). Regarding the environmental context, each country has a specific geodemographic situation, level of water availability, and degree of vulnerability to the effects of water scarcity (Maddocks et al., 2015). Thus, individuals from different countries may relate differently to water scarcity problems and develop different water consumption and water-saving behaviours (Seelen et al., 2019).

Regarding water culture, previous studies (Dadvar et al., 2021; Russell & Fielding, 2010; Smith & Ali, 2006) suggest the importance of considering cultural differences in the context of water conservation. These studies show that cultural differences are related to differences in beliefs and attitudes that lead individuals to understand water issues in a different way. A recent report by UNESCO (2021) notes that culture directly influences how the value of water is perceived and how it is used and conserved. Thus, different societies develop different relationships with water, whether for spiritual reasons, economic dependence, leisure or other reasons. Along these lines, Benarroch et al. (2021) point out the existence of two water cultures: the traditional one, where water saving is not a priority, and the new water one, where water saving is a priority at all levels (domestic, agricultural, industrial and institutional).

Finally, regarding RtC, Oreg et al. (2008) use samples of undergraduate students in 17 countries to examine the equivalence of the RtC measure, observing differences between countries. Pihlak and Alas (2012) also find differences in RtC in Indian, Chinese and Estonian organizations. Qualitatively, Yang (2014) reports that Norway and China have different RtCs because the positions of individuals in each society and cultural aspects cause them to respond differently to change. In addition, there are country- and culture-based differences in terms of risk perceptions (Zeng et al., 2020), environmental attitudes and concerns (Franzen & Meyer, 2010), and water awareness and saving habits (Skuras & Tyllianakis, 2018).

Several studies of water-saving behaviours have focused on specific regions of a single country (see the meta-analysis of Addo et al., 2018a). Nevertheless, there are no multi-country studies on this topic, which makes it infeasible to present a detailed analysis. Consequently, we propose the following hypothesis:

H_4: Country of origin moderates the relationships between water-saving behaviour and its proposed antecedents.

Figure 1 shows the model illustrating hypotheses H_1–H_4.

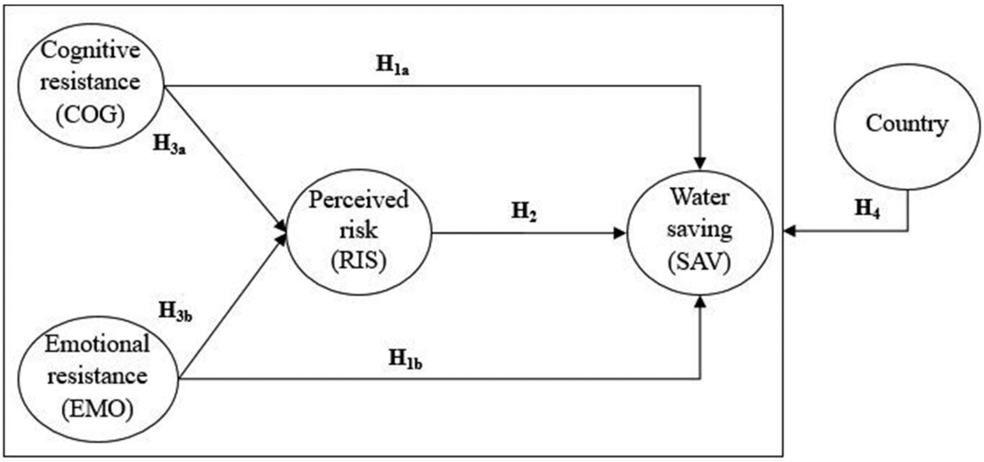

Figure 1. Hypothesized model.

Material and methods

Participants

Participants were 1256 individuals from Argentina and Spain. We removed responses outside the range of 25–70 years of age, those with straight lining and those completed in less than 2 min (the average time in the pre-test was 4 min). To avoid duplicating responses, we accepted only one response per IP address. The final sample comprised 1068 individuals (510 from Argentina and 558 from Spain). The sample (Table 1) is balanced by percentage by gender and very similar average age. However, the educational profiles reveal a greater presence of highly educated adults (in relation to the population level). This relatively high level is due to the bias of using a web-based questionnaire because individuals with lower levels of education have lower Internet use, and those with higher levels of education have better access (Israel, 2010).

