


Translating Dispositional Resistance to Change to the Culture Level: Developing a Cultural Framework of Change Orientations

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Abstract: A fundamental societal challenge is to balance the desire for growth, development, and progress on the one hand and the need for stability and maintenance of the status quo on the other. To better understand how societies deal with this challenge we employ the personality trait of dispositional resistance to change to conceptualize and empirically establish the concept of cultural change orientation. With data from individuals in 27 countries ($N = 6487$), we identify three culture-level change orientation dimensions (routine seeking, affective reactance, and cultural rigidity) and interpret their meaning through their relationships with established cultural frameworks (e.g. GLOBE, Hofstede, Inglehart, and Schwartz). We thus propose a new culture-level framework and test hypotheses about relationships between change orientation dimensions and national indexes of economic, technological, social, and environmental change. Our findings demonstrate meaningful differential relationships between the three change orientation dimensions and these societal outcomes. Copyright © 2018 European Association of Personality Psychology

Key words: resistance to change; cultural values; cultural change orientations

Given the ubiquity of change and its implications for people's lives, much attention has been devoted to understanding people's orientation toward change and their responses to it (e.g. Jost, Banaji, & Nosek, 2004; Oreg, Michel, & By, 2013). How individuals and societies respond to change is of great interest and importance for understanding human development and adaptation. At the individual level, responses to change have to do with people's most basic choices and experiences, in key milestones (e.g. getting married and changing careers), major events (e.g. the fallout of recent election results and changes in government regulations), as well as day-to-day events (e.g. receiving new work assignments and deciding on whether to upgrade to a new smart phone). At the societal level, investigating the orientation toward change can help predict the rate and manner in which societies develop, and can explain the cultural context within which individuals experience, initiate, and respond to change. We focus in the present study on this latter issue, starting from what we know about the personality trait of dispositional resistance to change.

Overall, personality theories have been useful not only for enhancing our understanding of individuals but in several cases have also been used as a starting point for understanding societal characteristics. For example, the five-factor model of personality (Digman, 1990) has been used in several studies as the backdrop for characterizing societies (e.g. Allik et al., 2017; Gebauer et al., 2015; McCrae &

Terracciano, 2005). Common practice in these studies is to aggregate individuals' personality scores to the country level and use these to infer about differences among societies.

As useful as this approach is, its findings have been criticized for being inconsistent and of questionable validity (e.g. Allik & Realo, 2017). These problems may have to do with the process of translating individual-level constructs (pertaining to inter-individual differences) to the culture level (pertaining to inter-cultural differences), disregarding the possibility that the constructs take on different structures and meanings at the different levels (Fischer, 2012; Hofstede & Bond, 1984; Na et al., 2010). In the present study, we thus use a more rigorous set of procedures, similar to those used in transitioning from personal values to cultural ones (e.g. Schwartz, 2006), for developing the concept of cultural change orientation. Moreover, as we elaborate below, extant cultural dimensions, both those that derive from personality theories (e.g. the Big Five, personal values) and those developed at the culture level to begin with (e.g. Gelfand et al., 2011; House, Hanges, Javidan, Dorfman, & Gupta, 2004), do not directly address the notion of stability versus change. In the present study, we explicitly focus on the notion of change and develop our cultural framework on the basis of the theory of dispositional resistance to change (Oreg, 2003; Oreg et al., 2008; for a review see Burnes, 2015), on which we elaborate further below.

The tension between preserving the status quo and promoting personal development and growth stands at the basis of key psychological theories, such as in the distinction between prevention and promotion (e.g. Higgins, 1998), avoidance and approach (e.g. Elliot & Covington, 2001), and

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conservation versus openness to change (Schwartz, 1992). Some personality research specifically addresses this tension by focusing on individuals' personal orientation toward stability versus change (Oreg, 2003; Oreg et al., 2008). Similarly, at the societal level, one can consider the tension between preserving a society's core attributes and maintaining continuity with its heritage and history on the one hand and enabling the society's development and adaptation to changes in its environment on the other.

Although the cultural dimensions that directly capture societies' orientation toward change have yet to be developed, research has been conducted with the aim of better understanding and explaining how and why cultures change over time (e.g. Chiu, Gelfand, Yamagishi, Shteynberg, & Wan, 2010; Chiu, Gries, Torelli, & Cheng, 2011; Greenfield, 2009; Grossmann & Varnum, 2015; Oishi & Graham, 2010). These studies link ecological changes (e.g. economic trends, globalization, immigration patterns, and climate change) with gradual changes in culture. The focus of these studies is on predicting and demonstrating patterns of cultural change. Contrarily, our interest in the present study is in identifying cultural predispositions to change, rather than describing the actual changes that result from these predispositions. In other words, whereas previous literature has focused on *changes of culture*, our interest is on a *culture of change*. This distinction parallels the distinction at the individual level between developmental research that shows how personality changes over time and trait research dedicated to characterizing individuals' personal orientation toward change. Our present investigation parallels and is based on this latter type of research, translated to the cultural level, and aimed at characterizing cultures rather than individuals.

Some recent theorizing has pointed to this direction by discussing the notion of cultural susceptibility to change, whereby societies differ in the degree to which they facilitate or impede cultural change (Varnum & Grossmann, 2017). We follow this direction of research and offer a conceptual development and empirical investigation of societies' orientation toward change versus stability. In the present study, we therefore set three main goals: First, we use the personality concept of dispositional resistance to change (Oreg, 2003; Oreg et al., 2008) to offer a preliminary definition and explore the culture-level dimensionality of societies' orientation toward stability and change. Second, to further uncover the meanings of the cultural orientation toward change, we establish its nomological net by exploring its relationships with extant cultural frameworks. Finally, we use the cultural orientation to predict country-level indexes of responses to change and patterns of change in these indexes over time.

Translating the Concept of Dispositional Resistance to Change to the Cultural Level

As has been the case for other frameworks of cultural dimensions (e.g. Hofstede, 2001; Schwartz, 2006), our starting point for learning about societies' orientations is the individual. Complementing approaches through which culture is assessed directly (e.g. the analysis of cultural

artefacts), individual-level theories offer another lens for considering societal phenomena and can often yield novel understandings of these phenomena. As noted above, this has been performed using the five factors of personality for characterizing societies (Allik et al., 2017; McCrae & Terracciano, 2005) as well as in transitioning from values that pertain to individuals to those that characterize cultures (Schwartz, 2006).

An important caveat in transitioning from the individual to the societal level, however, is that the structure and meaning of societal orientations will not necessarily correspond with those of individuals (Fischer, 2012; Hofstede & Bond, 1984; Na et al., 2010). Specifically, the number of dimensions comprising a construct, the interrelationships among dimensions (e.g. factors), and their meanings at the individual and societal level can vary. This idea has been addressed extensively through discussions of the reverse ecological fallacy (Hofstede, 2002), which pertains to the interpretation of data at the societal level as if they were about individuals, and the ecological fallacy (interpreting individual-level data as if they were about societies; Bond, 2002). An empirical manifestation of this is that the interrelationships among a construct's individual-level scale items can differ from the interrelationships among the items' country-mean scores (i.e. ecological analysis; Hofstede & Bond, 1984). This, for example, is the case in conceptualizations of individual (Schwartz, 1992) and cultural (Schwartz, 2006) values.

Thus, although individual-level constructs are useful for learning about society-level phenomena by providing a preliminary theoretical framework, the dimensionality and meaning of constructs at the societal level need to be re-established. As we explain below, societal constructs' dimensionality is established by examining the interrelationships among the society-level aggregation of scale items. The meaning of the resulting dimensions can then be determined from both the content of the items that comprise these dimensions and the relationships between these dimensions and extant cultural dimensions, whose meanings have already been established (e.g. Schwartz's or Hofstede's dimensions; see, e.g. Oreg et al., 2008). In the current research, we transition from the individual-level construct of dispositional resistance to change to the societal level. We begin by reviewing the literature on dispositional resistance to change and then proceed to describe our means of establishing the concept at the societal level.

Dispositional resistance to change is a personality trait that pertains to "an individual's tendency to resist and avoid making changes, to devalue change generally, and to find change aversive across diverse contexts and types of change" (Oreg, 2003, p. 680). The construct and its measurement scale have been established and validated in several sets of studies (e.g. Oreg, 2003; Oreg et al., 2008, 2010; Oreg, Nevo, Metzer, Leder, & Castro, 2009). The scale's structure has been established and replicated both through factor analytic and multidimensional scaling procedures (Oreg, 2003; Oreg et al., 2008, 2010). The scale's validation procedures included a demonstration of its measurement invariance across cultures, indicating that its structure and meaning are

comparable across a diverse set of cultural samples (Oreg et al., 2008, 2010).

As part of the construct's development, it has been shown to be distinct from related personality traits such as openness to experience, tolerance for ambiguity, dogmatism, risk aversion, and sensation seeking (Oreg, 2003). Whereas several traits are related to certain aspects of the change concept, none of them were designed to specifically capture individuals' dispositional orientation toward change. Accordingly, dispositional resistance to change has been shown to predict individuals' responses to specific change situations above and beyond these other traits (Oreg, 2003). It has also been shown to predict individuals' responses in a variety of change contexts, such as imposed organizational change (Oreg & Sverdlik, 2011; Sverdlik & Oreg, 2009), innovative and creative work behaviour (Battistelli, Montani, & Odoardi, 2013; Hon, Bloom, & Crant, 2014), occupational choices (Oreg et al., 2009), and the adoption of innovations (Nov & Ye, 2009; Oreg & Goldenberg, 2015).

The trait comprises four dimensions that capture cognitive, affective, and behavioural predispositions (Oreg, 2003). Cognitive rigidity constitutes a form of stubbornness involving an unwillingness to consider new ideas and perspectives. Two dimensions that are affective in nature are emotional reaction and short-term focus (Oreg, 2003). The former constitutes the extent to which people become stressed and uncomfortable when faced with change and the latter captures the degree to which people focus on the short-term hassles versus long-term benefits of change. Routine seeking constitutes the behavioural/intentional aspect of dispositional resistance and involves the degree to which people prefer and look for stable and routine environments. The four dimensions are positively correlated with one another, with particularly strong correlations between the two affective dimensions, which in a few samples have merged into a single affective dimension (Oreg et al., 2008, 2010). Our first step in the present study will therefore be to learn about the cultural orientation to change and its dimensionality by examining the aggregation of individuals' responses to the dispositional resistance to change scale.

This orientation's dimensions could be seen as manifestations of a cultural orientation toward change. For example, one way in which societies may promote stability could involve the application of stringent norms and regulations. Another could be through an emphasis on the dangers and risks involved in change. And yet another could be through an emphasis on and consistent adoption of routines and habits. Such different modes of promoting stability versus change could thus be uncovered by testing the structure of the cultural orientation toward change.

To provide further insights into the meanings of this cultural orientation and establish its nomological net, we will also explore its relationships with extant cultural taxonomies and culture-level personality profiles (Allik et al., 2017; e.g. Gelfand et al., 2011; Hofstede, 1980; Hofstede, 2001; House et al., 2004; Inglehart, 1997; Schwartz, 2006). We review below some of these key frameworks, focusing in particular

on those aspects within each that relate to notions of stability versus change.