The country contexts

Argentina and Spain have some similarities and striking differences in terms of their water resources and water consumption. Both countries have growing water availability

Table 1. Characteristics of the samples.

	Argentina	Spain
Size (*n*)	510	558
Gender (% females)	53.1	53.0
Age, mean (years)	43.3	41.1
Education		
% up to compulsory secondary school	28.6	14.5
% up to high school	41.8	40.5
% university graduate	29.6	45.0
Regions with $n \geq 10$ responses[a]	7 (22)	7 (17)
Regions with responses[a]	21	17

Note: [a]Total number of regions in each country is shown in parentheses.

problems due to climate change and excessive water consumption (OECD, 2013), but Argentina has an extensive network of rivers and surface aquifers, while Spain has a deficit and draws much of its water from subsurface aquifers. They also have comparable drought risks (Statista.com, 2020). Nevertheless, following AQUASTAT (FAO, 2023), Argentina shows lower water stress (10.46 compared with Spain's 42.56) and higher water consumption per person per day (500 litres compared with Spain's 132 litres). Argentines do not have a water-saving behaviour, as only 36% of individuals implement actions to minimize their consumption (Maitra et al., 2017). A relevant 22% of the population does not have access to piped water, and most households pay a fixed charge that depends on the dwelling size (OECD, 2020). Only affluent areas in large cities have individualized water meters. Therefore, most Argentines do not have the possibility of knowing how much water they consume. In addition, the water supply service has a very low cost for households, which limits the development of an awareness of saving water.

In contrast, 91.7% of individuals in Spain think that consumption decisions are important for the environment (Lázaro Touza et al., 2019). All inhabitants of Spain have access to the public water network, and every household must have its own water meter. Nevertheless, Spaniards do not know how much water they consume or how much they pay for it. This situation arises because water bills are often difficult to understand, prices vary greatly depending on the place of residence, and charges include other services besides water consumption. Individual behaviour also depends on the strategies followed to manage demand, which is highly decentralized (Tortajada et al., 2019). Thus, there is a wide range of strategies across very small regions, coupled with low awareness among individuals about the reality they face and their level of consumption.

Based on the work of Boada-Cuerva et al. (2018), Spain and Argentina differ in their reported level of RtC. The data from Argentina (mean = 21.13, SD = 6.65, n = 171) and from Spain (mean = 23.96, SD = 7.58, n = 482) show a significant difference ($t(651) = 4.60$, $d = 0.39$).

Procedure

We conducted the two web-based fieldworks, the first in May 2020 (Spain) and the second in December 2020 (Argentina). In that year, both countries experienced lockdowns and restrictions on free movement to tackle the COVID-19 pandemic. Therefore, we used a computer-assisted web interviewing system/software/app (CAWI) to minimize the risk of spreading the disease between interviewers and respondents. CAWI is a data collection method that uses a platform that combines access to an online questionnaire (via a single-use weblink), a sampling plan and fieldwork monitoring. Respondents either belong to a private panel (usually provided by a specialist company that selects panel members according to quotas or other statistical criteria) or are individuals who receive a single-use weblink (non-forwardable and only valid for a few days) via other channels (social media, email, etc.).

In Argentina, we used interviewers and panellists from the company Netquest. This company complies with data protection regulations and the ISO-20252 standard. In Spain, we exclusively used interviewers selected by two authors. All followed age, gender and regional quotas. Only participants from the Netquest panel received a monetary incentive for responding.

We selected a set of interviewers from each country. They were asked to contact individuals via social media (WhatsApp, Facebook, Telegram or Snapchat). For Facebook, the invitation to participate was written on the groups' walls, allowing the invitation to be posted. For WhatsApp, a request was sent to forward the message to the recipients' groups and to involve individuals outside the first group contacted by each interviewer. For Telegram, an invitation was shared in open groups. The interviewers all asked others to share the invitation with other groups. We prevented using Instagram or TikTok because they target a very young audience and are mainly based on images and videos. We instructed the interviewees that neither their relatives nor their friends answered the questionnaire. The origin of the responses was automatically monitored using a single-use link, the IP from which the respondent answered, and the respondent's geographical location (using GPS position). One of the conditions was that, for each interviewer, the responses had to come from different municipalities. Finally, the role of the interviewers was only to inform about the objectives of the study and to share the weblink to the questionnaire.