Extant Cultural Frameworks and Their Relevance to Notions of Stability and Change

Five well-established frameworks of cultural dimensions—by Schwartz (1994, 2006), Hofstede (1980, 2001), the GLOBE research group (House et al., 2004), Inglehart (1997; Inglehart & Baker, 2000), and Gelfand et al. (2011)—include dimensions that relate to notions of stability or change. In addition, personality profiles of cultures have been proposed (Allik et al., 2017; Gebauer et al., 2015; McCrae & Terracciano, 2005), including the concept of open cultures, which is also related to stability and change. These frameworks have been extensively studied and provide helpful frameworks for comparing cultures and explaining differences among them (e.g. Matsumoto, Yoo, & Nakagawa, 2008; Smith, Peterson, & Schwartz, 2002; Taras, Kirkman, & Steel, 2010). In the present study, we use them to establish the nomological net of the cultural orientation toward change.

Given that we have yet to uncover the dimensionality of the cultural orientation toward change, we do not establish here formal hypotheses about relationships with extant cultural dimensions. We do, however, highlight the particular cultural dimensions that pertain to notions of stability and change and point to the general relationship that could be expected between these dimensions and an overall orientation toward change.

Schwartz's cultural dimensions

Schwartz's (2006) framework includes three bipolar dimensions—embeddedness versus autonomy, hierarchy versus egalitarianism, and mastery versus harmony. Among these, the first and third dimensions include some reference to notions of stability and change. The autonomy-embeddedness dimension involves the degree to which societies highlight individuals' autonomy versus their embeddedness in and commitments to the collective. The embeddedness orientation is also characterized as involving an emphasis on maintaining in-group solidarity and the status quo. In Schwartz's (2006) third dimension, mastery is described as reflecting societies' emphasis on exploiting the environment for the attainment of group or personal goals. As part of this pursuit is an emphasis on mastering, directing, and changing the environment. Contrarily, harmony involves acceptance and appreciation of the world as it is (Schwartz, 2006). We can therefore expect that autonomy and mastery will be associated with a positive cultural orientation toward change and embeddedness and harmony with a negative one.

Hofstede's and the GLOBE cultural dimensions

Hofstede's (1980, 2001) framework includes five dimensions—power distance, individualism–collectivism, femininity–masculinity, uncertainty avoidance, and long-term versus short-term orientation. His framework was later expanded in the GLOBE project (House et al., 2004) to nine dimensions. In addition to power distance and uncertainty

avoidance, which retained their labels, long-term orientation was relabelled future orientation; collectivism was split into institutional collectivism and in-group collectivism; masculinity–femininity was split into assertiveness and gender egalitarianism; and two new dimensions were added—performance orientation and humane orientation. Of these nine, two in particular would seem to be relevant to the notion of change. Uncertainty avoidance is defined by Hofstede as the degree to which societies implement rules and regulations as a means of dealing with uncertain and ambiguous situations. It is similarly defined in the GLOBE project as the degree to which society members aim to avoid uncertainty by relying on norms, rituals, and bureaucratic practices.¹ Given that change often involves uncertainty and ambiguity, this dimension likely captures some aspects of cultures' orientation toward change.

Hofstede's (2001) long-term orientation reflects a greater emphasis on the future versus the past and present and involves an appreciation of persistence and the capacity for adaptation. Correspondingly, GLOBE's future orientation is defined as the degree to which individuals engage in future-oriented behaviours, such as planning, investing in the future, and delaying gratification (House, Javidan, Hanges, & Dorfman, 2002). Long-term/future-oriented societies would therefore seem to have greater openness to change relative to those with a stronger focus on the past and present. We therefore expect that uncertainty avoidance will be associated with a negative orientation toward change and a long-term/future-orientation with a positive one.

Inglehart's framework of traditional and secular values

Another well-established framework of cultural values is that of Inglehart (1997; Inglehart & Baker, 2000), which includes a dimension of traditional versus secular values and a dimension of survival versus self-expression values. Of these two, the traditional/secular dimension appears to be relevant to notions of stability and change. It captures societal differences in the importance given to religion and is related to the “transition from agrarian to industrial society, associated with bureaucratization, rationalization, and secularization” (Inglehart & Welzel, 2010, p. 553). As such, it can relate to societies' orientation toward stability in two ways. On the one hand, the association between tradition and the preservation of the status quo suggests that secularism would be associated with a greater openness to change. On the other hand, the bureaucratization that characterizes secular societies reflects an emphasis on structure, which suggests that secularism may also be related to a preference for the stability that bureaucratic structure provides. By testing relationships between secularism and

¹Despite the similarity in how this dimension is defined in both Hofstede's and the GLOBE frameworks, empirically, Hofstede's uncertainty avoidance index and the GLOBE index of uncertainty avoidance practices are negatively correlated with each other. To resolve this conflict, some have suggested that each of the frameworks captures a different aspect of uncertainty avoidance (Venaik & Brewer, 2010). Hofstede's index appears to capture the degree of stress society members experience under uncertainty whereas the GLOBE index captures rule orientation practices. We further address this point in discussing our results.

societies' cultural orientation toward stability and change, we will be able to test these conflicting predictions.

Cultural tightness–looseness

More recently, Gelfand et al. (2011) introduced the tightness–looseness cultural dimension that distinguishes among societies on the basis of the strength of their norms and tolerance for deviant behaviour. The tighter the culture, the stronger the norms and the less tolerance for deviation from them. Accordingly, given this form of rigidity in tight cultures, it has been suggested that the tighter the culture, the more stable it will be and the less open it will be to change (Erez & Gati, 2004; Toh & Leonardelli, 2012). Others, however, have suggested that the opposite trend could also be predicted, whereby tight cultures may actually be more open to change (Varnum & Grossmann, 2017). According to this view societies with tighter cultures may respond more promptly to changes that are adopted by their leaders, given the greater uniformity in society members' responses. As with respect to the conflicting predictions for Inglehart's secularism dimension, testing relationships between tightness and societies' orientation toward stability/change should contribute to our understanding of this apparent conflict.

Country Big Five scores

Finally, several studies incorporated the five-factor model to provide personality profiles of cultures (Allik et al., 2017; Gebauer et al., 2015; McCrae & Terracciano, 2005). Of the five profiles, the profile of open cultures (i.e. openness to experience aggregated to the culture level) seems to capture content relevant to notions of stability and change. Overall, these cultures are said to be independent and unconventional, progressive and free-thinking, whereas low-openness cultures are characterized as conservative and traditional (McCrae & Terracciano, 2005). As such, one could expect that societies' cultural openness profile will be associated with a positive orientation toward change. We propose this however, only tentatively given the limited validity of country-level scores of the Big Five in general, and of openness to experience in particular (Allik & Realo, 2017; McCrae et al., 2010).

Although each of the cultural dimensions described above is related to aspects of stability versus change, none of them captures this orientation directly nor were they intended to. For example, the defining features of embeddedness have to do with individuals' positioning within society, rather than the orientation toward stability or change. Uncertainty, which is at the heart of the uncertainty avoidance dimension, and change are related, but are by no means synonymous given that change has attributes beyond uncertainty and uncertainty exists in contexts other than change. Similarly, although aspects of cultural tightness (e.g. less flexibility and greater compliance to norms) are associated with notions of stability and change, the focus of tightness is more on the degree of a culture's homogeneity (Uz, 2015) than on either stability or openness to change.

The Predictive Validity of the Cultural Change Orientation

Beyond relationships of the orientation toward change and its dimensions with other cultural dimensions, which establishes the concept's construct validity, one can also consider the concept's role in predicting culture-level responses to change, thus establishing the construct's predictive validity. We aim to predict a variety of country-level change outcomes, including economic, technological, social, and environmental indexes of change. Overall, we expect that societies' cultural orientation toward change will be associated with the degree to which changes are implemented in them, as reflected in the various country-level indexes. Moreover, we expect that the orientation toward change will also be associated with the rate at which such change indexes change. Specifically, we hypothesize that societies' cultural orientation toward change will predict these societies' levels of economic and technological, as well as social and environmental development, and predict the rate at which these levels change over time. Before more methodically developing our hypotheses for predicting these outcomes, we first need to gain a better understanding of the structure and meanings of the orientation toward change.

THE PRESENT RESEARCH

As noted above, we focus on three goals: (i) To establish the definition and structure of the cultural orientation toward change construct, (ii) to develop the construct's nomological net, and (iii) to use the construct for predicting country-level change indexes. To address the first goal, we will use data about individuals' dispositional resistance to change that we obtained from 27 countries and will examine the interrelationships among the aggregated (to the country level) scale items. This will allow us to determine the dimensions of the cultural change orientation and the relationships among these dimensions. To address the second goal, we will test relationships between the newly established dimensions of the cultural change orientation and the extant cultural dimensions described above. After establishing the structure and meanings of the change orientation dimensions in the first two steps, we will develop hypotheses about relationships with country-level indexes of economic, technological, social, and environmental change. We then address the third goal by testing these relationships.

METHOD

All data and material have been made publicly available via the Open Science Framework and can be accessed at <http://osf.io/a3gnj>.²

²The OSF folder includes the 27-country data file and the syntax files we used for the analyses presented in the manuscript. It also includes the individual-level data from Israel, from which Israel's country-level mean dispositional resistance to change item scores were calculated. In addition, the folder includes the full table of correlations among the variables in the study, the partial correlation results, the results obtained while using the ordered categories of the cultural change orientations dimensions, and the HLM output files (see additional information about these analyses in the Results section).

Sampling and participants

We had a number of criteria for the type of data to collect. First, given that our purpose was to identify differences across countries, we aimed for a sample of countries that is as diverse as possible. Second, given the tight link between language and culture (Chen & Bond, 2010; Harzing, 2005) and the importance of ensuring that our measures are understood comparably in each country (Smith, Fischer, Vignoles, & Bond, 2013), it was important to obtain data that are based on responses provided in participants' native tongue. Finally, it was important to obtain samples that are comparable (Smith et al., 2013). Ideally, cross-cultural research should be based on nationally representative samples, yet these are difficult to obtain, so when they are not available, samples are matched on the basis of a given set of characteristics (Steenkamp & Baumgartner, 1998). Although such matching is not without its faults (we elaborate on this in the General Discussion section), it is nonetheless essential when random samples are not available. We therefore focused on data from undergraduates, which are matched on education and age.

The data collection procedures for the study, titled "Resistance to change", were approved by the University of Haifa's Committee for Research with Human Participants, 2006. We obtained data about individuals' dispositional resistance to change from two sources: One source was the data used in Oreg et al. (2008), which included data on dispositional resistance to change from 4201 university undergraduates in 17 countries. For the second source, we recruited colleagues from 10 additional countries who coordinated the collection of new data from 2286 undergraduates in their countries (described below). These data were collected using the same measure and procedures as those used in Oreg et al. (2008). Participation was in return for course credit or as part of course requirements. Overall, we obtained data from a total of 6487 participants from 27 countries (Table 1).

The countries sampled are Australia, Brazil, Canada (French), Chile, China, Croatia, the Czech Republic, Germany, Greece, Hong Kong, Iran, Israel, Japan, Lithuania, Mexico, the Netherlands, Norway, Russia, Slovakia, Slovenia, Spain, Turkey, the UK, Ukraine, and the USA. Our data for the study thus span five continents and 19 languages. The average sample size was 240, sizes ranging from 119 (Canada) to 386 (Greece). With the exception of Canada, China, and Slovakia, for which sample sizes were 119, 194, and 171, respectively; all samples exceeded 200 respondents (Table 1).

Measures

Dispositional resistance to change

Before administering the dispositional resistance to change scale, it was translated to the native language of each participating country through a translation-back-translation process (e.g. Schaffer & Riordan, 2003). This was performed by two individuals, fluent in both English and the country's native language. Differences between the original and back-translated versions were discussed by the two translators until agreement was reached about the most appropriate translation.