The Research Ethics and Integrity Committee of the corresponding author's university approved the study design and methods (references 2020.163.E.OIR and 2021/16406).

In calculating the sample size (*n*) per country, we considered that biases due to lack of coverage and self-selection strongly influence the composition of the samples used in the surveys (Economic Commission for Latin America and the Caribbean, 2020). Therefore, we followed the recommendations of Vehovar et al. (2016) on spreading the origin of participants and ensuring a minimum value for *n* based on a probabilistic assumption (min $n = 384$ for $p = q = 50$, population > 20,000, $e = 5\%$, $z = 1.96$).

Measures

We used the general measurement proposed by Oreg et al. (2008) to measure RtC. For cognitive resistance (COG), we used the items adapted and validated by Arciniega and González (2009) in Spanish. To measure emotional resistance (EMO), we used the 'short-term focus' subscale, which has four items. It measures 'the extent to which individuals are distracted by the short-term inconveniences involved in change' (Oreg, 2003, p. 683). It thus measures emotional reactions to change because (1) its items display emotional reactions or expressions ('hassle', 'uncomfortable', 'pressures' and 'avoiding'); (2) its items present a display of non-rational responses to a possible better future; and (3) no item has a focus on changes in the short term. We did not use the 'emotional reaction' subscale because the reactions included in this subscale have a low level of certainty ('I would probably feel stressed') or a very low affective intensity ('I tense up a bit'). Moreover, one of the items refers to a change of criteria in employee appraisals ('If my boss changed the criteria for evaluating employees . . . '), which does not make practical sense in relation to water saving.

To measure the perceived risk that a drought or water scarcity will affect individuals (RIS), we used the scale provided by Mitchell and Vassos (1998), originally developed to study perceived risk when purchasing. For the present study, we modified the items to reflect water scarcity and drought situations. The scale consists of four items. Finally, to measure the strength of water-saving behaviour (SAV), we used the scale proposed by

Verplanken and Orbell (2003). We only retained six of the 12 items because we removed items referring to past behaviours and items that overlapped with other items (after translation into Spanish).

For all measures, an 11-point Likert scale was used. The Appendix in the supplemental data online shows the wording of the items.

Statistical methods

To analyse the proposed model, we applied the two-step causal method. The first step consisted of performing a confirmatory factor analysis to validate the measurement model (reliability and validities). The second step consisted of applying a system of structural equations to test the causal relationships indicated in our hypotheses. Finally, to test the moderation hypothesis, we used multigroup analysis because it helped assess whether different variables in the same model had similar or different relationships across groups (Memon et al., 2019). In practice, this type of analysis allowed us to identify whether there was invariance in the model and whether the relationships corresponded to the same population, despite the presence of different groups (Brown et al., 2017).

Results

Measurement model

Mardia's *M* coefficient of multivariate normality was 190.92, so robust estimates were required. In the first fitting, the result for the chi-square test was high, and the fit indicators were below the values recommended in the literature (Hair et al., 2010). We also observed that some of the factor loadings (FLs) were very low. Hence, we discarded the items with FL < 0.60. These items are COG1 (FL = −.25), EMO1 (FL = 0.39) and SAV3 (FL = 0.55). Next, we performed a new CFA for each country and for the overall sample.

For Argentina, Mardia's *M* for the multivariate normality test (Mardia) is 60.36 > 5, which forced robust testing. Thus, we observed the following: normed chi-squared (NCS) = 1.56, robust comparative fit index (r-CFI) = 0.986, robust RMSEA (r-RMSEA) = 0.033 and 90% confidence interval (CI) of RMSEA = (0.021, 0.044). For Spain, Mardia = 47.57, NCS = 1.63, r-CFI = 0.982, robust RMSEA (r-RMSEA) = 0.034 and 90% CI of RMSEA = (0.023, 0.044). Finally, Mardia = 58.43 > 5 for the overall sample, which forced robust testing. Thus, we observed the following: NCS = 2.57, r-CFI = 0.98, r-RMSEA = 0.038 and 90% CI of RMSEA = (0.032, 0.045). In conclusion, all CFAs fit satisfactorily.[1]

Table 2 shows the results for the reliability of the measurement instruments in terms of the composite reliability (CR) indices (all indices > 0.80). Convergent validity was tested using the average variance extracted (AVE) of each measure (all AVE > 0.50). Discriminant validity was tested using the Anderson and Gerbing confidence interval method.