Table 1. Descriptive statistics on samples' demographics and the RTC scale's reliability

Country	Town	N	Language	Religion (majority)	% female	Mean age (SD in parentheses)	RTC scale's Cronbach's alpha
Australia ^a	Burwood and St Lucia	251	English	30% Atheist	67	21.09 (3.61)	.82
Brazil	São Gonçalo	281	Portuguese (Brazilian)	41% Catholic	75	22.96 (3.49) ^b	.74
Canada	Sherbrooke	119	French	56% Catholic	75	21.13 (6.01)	.88
Chile	Temuco	283	Spanish	53% 'No religion'	64	21.15 (9.54)	.79
China ^a	Beijing	194	Chinese (Mandarin)	— ^c	56	20.72 (1.09)	.85
Croatia ^a	Zagreb	246	Croatian	81% Roman Catholic	83	21.43 (1.79)	.84
Czech Republic ^a	Brno	224	Czech	50% Roman Catholic	78	22.49 (2.10)	.84
Germany ^a	Braunschweig	206	German	51% Protestant	49	23.03 (4.35)	.77
Greece ^a	Athens	386	Greek	87% Greek Orthodox	60	20.97 (2.31)	.72
Hong Kong	Hong Kong	224	Chinese (Cantonese)	77% 'No religion'	50	20.79 (1.52)	.85
Iran	Kermanshah	201	Persian	99% Muslim	98	23.07 (4.07)	.71
Israel ^a	Haifa	241	Hebrew	83% Jewish	82	24.35 (3.21)	.85
Japan ^a	Tsukuba	337	Japanese	— ^c	23	19.71 (1.62)	.75
Lithuania ^a	Vilnius	212	Lithuanian	96% Catholic	77	20.31 (1.67)	.77
Mexico ^a	Mexico City	265	Spanish	82% Catholic	51	20.62 (2.19)	.79
Netherlands ^a	Tilburg	205	Dutch	— ^c	80	20.22 (3.45)	.85
Norway ^a	Bergen	266	Norwegian	67% Christian	74	23.24 (4.40)	.84
Poland	Gdańsk	223	Polish	78% Catholic	61	21.49 (2.45)	.80
Portugal	Lisbon	284	Portuguese (European)	49% Catholic	75	20.66 (3.07)	.80
Russia	Moscow	214	Russian	71% Christian	59	18.72 (1.17)	.77
Slovakia ^a	Bratislava	171	Slovakian	50% Catholic	54	21.40 (1.10)	.79
Slovenia	Ljubljana	205	Slovenian	34% Christian	86	21.41 (2.53)	.84
Spain ^a	Salamanca	288	Spanish	— ^c	59	21.90 (1.55)	.81
Turkey ^a	Istanbul	241	Turkish	98% Muslim	39	21.04 (1.52)	.77
UK ^a	Durham	204	English	95% Christian	45	19.22 (1.83)	.78
Ukraine	Makiivka	252	Ukrainian	86% Christian	74	21.54 (6.25)	.78
USA ^a	Auburn, AL	264	English	49% Christian	50	21.19 (2.38)	.83
Total/Average		6487			64	21.33 (3.72)	.80

Note. RTC, resistance to change.

^aData for these countries were available to us from the dataset used by Oreg et al. (2008).

^bData in Brazil were collected from undergraduates in both day and evening programs. Information about the program in which each participant was enrolled was not available. Because the mean age of evening program participants is significantly higher than that of the day program, which is more comparable with undergraduate programs in other countries, we included in our analyses only participants of age 30 or less, leaving us with the 283 participants reported in the table.

^cIn some countries, it was deemed inappropriate to collect data on respondents' religion in the context of this study. This information is therefore missing for these countries.

Participants filled out the 17-item resistance to change scale (Oreg, 2003) and answered questions about their demographics. Items on the resistance to change scale are statements about one's typical attitude toward the notion of change (Appendix A). Response options range from 1 ('Strongly disagree') to 6 ('Strongly agree'). Cronbach's alpha reliability scores for the scale in each of the 27 countries are provided in Table 1.

Schwartz's cultural dimensions

Data for Schwartz's (2006) cultural values are based on samples of undergraduates, teachers, and national representative samples. Dr. Schwartz provided us with country scores for all 27 countries in our sample (5 December 2014), on each of the seven cultural value orientations: embeddedness, affective autonomy, intellectual autonomy, hierarchy, mastery, egalitarianism, and harmony. Schwartz (2006) derived these scores by aggregating responses of individuals to Schwartz's (1992) personal values scale in each country.

Hofstede's cultural dimensions

Hofstede's cultural value scores are based on samples of IBM employees from 50 countries (Hofstede, 1980, 2001). Scores for the four dimensions of power distance, uncertainty avoidance, individualism, and masculinity were available at <http://geert-hofstede.com/> for 26 of the countries in our sample. Scores for long-term orientation were obtained from (Hofstede & Minkov, 2010), which were derived from the World Values Survey, and were available for 17 of the countries in our sample.

GLOBE cultural dimensions

GLOBE societal scores are based on data collected from managers in 62 countries (House et al., 2004). Scores for the nine societal dimensions were collected in two ways. One way was by asking respondents to describe their national culture as it actually is ('as is'), labelled cultural *practices*. In the other way, respondents were asked to describe their national culture as they would want it to be ('should be'), labelled cultural

values. As it turns out, GLOBE practices on a given dimension tend to be negatively correlated with the GLOBE values of that dimension. Although both sets of dimensions are informative about aspects of national culture, the values measures have been criticized for having little linkages with prior measures of cultural values (Smith, 2006). Given that GLOBE practices more directly represent culture as it actually is, researchers often focus on them for characterizing societies (Gelfand et al., 2011; McCrae, Terracciano, Realo, & Allik, 2008). Accordingly, in the present study, we used the GLOBE societal practices scores. These data were available for 19 of the 27 countries in our sample.

Inglehart's cultural dimensions

Scores for Inglehart's two value dimensions—traditional/secular-rational and survival/self-expression—are derived from the World Values Survey, as described in Inglehart and Baker (2000). Dr. Inglehart provided us with country scores for 24 of the 27 countries in our sample (6 April 2017). There were differences in the years in which these data were collected for the different countries. Years for which data were collected for the 24 countries in our sample were between 2005 and 2008, with the exception of Israel and Slovakia, for which data were only available from 2001 and 1999, respectively.

Gelfand et al.'s tightness–looseness scores

Gelfand et al. (2011) collected data on cultural tightness (vs looseness) from students and employees in 33 nations, of which, 18 were also represented in our sample. The tightness–looseness scale is designed to capture “the degree to which social norms are pervasive, clearly defined, and reliably imposed within nations” (p. 1102).

Five-factor cultural profile scores

Personality profiles of cultures were calculated through aggregation of the NEO Personality Inventory scores, provided by students from 51 countries (McCrae & Terracciano, 2005) and from a diverse set of respondents from 62 countries (Allik et al., 2017). Twenty-one of the countries from McCrae and Terracciano (2005) and 20 of the countries from Allik et al. (2017; 16 of which were the same as those from McCrae and Terracciano) overlapped with the countries in our sample.³

³Country-level Big-Five scores are also available from the Gosling–Potter internet project (Gebauer et al., 2015), which includes a very large number of countries and participants in each country, yet the samples on which these scores are based are less comparable with the samples in our study. First, respondents in the Gosling–Potter project had the option of filling out surveys in one of four languages, a large majority of whom ended up responding in English. This procedure likely restricts the variance in participants' responses and obscures important differences between countries (Chen & Bond, 2010; Harzing, 2005). Similarly, surveys in the Gosling–Potter project were administered online, which although comparable with standard samples in many respects, could yet come at the cost of sample comparability given cross-country differences in the accessibility to online questionnaires. We nevertheless tested the relationship of the Gebauer et al.'s (2015) country-level Big-Five scores with the change orientation dimensions (the correlation table depicting these relationships is available at <http://osf.io/a3gnj>). The relationships obtained were not consistent with those obtained with the other two sets of country Big-Five scores or with the relationships with the other cultural dimensions. As we suggest above, this inconsistency may result from the lower comparability of the Gebauer et al. (2015) samples with the other samples on which our analyses are based.

Country-level indexes of change

We looked for indexes of technological, economic, social, and environmental change that are well-established and that are available for as many of the countries in our sample as possible. We obtained relevant data from the World Bank World Development pool (<http://data.worldbank.org/data-catalog/world-development-indicators>). Specifically, we obtained the data from 1990 to 2012⁴ for the following variables: As *indicators of technological and economic development*, we used data on countries' GDP, mobile cellular subscriptions (per 100 people), number of patent applications, research and development expenditure (% of GDP), and high-technology exports (in US\$). As another indicator, we also used an index of entrepreneurship from the Global Entrepreneurship Monitor (<http://www.gemconsortium.org/>). Specifically, we obtained the 2011–2017 rate of employees' involvement in entrepreneurial activities, which was available for 26 of the countries in our sample.

As *indicators of social and environmental change*, we found in this dataset two variables that capture these types of change: the proportion of women in parliament and countries' use of alternative and nuclear energy (% of total energy use). To supplement these indicators, we also used the 2010 Rainbow Europe Map and Country Index (<http://www.ilga-europe.org/rainboweurope/2010>), which includes an index of the degree of legislation geared at the protection of human rights and equality for lesbian, gay, and bisexual (LGB) people for the 16 European countries in our sample. As we describe below, we also wanted to test relationships with *countries' well-being* for which we used the dataset from Diener and Tay (2015), who used an index of subjective well-being from the Gallup World Poll. Country scores on each of the variables used in the study are available at: <http://osf.io/a3gnj>.

With the exception of countries' index of entrepreneurial activity, LGB rights protection, and well-being, the outcome variables comprised measurements across a sufficiently large number of years to allow us to test hypotheses that pertain to the rate of change in these variables. We therefore used these variables (e.g. mobile cellular subscriptions and patent applications) in two ways. We use the mean of each variable across years to predict country-level change, and also conducted hierarchical linear modelling analyses (see below) to predict change in these change indexes over time.

TESTING THE STRUCTURE, NOMOLOGICAL NET, AND OUTCOMES OF THE CULTURAL CHANGE ORIENTATION

Goal I: Exploring the content and structure of cultures' change orientation

Our first aim was to examine the content and structure of the change orientation by observing the relationship among scale items, aggregated to the societal level. We followed

⁴For a few of the indexes, data were only available for a subset years or a subset of countries from our sample. This is elaborated in Table B.1, in Appendix B.

the multidimensional scaling (MDS) analysis procedures used in previous cross-cultural contexts (e.g. Schwartz, 1994; Smith, Dugan, & Trompenaars, 1996). Contrary to factor analytic approaches, which are based on assumptions of linear relationships among items and factors (Bauer, 2005; Cohen, 2008), and generally require relatively large samples (e.g. MacCallum, Widaman, Zhang, & Hong, 1999), MDS is a non-metric alternative that relaxes these requirements. MDS is therefore particularly useful for exploring the structure of country-level data, which are often available only in smaller samples.⁵

The multidimensional scaling analysis

We first calculated the country mean of each item of the dispositional resistance to change scale for each country. Country-level item means ranged from 1.98 to 3.85, and the standard deviations ranged from 0.28 to 0.44. We then calculated the correlations among all item means. The resulting correlation matrix serves as a measure of similarity among items, with which we conducted a two-dimensional ordinal MDS analysis.⁶ Through this analysis, each item becomes represented by a point in a two-dimensional space. Distances between the points in the space represent the interrelations among the scale items. The smaller the distance between two points, the more similar are the items that they represent.

The structure of the scale (i.e. the number and content of the subscales) is determined by identifying groups of items in distinct regions of the two-dimensional space. When previous knowledge is available about scale structure, the focus in analysing MDS plots is on determining whether items of a known subscale are spatially separate from items of other subscales. In the present analysis, we use our knowledge of the scale's structure at the individual level as the backdrop for our analysis of the scale at the culture level, although we do not expect the scale's structure to necessarily remain the same. The syntax for the analyses conducted is available at <http://osf.io/a3gnj>.

Multidimensional scaling results

At the individual level, items 1–5 of the scale (Appendix A) represent the routine seeking dimension, items 6–9 represent the emotional reaction dimension, items 10–13 represent the short-term focus dimension, and items 14–17 represent cognitive rigidity. In earlier research, MDS analyses of the items at the individual level supported the four-dimensional structure of dispositional resistance to change, although in some

countries a three-dimensional structure, in which emotional reaction and short-term focus were merged to form a single dimension, was more apparent (Oreg et al., 2010). The MDS plot of the scale's country-mean items from our present data is presented in Figure 1.

As can be seen in the MDS plot, items 14–17 (e.g. "I don't change my mind easily"), which at the individual-level represent cognitive rigidity, are spread out in the top-right corner of the plot, separate from the other scale items. On the left side of the plot, items 1–4 (e.g. "I'll take a routine day over a day full of unexpected events any time"), which at the individual-level represent routine seeking, are separate from the other items, but item 5 (also originally from the routine seeking dimension: "I'd rather be bored than surprised") is not and is in the midst of the remaining items. These remaining items include items 6–9 (e.g. "When I am informed of plans, I tense up a bit"), which at the individual-level represent the emotional reaction to change and items 10–13 (e.g. "Often, I feel a bit uncomfortable even about changes that may potentially improve my life") that represent the short-term focus dimension.

Similar to analyses at the individual level (Oreg et al., 2010), the (horizontal) spatial separation of these latter two sets indicates the similarity of their conceptual content, which is more salient than between these eight items and the first two sets (i.e. items 1–4 and 14–17). In previous analyses of the dispositional resistance to change scale, Oreg et al. (2008, 2010) proposed that the entire set of items 6–13 represents an overarching affective dimension. As presented above, this corresponds with the conceptual definitions of the two dimensions to which these items belong (Oreg, 2003). In the sake of parsimony, we adopt this proposition in the present analysis and refer to a single, culture-level, affective dimension.

In contrast to analyses at the individual level, in the present analysis, item 5 ("I'd rather be bored than surprised") is positioned within this affective cluster rather than within the routine seeking cluster to which it has consistently belonged at the individual level. This actually corresponds with the fact that the item also includes affective content. Thus, following our analysis to this point, we focus on the vertical partitioning of country-mean items into three clusters, each representing a separate dimension of cultures' orientation toward stability versus change. One cluster (items 14–17) involves societies' cultural rigidity, a second (items 5–13) is about their members' affective responses to change, and a third (items 1–4) involves these societies' preference for routines. The relative positions of the three clusters of items on the MDS plane suggest an ordering of the three dimensions, which range from cognitive rigidity, through affective reactance, to routine seeking.

Change orientation dimensions

An examination of the items in each cluster and the definitions of the dispositional resistance to change dimensions (Oreg, 2003; Oreg et al., 2008) provide a preliminary and tentative understanding of the three dimensions of the cultural orientation toward change. As can be seen in Appendix A, items 14–17, which form the cognitive rigidity subscale, pertain to the likelihood that the individual will change her

⁵Ideally, we would have run a multi-level MDS procedure that would account for the within country variability of items when analysing the between-country correlations. As far as we are aware, however, such a procedure has yet to be developed.

⁶The following set of analyses was conducted prior to selecting the two-dimensional solution: In a set of five MDS analyses with dimensionalities ranging from one to five, the number of dimensions at which improvements in the stress index became less pronounced (the 'elbow' of the stress-index scree plot) was two. The stress index for the two-dimensional solution was .16, which is significantly lower than the .28 benchmark indicated by Spence and Ogilvie's (1973), and the .25 benchmark indicated by Sturrock and Rocha (2000), thus supporting the fit of our two-dimensional mapping of the items. Correspondingly, two dimensions were also found to be most appropriate for representing the dispositional resistance to change items at the individual level (Oreg et al., 2010).

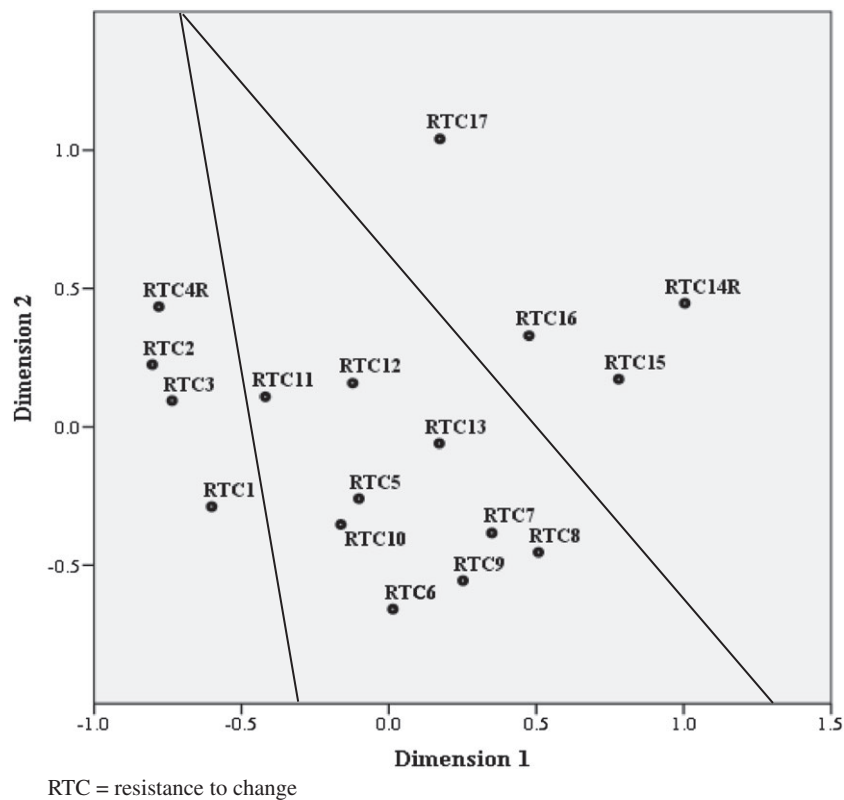


Figure 1. Multidimensional scaling of country-mean RTC items.

or his mind. Accordingly, this dimension is defined as a form of stubbornness involving an unwillingness to consider new ideas and perspectives. At the societal level, this dimension may therefore capture a societal disinclination to change established beliefs, ideas, and norms.

Items 5–13, which form the second dimension, pertain to affective aspects of individuals' responses to change. They refer to the negative emotions (e.g. stress) and irrational responses that people experience during change. Several of the items refer to negative responses to changes that are imposed on the individual. At the societal level, this dimension may therefore represent an overall anxiety and vigilance that members in society exhibit in general, and toward imposed change in particular.

Finally, items 1–4 form the third cultural change orientation dimension. Except for item 1, which refers to a general orientation toward the notion of change, the items of this dimension refer to individuals' preference for routines over new experiences. Accordingly, at the societal level, it may represent a societal emphasis of routines. For all three dimensions, the definitions we provide to this point are tentative. Further insights into the meanings of these dimensions will be obtained once we examine their relationships with established cultural dimensions (see below).

Before this, however, we examine the between-country variation in the change orientation dimensions and the interrelations among them. As can be seen in Table 2, the between-country standard deviations of the three change orientation dimensions were 0.23, 0.23, and 0.31 for cultural rigidity, affective reactance, and routine seeking, respectively. For comparison, at the individual level, the within-country standard deviations of the overall dispositional resistance to

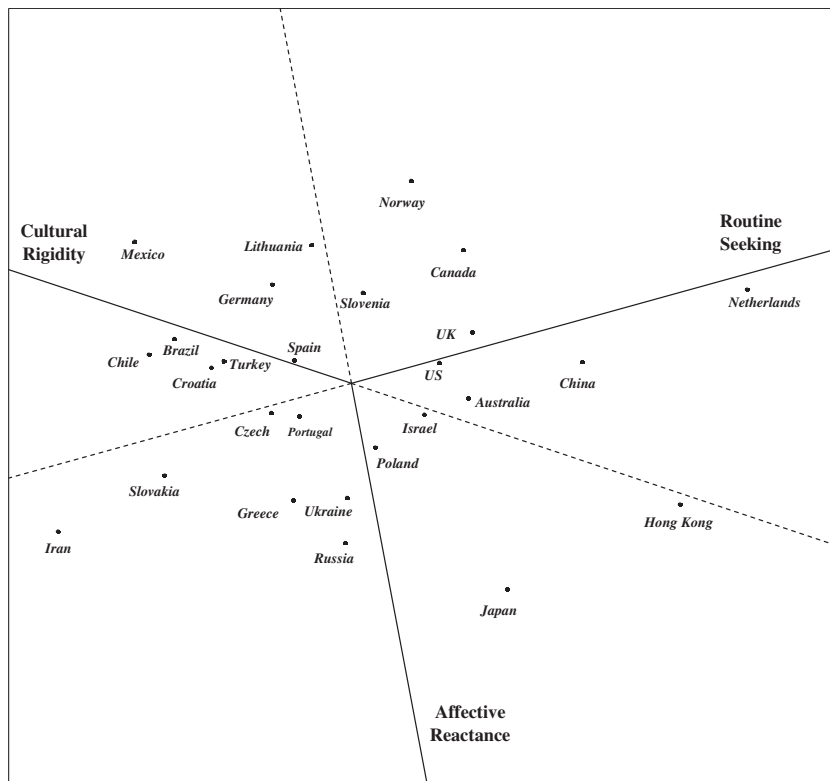
change score in the 27 countries in our sample ranged from 0.49 to 0.67. This smaller variance between countries relative to the within-country variance is consistent with the general observation that cultural differences in personality are significantly smaller than those between individuals, within countries (Allik & Realo, 2017). As another benchmark to which we can compare the culture-level variance we obtained, we consider the average between-country standard deviation across the 30 Big Five subscales as reported by Allik et al. (2017), which was 3.46. The culture-level means in Big Five scores were about 50, so the ratio of the standard deviation to the mean is 0.069 (3.46/50). In our data, the ratios of the culture-level standard deviation for the change orientation dimensions relative to the means ranged from 0.064 (0.23/3.57) for cultural rigidity to 0.11 (0.31/2.74) for cultural routine seeking. Thus, the degree of between-country variation of the three change orientation dimensions seems to be comparable with that obtained for other aggregated personality constructs.

Table 2 also shows the correlations among the three change orientation dimensions. Given that at the country level our sample consisted of 27 countries, in which case parametric assumptions about the data are not likely to be held, we used the non-parametric Spearman, rather than Pearson, correlation coefficients, and accordingly report Spearman's rho (ρ) (see, e.g. Fowler, 1987; Gauthier, 2001). Contrary to the relationships among these dimensions at the individual level, which are all positive, and relatively strong, the cultural dimensions are much more loosely linked with each other. The correlations ranged from $-.42$ to $.01$ and only the (negative) correlation between cultural rigidity and cultural routine seeking was significant ($p = .029$). Thus, at the culture level, the three change

Table 2. Descriptive statistics and Spearman correlations among change orientation dimensions

Variable	<i>N</i>	Mean	<i>SD</i>	Cultural rigidity	Cultural affective reactance
Change orientations					
Cultural rigidity	27	3.57	0.23	—	
Cultural affective reactance	27	2.99	0.23	-.12	—
Cultural routine seeking	27	2.74	0.31	-.42*	.01

* $p < .05$. ** $p < .01$.