The analysis confirmed configural and metric invariances because the imposition of restrictions on the FLs of the items in both samples shows the following: NCS = 1.89, r-CFI = 0.974, robust RMSEA (r-RMSEA) = 0.041 and 90% CI of RMSEA = (0.034, 0.047).

Table 2. Validity and reliability of latent constructs (overall sample).

						Covariances (standard error)		
Construct	FL	M	SD	CR	AVE	RIS	EMO	COG
SAV				0.92	0.70	0.381 (0.034)	−0.008 (0.036)	0.176 (0.036)
SAV1	0.84	7.90	2.29					
SAV2	0.75	7.70	2.32					
SAV4	0.90	7.65	2.43					
SAV5	0.80	6.97	2.60					
SAV6	0.87	7.50	2.58					
COG				0.81	0.58	0.18 (0.040)	0.40 (0.035)	–
COG2	0.80	7.02	2.16					
COG3	0.75	7.78	2.05					
COG4	0.74	7.51	1.96					
RIS				0.85	0.59	–	0.05 (0.041)	–
RIS1	0.63	9.14	2.00					
RIS2	0.87	8.52	2.37					
RIS3	0.74	7.80	2.56					
RIS4	0.81	8.24	2.50					
EMO				0.81	0.58	–	–	–
EMO2	0.79	5.13	2.45					
EMO3	0.73	5.18	2.45					
EMO4	0.77	4.70	2.56					

Note: FL, factor loading; M, mean; SD, standard deviation; CR, composite reliability; AVE, average variance extracted; SAV, water-saving behaviour; RIS, perceived risk; EMO, emotional resistance; COG, cognitive resistance.

Hypothesis testing

Figure 2 shows the detailed results of the hypothesis testing for Argentina and Spain. When testing H_{1a}, we observe that cognitive resistance significantly affects water-saving behaviour in Argentina, a relationship that is not evident in Spain. Moreover, in both countries there is no evidence that negative emotions influence saving behaviour (rejection of H_{1b}). In contrast, in both countries risk perceptions directly influence water-saving behaviour, so we accept H_2. In both samples, the direct influence of cognitive resistance on risk perceptions is significant (acceptance of H_{3a}). Finally, we observe that negative emotions do not affect risk perceptions because the relationship is not significant in both countries (rejection of H_{3b}). Thus, it can be observed that for Spain, the perceived risk variable is a complete mediator due to, without its existence, the model fails because there is no direct relationship between cognitive resistance and water saving. However, perceived risk is a partial mediator for Argentina since the aforementioned relationship is detected without it.

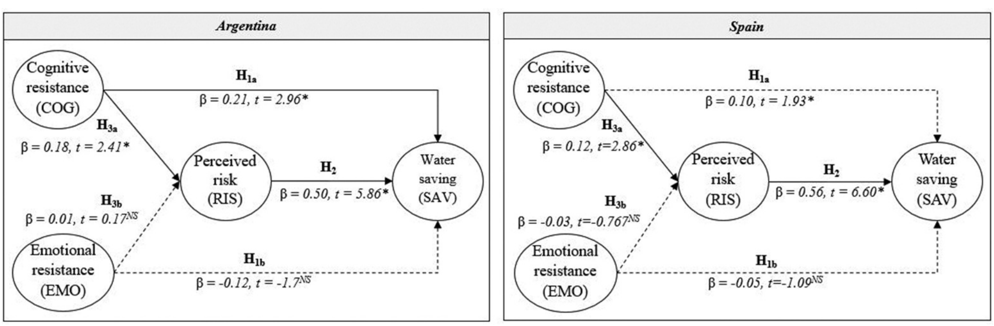

Figure 2. Structural equation model results by country.