Note: the dashed part of the axes represents their lower end.

Figure 2. Biplot of countries mapped on to the three stability orientation dimensions.

orientations represent distinct, relatively independent, aspects in which a culture's orientation toward change is expressed. Although the structure and meaning of individual level constructs and of their aggregation to the culture level are sometimes similar (Fischer, Vauclair, Fontaine, & Schwartz, 2010), they often are not (e.g. Bond et al., 2004; Na et al., 2010). Accordingly, as the correlations among the change orientation dimensions indicate, the cultural change orientation takes on a very different structure than that of the individual-level dispositional resistance to change trait.

Country positions on the three change orientation dimensions

To visualize countries' position on the three change orientation dimensions, we created an MDS biplot⁷ (Figure 2),

⁷To create the biplot, we used the BiplotGUI module on R (La Grange et al., 2009). The stress index for the plot was .06, which for a biplot with 27 objects is considered an indication of a good fit (Spence & Ogilvie, 1973; Sturrock & Rocha, 2000).

based on monotonic regression (La Grange, le Roux, & Gardner-Lubbe, 2009). The plot allows for the simultaneous graphical representation of both variables and observations, in which the relative position of a country on the biplot represents the particular ways in which each country is similar to and different from the others. The farther along an axis toward the axis' label (i.e. cultural rigidity, affective reactance, routine seeking), the higher the country is on the dimension represented by that axis (the dashed part of the axes represents their lower end). Thus, in our case, the more to the upper-left a country appears on Figure 2, the higher it is on cultural rigidity; the lower it is on the plot, the higher it is on affective reactance; and the more to the lower-right it is, the higher it is on routine seeking.

For example, Iran and Mexico in our sample are high on cultural rigidity, Greece is moderate, and Hong Kong is low on this dimension. Whereas Mexico and Iran are highest on cultural rigidity, Japan is highest on affective reactance, and the Netherlands is highest on routine seeking. This form of presentation nicely conveys a country's positioning on the

three dimensions. For example, as can be seen in the figure, Lithuania, is moderate on both cultural rigidity and routine seeking and is low on affective reactance.

Some support for the meaningfulness of the cultural change orientation concept is gained from the fact that countries of similar backgrounds tend to appear within the same area of the biplot. For example, Anglo countries (i.e. the USA, the UK, Australia, and Canada) are all adjacent to one another. As in other cultural value plots (e.g. Schwartz, 2006), here too Israel is adjacent to the Anglo cluster. Similarly, countries from Eastern Asia (i.e. China, Japan, and Hong Kong) are also within the same general area of the plot, as are the countries from Central and South America (i.e. Mexico, Brazil, and Chile).

In the next step, we use established cultural frameworks (Gelfand et al., 2011; Hofstede, 1980, 2001; House et al., 2004; Inglehart, 1997; McCrae & Terracciano, 2005; Schwartz, 2006) to develop the nomological net of the three change orientation dimensions and to more fully uncover their meanings.

Goal II: Establishing the nomological net of the cultural orientation toward change

To further explore the meaning of each of the three change orientation dimensions, as well as their distinctiveness vis-à-vis extant frameworks, we examined their correlations with the other six frameworks for which we obtained data (i.e. Schwartz, Hofstede, GLOBE, Inglehart, Gelfand et al., Allik et al., and McCrae et al.; Table 3). As in Table 2, we calculated Spearman correlation coefficients, which do not require parametric assumptions about the data.⁸

To proceed with interpreting the meaning of the three change orientation dimensions, we follow a useful practice (e.g. Bond et al., 2004; Gelfand et al., 2011; Schwartz, 1994) of examining the relationship between the new proposed cultural dimensions and cultural dimensions in extant frameworks (Table 3). We use these extant and well-established frameworks as conceptual anchors from which we can infer meaning.

Intercorrelations among extant cultural dimensions

Although not included in Table 3, patterns of relationships among the various frameworks were very similar to those reported in previous research (e.g. Gelfand et al., 2011; House et al., 2004; Inglehart, 2006; McCrae & Terracciano, 2005; Schwartz, 1994), such as the high positive correlations among Schwartz's autonomy, Hofstede's and the GLOBE's individualism, and Inglehart's self-expression dimensions; the negative correlation between Schwartz's egalitarianism dimension and power distance; the positive correlations between Schwartz's intellectual autonomy and Inglehart's secularism; and between power distance and Gelfand et al.'s tightness dimension.⁹ Replicating these

patterns of relationships provides support to the validity of our data.

Correlations between change orientation dimensions and the other cultural dimensions ranged from $\rho = 1.001$ to $\rho = 1.721$ and the magnitude of effects was comparable with those found in other comparisons of cultural frameworks (Gelfand et al., 2011; House et al., 2004; Inglehart, 2006; Schwartz, 1994).

Cultural rigidity and extant cultural dimensions

As can be seen in Table 3, cultural rigidity correlated positively with Schwartz's harmony dimension and negatively with mastery. This corresponds with the fact that mastery reflects an emphasis on changing one's environment and harmony on accepting the environment as it is. In addition, cultural rigidity was negatively correlated with the GLOBE institutional collectivism dimension, which reflects the degree to which societal institutional practices encourage and reward collective action. This negative correlation, along with the emphasis in institutional collectivism on collective action correspond with the tendency toward inaction and passivity that appears to be captured in cultural rigidity. As noted above, the items that make up the cultural rigidity dimension suggest that it reflects a form of societal disinclination to change established norms, beliefs, and ideas. The relationships with extant cultural frameworks highlight this dimension's link with an overall societal inaction.

Cultural affective reactance and extant cultural dimensions

Affective reactance correlated positively with Schwartz's hierarchy dimension and negatively with egalitarianism and harmony (Table 3). The positive relationship with hierarchy and negative relationship with egalitarianism suggest that affective reactance is more prominent in societies with an uneven division of power. In such societies people are more prone to experience 'micro worries', which involve a sense of personal threat, lower levels of well-being, and higher levels of anxiety (Schwartz & Melech, 2000). Furthermore, given the unequal distribution of power, individuals in these societies are more likely to experience changes that are imposed rather than voluntary and therefore have more reasons to respond in affective reactance. Similarly, low harmony societies, which based on Table 3 would tend to be high in affective reactance, have also been shown to exhibit a greater degree of 'micro worries' (Schwartz & Melech, 2000). In these cultures, "people must be vigilant about their fate in order to control it ... [and] are therefore likely to worry a great deal about what could go wrong for them" (Schwartz & Melech, 2000, p. 237).

As noted above, for the Big Five cultural profiles, we used data from two separate sources. As can be seen in Table 3, three of the Big Five profiles showed significant correlations with affective reactance. In all three cases, the correlation was significant only with one set (i.e. Allik et al. versus McCrae and Terracciano) of the Big Five profile scores, although the direction of the relationships was the same across both sets of scores. Specifically, affective reactance had a positive correlation with the neuroticism profile (with Allik

⁸The results with Pearson correlations were nevertheless very similar to those obtained with Spearman correlations. These can be found at <http://osf.io/a3gnj>.

⁹The complete matrix of correlations among the various framework dimensions is available at <http://osf.io/a3gnj>.

Table 3. Descriptive statistics and Spearman correlations between change orientation dimensions and extant cultural dimensions

Variable	N	Mean	SD	Cultural rigidity	Cultural affective reactance	Cultural routine seeking
Schwartz values orientations						
Affective autonomy	27	3.60	0.39	-.35	-.23	.39*
Intellectual autonomy	27	4.47	0.28	.02	-.32	.29
Egalitarianism	27	4.72	0.29	.23	-.46*	.04
Harmony	27	4.09	0.35	.40*	-.50**	-.24
Embeddedness	27	3.62	0.27	.25	.24	-.41*
Hierarchy	27	2.29	0.48	-.10	.56**	-.07
Mastery	27	4.00	0.16	-.52**	.38	.17
Hofstede's value orientations						
Individualism (vs collectivism)	26	50.90	22.16	-.21	-.12	.40*
Uncertainty avoidance	26	69.90	22.97	.17	.12	-.58**
Power distance	26	57.31	20.47	.24	.14	-.42*
Masculinity–femininity	26	49.73	22.39	-.06	.34	.06
Long-term orientation	17	55.82	25.33	-.39	.05	.04
GLOBE societal practices						
Institutional collectivism	19	4.19	0.42	-.67**	.33	.52*
In-Group collectivism	19	4.79	0.73	.32	-.10	-.49*
Uncertainty avoidance	19	4.06	0.57	-.24	-.15	.67**
Power distance	19	5.15	0.36	.43	-.21	-.72**
Gender egalitarianism	19	3.42	0.35	-.26	-.06	.16
Assertiveness	19	4.20	0.34	.24	-.16	.08
Future	19	3.82	0.42	-.27	-.10	.49*
Humane	19	3.87	0.34	-.42	.32	.08
Performance	19	4.07	0.41	-.15	.20	.42
Inglehart's value dimensions						
Secularism (vs traditionalism)	24	0.19	0.53	-.13	.13	.53**
Self-expression (vs survival)	24	0.23	0.55	-.28	-.32	.33
Gelfand et al.'s tightness (vs looseness)	18	5.66	2.65	.18	-.26	.00
Allik et al.'s/McCrae et al.'s Big Five cultural profiles						
Neuroticism	20/21	51.14/49.80	4.42/1.77	.12/-.10	.54*/.17	-.31/-.18
Extraversion	20/21	47.75/50.08	4.72/2.41	.19/.08	-.70**/-.42	-.06/.10
Openness	20/21	50.64/50.03	3.43/1.82	-.06/-.07	-.24/-.09	.39/-.06
Agreeableness	20/21	49.77/49.87	3.20/1.66	-.22/.28	.08/-.15	.69**/-.19
Conscientiousness	20/21	49.55/49.97	3.34/1.62	.08/.40	-.11/-.46*	.01/-.28

* $p < .05$. ** $p < .01$.

et al.'s scores) and a negative correlation with the extraversion (with Allik et al.'s scores) and conscientiousness (with McCrae and Terracciano's scores) profiles. The positive relationship with neuroticism corresponds with the fact that the affective reactance dimension encompasses negative affect, as with the relationship between neuroticism at the individual level and dispositional resistance to change (Oreg, 2003). Correspondingly, the negative correlation between affective reactance and extraversion may be driven by the positive emotions facet of extraversion.

The negative correlation with conscientiousness is the only significant relationship obtained with the McCrae and Terracciano scores. This correlation was less straightforward than the former two given that neither of the three change orientation dimensions pertains directly to the core attributes of conscientiousness. Yet some of the items that make up affective reactance involve the tendency to go against one's better judgement (see, e.g. items 11–13 in Appendix A), which is incongruent with the self-control aspects of conscientiousness and could possibly explain the negative relationship between the two.

Relationships between affective reactance and dimensions from the other cultural frameworks were all relatively

weak (the highest correlation was .34 with Hofstede's masculinity dimension), and none were significant. Given the moderate–strong relationships with Schwartz's dimensions and the positive relationship with the cultural neuroticism profile, we tentatively propose that affective reactance represents an overall anxiety and vigilance that members in society exhibit in general, and toward imposed change in particular.

Cultural routine seeking and extant cultural dimensions

Of the three change orientation dimensions, cultural routine seeking yielded the largest number and most complex set of significant correlations with the other cultural dimensions (Table 3). Some of the relationships correspond with the focus on stability described in the dimension's items. These include the high positive correlation with GLOBE's uncertainty avoidance, which corresponds with the emphasis on structure and rules that routines can provide. This underscoring of structure also corresponds with the emphasis on bureaucratization and standardization, as captured in both Inglehart's (1997) secular-rational values and GLOBE's institutional collectivism dimension, which were positively correlated with cultural routine seeking.

This also corresponds with the positive correlation between this dimension and GLOBE's future orientation dimension, despite our initial speculation that this correlation would be negative. Given the links between cultural routine seeking and indexes that reflect an emphasis on structure, the positive correlation with future orientation may result from the emphasis on planning and investing in the future that defines future orientation (House et al., 2002). Such an emphasis provides societies with the structure and predictability that are also provided by routines.

Alongside these relationships, several of the significant relationships for cultural routine seeking reflect an emphasis on freedom and autonomy versus constraint and the restriction of freedom. This is manifested in three sets of relationships: (i) the positive correlation with Schwartz's affective autonomy and negative correlation with embeddedness, (ii) the positive correlation with Hofstede's individualism and negative correlations with GLOBE's in-group collectivism, and (iii) the strong negative correlations with both Hofstede's and GLOBE's power distance dimensions, which reflect the restrictions that the hierarchical structure of society imposes on individual members.

Cultural routine seeking thus seems to represent the importance of structure, while maintaining individuals' autonomy. From a functionalist point of view, the positive association between routines and autonomy suggests that routines may provide the structure that enables societies to allow their members freedom without slipping into chaos (Brown & Eisenhardt, 1997). Alternatively, the association between routines and autonomy may suggest that members in societies that highlight autonomy are more satisfied with their routines and therefore seek them out and maintain them.

Interestingly, routine seeking was positively correlated with Hofstede's uncertainty avoidance dimension, but negatively correlated with the GLOBE uncertainty avoidance dimension. This corresponds, however, with the fact that the two uncertainty avoidance dimensions are typically negatively correlated with one another (House et al., 2004). To reconcile this conflict, Venaik and Brewer (2010) suggested that whereas the focus of GLOBE's uncertainty avoidance is on a rule-orientation, the focus of Hofstede's uncertainty avoidance is on the experience of stress that society members experience during uncertainty. The relationships that cultural routine seeking shows with the two uncertainty avoidance dimensions therefore suggest that it represents a societal emphasis on rules and structure without the experience of stress.

Thus, whereas at the individual level routine seeking is consistently negatively correlated with variables that reflect an openness to change (Oreg, 2003; Oreg et al., 2009), at the societal level, it shows both negative and positive correlations with such variables. Given these correlations, alongside the content of the items that comprise this dimension—most of which highlight the value of routines—routines appear to have an important role, through the structure and rule-orientation that they provide. The dimension involves members' voluntary preference for structure, as reflected in the positive association between this dimension and the cultural emphasis on freedom and autonomy.

Especially in developed societies, characterized by progress and affluence, growth and change are part of the daily routine and cultural landscape. Individuals in these societies appreciate their routines and the convenience they afford and at the same time appreciate and promote development and change that further advance such convenience (Shove, 2003). This link between structure and development corresponds with the higher scores that developed countries tend to have on GLOBE's uncertainty avoidance and institutional collectivism practices and on Inglehart's secular-rational values. It also corresponds with relationships found at the organizational level between structure and innovation, whereby a minimal degree of structure in organizations is needed for them to innovate successfully.¹⁰

Interim summary

Taken together, the relationships between the change orientation dimensions and extant cultural dimensions help sharpen the meanings and highlight the unique aspects of each of the three change orientation dimensions. Each of them is associated with a distinct set of cultural dimensions. Specifically, with respect to the three bipolar dimensions in Schwartz's (2006) theory, cultural rigidity is positively linked with harmony (vs mastery); affective reactance with hierarchy (vs egalitarianism); and routine seeking with autonomy (vs embeddedness). Relationships between cultural routine seeking and the other cultural frameworks further support its emphasis on structure while maintaining the importance of society members' personal freedom.

Each of these dimensions reflects a societal position on the tension between stability and change. In routine seeking, the emphasis is on the benefits of stability; in affective reactance, the emphasis is on the threats that change entails; and cultural rigidity captures a form of inaction, involving the reluctance to change beliefs and norms.

Goal III: Predicting outcomes of the cultural orientation toward change

Following our explorations of the structure and nomological net of the cultural orientation toward change, we can now turn to test the construct's predictive validity. We test hypotheses about the relationships between cultural change orientation and country-level change-related outcomes. We tentatively hypothesized that the orientation toward change, overall, will be associated with country-level indexes of economic and technological change, and of social and environmental development. Now that the dimensionality of the orientation toward change and the meanings of its dimensions have been uncovered, we can develop and test more specific hypotheses for each of the change orientation dimensions. We first establish and test hypotheses to predict

¹⁰One relationship that is consistent neither with our initial tentative expectations nor with the emerging pattern with the other cultural dimensions is the positive relationship between cultural routine seeking and agreeableness, using Allik et al.'s data. We should note, however, that although the correlation was positive and high, the correlation with agreeableness using McCrae and Terracciano's data was not significant and actually negative. We are therefore reluctant to give much weight to this finding.

country-level outcomes (indexes of change and country-level well-being) with each of the three change orientation dimensions. We then turn to test the rate of change in the country-level change indexes.

Predicting country-level outcomes

Hypothesis development

The predictive validity of cultural rigidity. As established above, cultural rigidity involves a form of societal disinclination to change established norms, beliefs, and ideas. The relationships with extant cultural frameworks highlights this dimension's link with an overall societal inaction. Alongside the stability that holding on to established ideas provides, refraining from considering new ones may stymie a society's development and progress. It may directly prevent such disinclined societies from adopting new and improved means of coping with everyday challenges and can overall hinder creativity and innovativeness in these societies.

Indeed, in direct contrast to cultural rigidity, the concept of unlearning has been used to explain the process through which collectives (e.g. groups, organizations, and societies) acquire new information (e.g. Hedberg, 1981; Huber, 1991). It pertains to collectives' proactive adaptiveness in coping with turbulent environments and reflects these collectives' openness to changing extant beliefs, norms, and procedures. In several studies, unlearning has been linked with the adoption and success of new technology (e.g. Akgün, Lynn, & Byrne, 2006; Becker, 2010). Correspondingly, research of culture and entrepreneurship demonstrates negative relationships between cultural dimensions that are related to inaction (e.g. low mastery and low institutional collectivism) and entrepreneurship activities, such as initiating and developing new businesses (Liñán & Fernandez-Serrano, 2014), societal competitiveness and economic prosperity, and countries' success in basic science (House et al., 2004). Thus, in contrast, the focus of cultural rigidity on maintenance of current ways of thinking could be expected to yield negative relationships with such indexes of economic and technological development. Thus, we expect that cultural rigidity will be (negatively) associated with indexes of technological and economic development.

Hypothesis 1: Cultural rigidity will be negatively associated with indexes of growth, as represented in national indexes of technological and economic development.

The predictive validity of cultural affective reactance. As established above, we proposed that the second change orientation dimension—*affective reactance*—represents an overall anxiety and vigilance that members in society exhibit in general and toward change in particular. Individuals in affective-reactant societies are likely to perceive change as threatening. We propose that this construal of change and overall experience of anxiety should also be negatively associated with these society members' overall well-being. Indeed, the framing of events has been empirically linked with well-being (e.g.

Lyubomirsky, 2001). For example, expecting favourable future outcomes (e.g. Scheier & Carver, 1993) and a sense of control over the events experienced (e.g. Bandura, 1997) have been shown to be positively associated with well-being.

Accordingly, one could predict that expecting negative outcomes and uncertainty about one's control of events, as is characteristic of individuals under threat, will be negatively associated with well-being. We therefore expect that societies in which individuals are prone to experience a sense of threat will tend to exhibit overall lower levels of well-being:

Hypothesis 2a: Cultural affective reactance will be negatively associated with country-level well-being.

The vigilance toward change that defines affective reactance corresponds with the main tenets of system justification theory (Jost et al., 2004; Jost & Banaji, 1994), whereby people are motivated to preserve social stability as a means of "alleviating the anxiety, uncertainty and fear elicited by threats to the societal status quo" (Feygina, Jost, & Goldsmith, 2010, p. 327). According to the theory, evaluations of social systems are driven by the need to maintain a sense of certainty and stability. In several contexts, the theory has been used to explain individuals' resistance to social and environmental changes (e.g. Feygina et al., 2010; Hennes, Nam, Stern, & Jost, 2012; Wakslak, Jost, & Bauer, 2011).

In line with our current cross-cultural focus, differences in system justification tendencies have also been demonstrated across countries (e.g. Feygina et al., 2010; van der Toorn, Berkics, & Jost, 2010). In other words, the tendency to resist changes to the societal status quo due to the anxiety they elicit is greater in some societies than in others. Accordingly, we propose that resistance to changes of the societal status quo (e.g. social changes and environmental changes) will be greater in countries in which members tend to experience a greater degree of anxiety and threat from change. Resistance will be manifested in an overall lower tendency to adopt such changes. Given what we know about the social justification motive, and given how we conceptualize cultural affective reactance, we hypothesize the following:

Hypothesis 2b: Cultural affective reactance will be negatively associated with indexes reflecting changes in countries' social order, as represented in national indexes of social and environmental change.

The predictive validity of cultural routine seeking. We defined the third change orientation dimension, *cultural routine seeking*, as the societal emphasis on the structure that routines provide. The correlations between routine seeking and cultural dimensions from Hofstede's (2001), GLOBE's (House et al., 2004), Schwartz's (2006), and Inglehart's (1997) frameworks demonstrate the link between this emphasis on structure and notions of rationality and bureaucracy (e.g. Weber, 1947) and their positive association with societal autonomy and a focus on future benefits.

This link between structure and autonomy corresponds with a similar association drawn by Inglehart (2008), whereby in the context of a secure environment, societies turn their focus to values of freedom and autonomy. Accordingly, the emphasis on structure, which is at the core of cultural routine seeking, may be associated with freedom and autonomy through the security that structure and routines provide. This also corresponds with organizational research in which structure was shown to be conducive to exploration and development (Brown & Eisenhardt, 1997). This is analogous to individual-level theories of creativity that highlights the conducive effects of routines and structure on creativity and innovation (e.g. Goldenberg & Mazursky, 2002; Goldenberg, Mazursky, & Solomon, 1999; Sagiv, Arieli, Goldenberg, & Goldschmidt, 2010), both of which reflect an openness to change. Thus, an emphasis on routines and structure may be conducive to societies' development and growth.

Looking at the relationship between structure and development from another direction, one could argue that individuals in societies that emphasize their development and growth, in which quality of living and subjective well-being tend to be high (e.g. Diener & Suh, 1997), will tend to prefer their routines more than those who live in societies with lower levels of development. The rationales for both causal directions support the notion that cultural routine seeking will be positively correlated with indexes of development and growth and with individuals' well-being. We therefore hypothesize:

Hypothesis 3a: Cultural routine seeking will be positively associated with country-level well-being.

Hypothesis 3b: Cultural routine seeking will be positively associated with indexes of growth, as represented in national indexes of technological and economic development.

We thus focus on three primary outcomes, each of which is differentially shaped by the various change orientation dimensions. Well-being is expected to correlate negatively with affective reactance and positively with routine seeking. Indexes of technological and economic development should correlate negatively with cultural rigidity and positively with routine seeking; and indexes of social change should be negatively correlated with affective reactance.