In terms of the influence of country of origin, we find the following: Satorra-Bentler scaled chi-square = 330.356 ($p < 0.001$, DF = 180), with NCS = 1.84, r-CFI = 0.976, robust RMSEA (r-RMSEA) = 0.040 and 90% CI of RMSEA = (0.033, 0.046).[2] Because fit and error indices are low, we conclude that the model and its constraints match the structure of the data. Therefore, the country of origin does not moderate the relationships between water-saving behaviour and its proposed antecedents (H_4).

Discussion

Our results provide interesting evidence about how cognitive rigidity is an antecedent of water-saving behaviours in the two countries. We have shown that RtC is an antecedent of the perceived risk of drought or water scarcity from a cognitive but not an emotional point of view. This finding aligns with those of Oreg (2003) and Sarabia-Sanchez et al. (2021). In contrast, the influence of the emotional dimension of RtC is non-significant, contrary to the findings for work and business environments. Regarding this, although it has been posed that negative emotions can limit engagement with environmental issues (Verplanken et al., 2020), we have found that emotional resistance does not affect water-saving behaviours. There is no emotional reluctance to maintain current water-saving behaviours. Thus, the negative emotional mechanisms that scarcity problems could activate do not inhibit or favour risk perception since cognitive aspects generate it. Another possible explanation for this finding may be related to the nature of the emotional resistance scale used. It measures short-term emotional RtC, whereas the perceived risk of future water scarcity may be a long-term perception. This finding may indicate that individuals need to perceive temporal proximity in uncertainty or change to experience emotional reactions.

Individuals' perceived risk of drought or water availability problems promotes water-saving behaviours. Our results show that perceived risk is a direct antecedent of water-saving behaviour in both countries. This finding contradicts those of Rodriguez-Sanchez and Sarabia-Sanchez (2020). However, it is consistent with Jorgensen et al. (2009) proposal on the direct influence of perceived risk on water conservation intention. Thus, the perceived risk emerges as a potentially powerful tool for water managers to use in their strategies to foster water-saving behaviours. In addition, cognitive rigidity significantly increases perceived risks of future water scarcity. This suggests that RtC may lead these individuals to see such risks as more severe and more difficult to avoid, given their lack of adaptability.

Finally, the intensity and importance of the relationships proposed in our model do not differ significantly between the countries included in the study. Although this result is unexpected, we view it as encouraging because it shows that our model is robust in explaining water-saving habits, regardless of the idiosyncrasies of each country. Therefore, the results can be generalized to the water scarcity situations in Argentina and Spain. Despite this, an interesting finding deserves to be commented on regarding the influence of RtC on water-saving behaviour, as only cognitive resistance shows a significant and positive influence on Argentines. Here, we can observe a difference with respect to Spaniards. For Argentines, this positive influence may be interpreted as the fact that they consider water saving to be altruistic behaviour. This is because most Argentines pay a fee based on the home's surface area, not the water consumed. This may mean that water conservation behaviour may be more related to the altruistic approach of saving for greater future water availability and not for personal gain, economic or otherwise. Such altruistic behaviour does not generate resistance based on negative emotions and is positively related to pro-environmental behaviours, such as conserving energy or water (Aprile & Fiorillo, 2017; Asensio & Delmas, 2015). Furthermore, the positive influence of cognitive resistance on water-saving behaviour may indicate that individuals want to maintain this altruistic behaviour. However, for Spaniards, neither cognitive nor emotional resistance influences water-saving behaviour. We believe this absence of influence may be because they are more attentive to saving water in response to economic motives and a growing awareness of water scarcity. However, more research is needed in order to clarify this issue better.

Conclusions

The current global water crisis and its foreseeable worsening in the short term should not only promote a further reduction in water demand by all end users of water but also lead to an intensification of current water-saving behaviours. Adequate management of the water scarcity problem is essential for the near future. Saving water will become increasingly important, directly affecting the amount of water available, financial savings, and the environment's health. Water-saving behaviours will also help reduce wastewater treatment costs, energy consumption, and pollution.