Results and discussion

To test these hypotheses, we calculated Spearman correlations between the change orientation dimensions and country-level outcomes (Table 4). As can be seen in Table 4, in line with Hypothesis 1, cultural rigidity was negatively correlated with four of the six hypothesized outcomes, excluding mobile cellular subscriptions and entrepreneurial activity. In support of Hypotheses 2a and 3a, affective reactance was negatively (significant with a one-tailed test),¹¹ and routine seeking positively, correlated with country-level well-being. These effects were generally maintained while controlling for GDP (the

¹¹One-tailed tests are justified for directional hypotheses, as in the present case.

partial correlation for affective reactance was $-.37, p = .064$, and for routine seeking was $.53, p = .005$).¹²

In support of Hypothesis 2b, affective reactance was negatively correlated with all three hypothesized outcomes: proportion of women in parliament, countries' use of alternative and nuclear energy, and LGB rights. These effects were also maintained while controlling for GDP (partial correlations for proportion of women in parliament, use of alternative nuclear energy, and LGB rights were $-.38, p = .059$, $-.50, p = .010$, and $-.53, p = .040$, respectively).

Furthermore, in partial support of Hypothesis 3b, routine seeking was significantly correlated with four of the six economic and technological outcomes. Specifically, it significantly predicted mobile cellular subscriptions, research and development expenditure, high-technology exports, and entrepreneurial activity. The relationships with GDP and the number of patent applications were not significant.

Whereas most of the economic and technological indexes were significantly correlated with both cultural rigidity (negatively) and routine seeking, GDP and use of patent applications correlated only with cultural rigidity, and mobile cellular phones and entrepreneurial activity only with routine seeking. The fact that these outcomes were not significantly predicted by both cultural dimensions suggests that we may need to consider a greater differentiation among the various economic and technological outcomes we examined, to more closely capture the differences among the various change orientation dimensions.

Beyond these relationships, two relationships that were not hypothesized were also significant. Specifically, routine seeking was positively related to LGB rights and to the proportion of women in parliament (Table 4). These relationships, along with the hypothesized relationships with indicators of economic and technological development, suggest that this dimension may more broadly reflect societal progress. As societies develop, individuals in these societies become more satisfied with their lives and therefore wish to maintain their routines.

Following these tests, we wished to test for the robustness of the effects while controlling for country-level demographics and the other relevant cultural dimensions. We therefore conducted partial correlation analyses for the relationships that were supported, this time controlling for (i.e. partialing out) country-mean sex and age, and the cultural dimensions that were significantly correlated with each of the change orientation dimensions (Table 3). These analyses are presented in the supplemental material (<http://osf.io/a3gnj>). Overall, the analyses are supportive of the incremental validity of the cultural change orientation in predicting country-level change outcomes. Most of the effects were maintained while controlling for the country-mean

¹²Because in Hypotheses 1 and 3b economic development was the predicted outcome, one would not ordinarily control for an index of economic development while testing such a prediction. We nevertheless conducted additional analyses controlling for GDP while predicting the remaining indicators of economic and technological change, namely, mobile cellular subscriptions, patent applications, R&D expenditures, and high-tech exports. For cultural rigidity, the effect on R&D expenditures, and for routine seeking, the three effects on mobile cellular subscriptions, R&D expenditures, and high-tech exports, remained significant while controlling for GDP.

Table 4. Spearman correlations between change orientation dimensions and country-level outcomes

Variable	Cultural rigidity	Affective reactance	Routine seeking
1. GDP	-.38 [†]	-.12	.21
2. Mobile cellular subscriptions	-.05	.07	.41*
3. Number of patent applications	-.45*	.02	.19
4. Research and development expenditure	-.47*	-.07	.62**
5. High-technology exports	-.42*	-.08	.45*
6. Entrepreneurial activity ^a	-.14	-.24	.67**
7. Proportions of women in parliament ^a	-.09	-.39*	.54**
8. Alternative and nuclear energy	.06	-.48*	-.03
9. LGB rights ^b	.04	-.54*	.66**
10. Subjective well being	-.36	-.39*	.56**

Note. LGB = lesbian, gay, and bisexual.

^aScores for this variable were only available for 26 countries.

^bScores for LGB rights were only available for the 16 European countries in our sample.

[†] $p = .052$. * $p < .05$. ** $p \leq .01$.

demographics and for most of the other cultural dimensions. The fact that in all cases the effects of the change orientation dimensions maintained their sign, and in most cases maintained a meaningful magnitude, suggests that loss of effect significance may have resulted from the loss of statistical power with the addition of the controls. This is particularly plausible in tests with cultural dimensions for which data were only available for a subset of our countries. One caveat is with respect to Schwartz's hierarchy dimension, which shows significant overlap with affective reactance and stronger effects as a predictor of the environmental and social change indicators on which we focused. Neither of the extant cultural frameworks, however, performed as well or as consistently as the cultural change orientation in predicting all of the change outcomes. Our findings are therefore largely consistent with our hypotheses and demonstrate the predictive validity of cultural change orientation. We turn in the next section to further test the predictive validity of the construct with another set of outcomes.

Predicting growth in country-level change indexes over time

Hypotheses

The degree of a society's growth and development is not static and may itself change over time. Accordingly, a society's orientation toward change will be linked not only with changes at a given point in time but also with the rate at which such changes develop. Thus, beyond the manifestation of societies' change orientation in the various country-level indexes of change that we assessed above, one can also expect them to manifest in the rate at which these indexes change. Based on the theoretical rationale we developed in the previous section, we also propose a parallel set of hypotheses about the relationships between the three change orientation dimensions and the rate of change in the economic and technological, and the social and environmental change indexes. Specifically, we raise the following hypotheses:

Hypothesis 4: Cultural rigidity will be negatively associated with indexes of growth, as represented in the rate of growth in the above indexes over time.

Hypothesis 5: Cultural affective reactance will be negatively associated with indexes reflecting changes in countries' social order, as represented in the rate of change in the above indexes over time.

Hypothesis 6: Cultural routine seeking will be positively associated with indexes of growth, as represented in national indexes of technological and economic development.

Results and discussion. To test Hypotheses 4, 5, and 6 we used hierarchical linear modelling (Bryk, Raudenbush, & Congdon Jr., 1996). The cultural change orientation dimensions were level-2 variables and year was a level-1 variable. Specifically, we tested a slopes-as-outcomes model, whereby countries' change orientation dimensions are set to predict the level-1 slope of the relationship between the year and the outcome index (e.g. mobile subscriptions and patent applications). Results for Hypotheses 4, 5, and 6 are presented in Tables 5, 6, and 7, respectively. The interaction terms are those on which we focus for testing our hypotheses.

As can be seen in Table 5, Hypothesis 4 was supported for four of the five outcomes. With the exception of mobile cellular subscriptions, cultural rigidity was negatively associated with the rate of change in the economic and technological development outcomes. To delineate the interaction patterns that emerged, we plotted the interactions for the four variables for which the interaction was significant. The plots are presented in Figure 3. As hypothesized, in all four cases, the slope was steeper, indicating a higher rate of growth, when cultural rigidity was low.

As can be seen in Table 6, testing Hypothesis 5, the interaction of affective reactance and year was significant for the outcome of alternative and nuclear energy but not for the ratio of women in parliament. Affective reactance was negatively associated with the rate of increase in the use of alternative and nuclear energy. A graph of this interaction is presented in Figure 4. Contrary to our hypothesis, however, rate of change in the use of alternative and nuclear energy use was higher when affective reactance was high. In other words, as affective reactance increased, so did this

Table 5. Results of hierarchical linear modelling analyses with cultural rigidity predicting country-level outcomes

Variable ^a	GDP γ (SE)	Mobile cellular subscriptions (per 100 people) γ (SE)	Number of patent applications (/100) γ (SE)	Research and development expenditure (% of GDP) γ (SE)	High-technology exports (in US \$1000 M) γ (SE)
Level-1 predictors					
Intercept	109646.42* (41396.88)	51.83** (2.95)	260.34 [†] (129.48)	1.28** (.17)	25.54** (8.27)
Year	5741.23** (445.07)	6.59** (.12)	8.61** (1.42)	.03** (.00)	1.75** (.21)
Level-2 predictors					
Cultural rigidity	-265132.55 (182912.91)	-11.94 (13.03)	-1269.11* (572.14)	-1.47 [†] (.74)	-62.57 (36.57)
Cross-level interaction					
CR × Year	-12622.06** (1953.05)	-.56 (.53)	-29.67** (6.44)	-.03* (.01)	-3.41** (.96)
R ^{2b}	.10	.76	.16	.14	.11

Note. CR, cultural rigidity.

^aPredictors were grand-mean centered.

^bR² values, which are not provided in the Hierarchical Linear Modeling analysis, are calculated using ordinary least squares regressions (with change orientation dimension scores duplicated and assigned down to each of the years), with year, change orientation dimension, and their product as predictors. Although, given the nested nature of our data, these analyses violate the assumed independence of the error terms (which results in biased parameter tests), the overall R² values provide an unbiased assessment of the percentage of variance explained and may be more comparable with effect sizes reported in other studies (Hofmann, Morgeson, & Gerras, 2003).

[†]p < .1. *p < .05. **p < .01.

Table 6. Results of hierarchical linear modelling analyses with affective reactance predicting country-level outcomes

Variable ^a	Proportions of women in parliament γ (SE)	Alternative and nuclear energy (% of total energy use) γ (SE)
Level-1 predictors		
Intercept	15.79** (1.59)	11.13** (1.68)
Year	.52** (.03)	.05** (.02)
Level-2 predictors		
Affective reactance	-18.82* (7.78)	-24.82** (7.59)
Cross-level interaction		
AR × Year	-.20 (.13)	.45** (.07)
R ^{2b}	.25	.29

Note. AR, affective reactance.

^aPredictors were grand-mean centered.

^bR² values are calculated using ordinary least squares regressions (with change orientation dimension scores duplicated and assigned down to each of the years), with year, change orientation dimension, and their product as predictors. Although, given the nested nature of our data, these analyses violate the assumed independence of the error terms (which results in biased parameter tests), the overall R² values provide an unbiased assessment of the percentage of variance explained and may be more comparable with effect sizes reported in other studies (Hofmann et al., 2003).

*p < .05. **p < .01.

outcome's growth over time. One possible explanation for this finding is a ceiling effect of those countries that are low on affective reactance and already exhibit high usage of these energy forms, as corresponds with the particular pattern exhibited in Figure 4. The non-significant finding when predicting the proportion of women in parliament could be explained by the fact that parliament membership does not actually change annually, thus restricting the variance of this variable in our data.

Finally, as can be seen in Table 7, interaction terms with routine seeking for four of the five outcomes were significant, mostly supporting Hypothesis 6. With the exception of research and development expenditure, routine seeking was positively associated with the rate of growth in all of the outcomes. We present graphs of the significant interaction effects in Figure 5. As hypothesized, in all four cases, the slope was steeper, indicating a higher rate of growth, when

routine seeking was high. The output for these analyses is available at <http://osf.io/a3gnj>.

These findings thus provide some further support for the predictive validity of cultural change orientation. We discuss in the following section the meaningfulness of our findings and offer further interpretations for those findings that were not consistent with our expectations.