As the world's population grows, water scarcity will concern an increasing number of countries as the demand for water resources increases worldwide. Although technologies allow for more efficient domestic consumption, they may be useless if individuals do not internalize water-saving behaviours. It should be noted that most knowledge about how to address water problems and efforts to improve water management is achieved without public communication. Hence, consumers have neither information nor awareness of what is known and the efforts to cope with demand and future crises. They perceive that they are being asked to save more water and, in extreme cases, endure consumption restrictions.

The importance of our study lies in the fact that, in contrast to the extensive literature on the influence of perceived risk, little interest has been paid to the influence of individuals' resistance to adopting changes. Our study, performed in two countries on two different continents (Argentina in South America and Spain in Europe), provides evidence of the influence of RtC on individuals' water-saving behaviours. To date, and to the best of our knowledge, this analysis has not been performed with large samples, although some case studies do exist.

Regarding this, there is an idea that is important to convey to public authorities. In both countries, public authorities have often used advertising campaigns on street billboards and television to raise awareness of the need to make savings. For instance, in Spain, it is very common to use shocking images of reservoirs and other places with aquifer reserves where the lack of water is clearly observed. These images are usually accompanied by slogans such as 'water gives us life, let's take care of it', a message with much more emotional than cognitive or rational content. While, in general, these campaigns may be effective, our findings show that cognitive rather than emotional advertising might be more effective. This greater effectiveness is because there is no emotional resistance to influencing water saving, whereas cognitive aspects would create another barrier. Accordingly, advertising campaigns more centred on the cognitive or rational content of the message will be better directed to those aspects that, according to this research, are more likely to positively influence water-saving behaviours. For example, we can give numbers of how much water we consume in our daily activities to know how much could be reduced in a day or a week.

Thus, we believe that water managers, and those who decide on institutional communication, should focus on the perceived risk of droughts and water scarcity when implementing policies that encourage water-saving behaviours. In addition, given the positive relationship between cognitive rigidity and perceived risks, it should also be, it would also be advisable to focus on communicating changes in habits that are easy to adopt, that can be adopted little by little, to help cope with the lack of adaptability that is generated because of this cognitive rigidity. The absence of differences between the countries analysed in this study, despite their different water contexts and individual behaviours, suggests the need for further multi-country studies to test whether our findings could be generalized to other countries. Our findings suggest that focusing on cognitions rather than emotions is advisable to cope with future water scarcity. This recommendation relates to informing, developing, and communicating reasons and arguments rather than messages based solely on emotions.

Limitations and future research lines

Finally, as with any academic research, this study has limitations. The first relates to using a survey method to obtain the data, which makes it impossible to avoid biases such as self-selection. Moreover, in surveys, individuals do not respond exactly to what they think but adjust their responses to the questions and response options provided by the researchers. The second limitation relates to the time when the fieldwork was performed. Data collection occurred during the height of the COVID-19 pandemic, which may have created biases (ECLAC, 2020). It also coincided with the declaration of a climate emergency in Spain in 2020, which led to reports on climate change and future water scarcity in the media. Finally, we carried out the study in countries with different water contexts that are culturally similar, even though Spain's culture has a strong European component that is quite far removed from the culture in Argentina. These factors mean that it would be interesting to investigate whether the findings reported in this study are equivalent to those reported for other countries where there is little perceived risk of water scarcity. For example, such analysis could be performed in countries with low water stress projections for 2040, such as Canada, Ecuador, Germany, Norway, New Zealand and Tanzania (Maddocks et al., 2015). We also believe that it is important to test whether other dimensions of RtC behave in a similar way to that observed in the case of water. Such analysis in countries without high levels of water stress could help explain how individuals cope with the need to reduce their consumption of this essential resource.

Notes

1. RMSEA, root mean squared error of approximation.
2. DF, degrees of freedom.

Author contributions

Francisco J. Sarabia-Sanchez: conceptualization, project administration, methodology, investigation, supervision, writing – original draft preparation, reviewing and editing; Juan M. Bruno: investigation, formal analysis, data curation, writing – original draft preparation and editing; Isabel P. Riquelme: validation, writing – original draft preparation, reviewing, and editing.

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