GENERAL DISCUSSION

Summary of findings

We started out from the personality concept of dispositional resistance to change on the basis of which we establish a concept of societal change orientation, examined its dimensionality, and explored its relationships with country-level

Table 7. Results of hierarchical linear modelling analyses with routine seeking predicting country-level outcomes

Variable ^a	GDP γ (SE)	Mobile cellular subscriptions (per 100 people) γ (SE)	Number of patent applications (/100) γ (SE)	Research and development expenditure (% of GDP) γ (SE)	High-technology exports (in US \$1000 M) γ (SE)
Level-1 predictors					
Intercept	109646.41* (42401.36)	51.85** (2.61)	260.20 (139.87)	1.28** (.16)	25.82** (8.03)
Year	5741.02** (445.07)	6.59** (.12)	8.60** (1.40)	.03** (.00)	1.66** (.20)
Level-2 predictors					
Routine seeking	12785.08 (140124.13)	25.15** (8.62)	341.45 (462.25)	1.26* (.54)	56.79* (26.54)
Cross-level interaction					
RS \times Year	7838.90** (1482.42)	1.40** (.40)	27.92** (4.64)	-.00 (.01)	4.46** (.66)
R ^{2b}	.06	.79	.02	.17	.15

Note. RS, routine seeking.

^aPredictors were grand-mean centered.

^bR² values are calculated using ordinary least squares regressions (with change orientation dimension scores duplicated and assigned down to each of the years), with year, change orientation dimension, and their product as predictors. Although, given the nested nature of our data, these analyses violate the assumed independence of the error terms (which results in biased parameter tests), the overall R² values provide an unbiased assessment of the percentage of variance explained and may be more comparable with effect sizes reported in other studies (Hofmann et al., 2003).

* $p < .05$. ** $p < .01$.

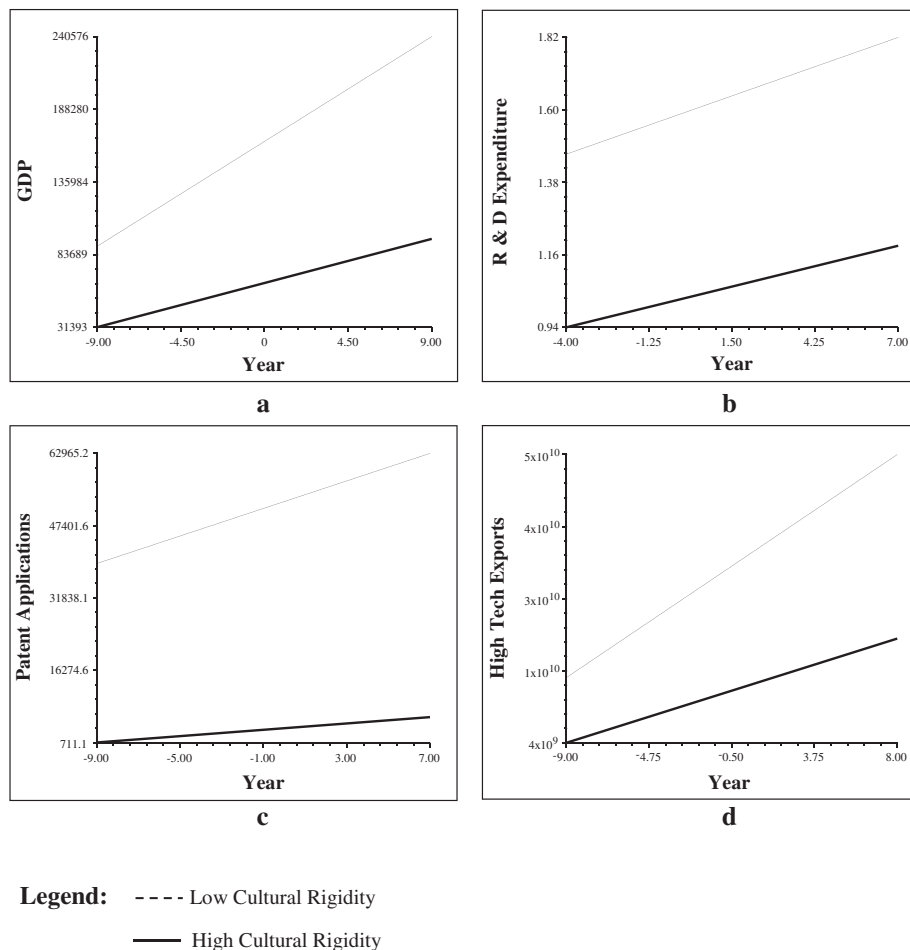
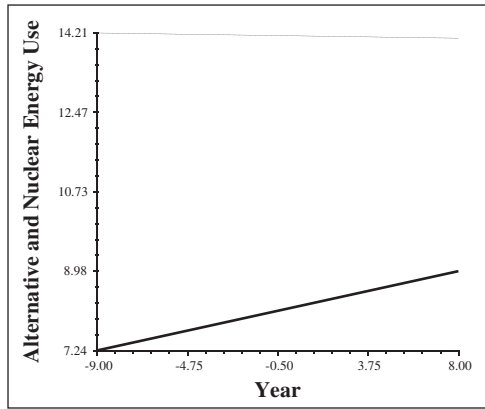


Figure 3. (a–d) Moderation effect of cultural rigidity on the relationship between year and economic and technological outcomes.

indexes of change. Our goal was to identify the cultural characteristics that predispose societies toward stability versus change and use them to predict societal and aggregated individual indexes of change. We identify three distinct aspects

of the change orientation—cultural rigidity, affective reactance, and cultural routine seeking—each of which is associated with a distinct set of cultural values and is differentially related to societal outcomes. The three dimensions are

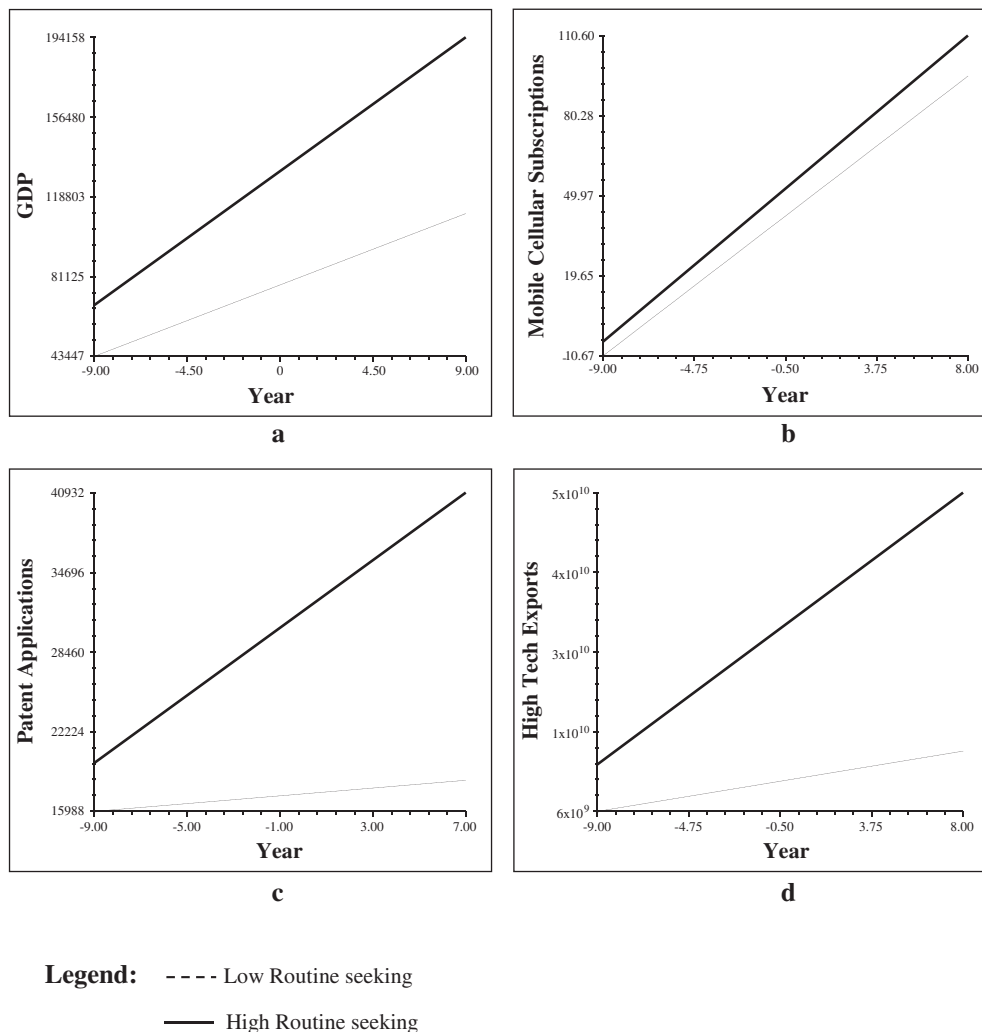


Legend: - - - Low Affective Reactance
 — High Affective Reactance

Figure 4. Moderation effect of affective reactance on the relationship between year and alternative and nuclear energy use.

distinct from one another, with only cultural rigidity and cultural routine seeking showing a moderate, negative, correlation with each other. This is unlike the structure of the individual-level concept of dispositional resistance to change, in which all of the dimensions are positively correlated with one another. Our findings thus highlight the fact that the aggregation of personality concepts to the societal level does not necessarily maintain their structure or meanings.

Beyond the establishment of the concept's structure and nomological net, we incorporated several theoretical frameworks (e.g. organizational structure, Brown & Eisenhardt, 1997; unlearning, Hedberg, 1981; cultural change, Inglehart, 2008; and system justification theory, Jost & Banaji, 1994) to establish hypotheses between the three change orientation dimensions and several important outcomes, including distinct types of societal change. As our findings demonstrate, cultural rigidity captures a societal inaction and reluctance to change beliefs, norms, and procedures and is negatively associated with indexes of economic



Legend: - - - Low Routine seeking
 — High Routine seeking

Figure 5. (a–d) Moderation effect of routine seeking on the relationship between year and economic and technological outcomes.

and technological development. Affective reactance captures a societal vigilance and anxiety about change and is negatively related to national well-being and indexes of social and environmental change. Cultural routine seeking captures a societal emphasis on the voluntary adoption of structure and routines, which is positively associated with national well-being and indexes of economic and technological development.

Findings for cultural rigidity and cultural routine seeking included not only relationships with the enduring (aggregated across years) development indexes but for most indexes also with their rate of growth. For affective reactance, we found support for our hypotheses only with the enduring social-change indexes but not for their rate of growth. This difference in findings across the three dimensions highlights both the distinct nature of the three change orientation dimensions as well as the distinct nature of the change outcomes we studied. Most of our findings were maintained while controlling for extant cultural dimensions. With the exception of Schwartz's (2006) hierarchy dimension, which showed significant overlap with affective reactance and stronger effects in predicting most of the social and environmental change indexes, cultural change orientation was superior at predicting all of the change indexes. Neither of the extant cultural frameworks, including that of Schwartz, performed as well or as consistently as the cultural change orientation in predicting all of the change outcomes. Thus, whereas specific dimensions of extant cultural frameworks may be useful for predicting specific types of change-related outcomes, our framework, which was developed with a focus on the notion of change, more directly and fully captures those elements in cultures that pertain to change versus stability.

As described above, we also found positive relationships that were not hypothesized between routine seeking and indexes of social change (i.e. proportion of women in parliament and LGB rights). In retrospect, these findings make sense given that the two indicators of social change involve structures (e.g. laws and the structure of parliament) that highlight the importance of personal freedom and rights, which corresponds with our understanding of cultural routine seeking as a societal emphasis on structures that maintain individuals' freedom. Furthermore, these relationships also correspond with another rationale that we presented, whereby routine seeking may result from the developmental outcomes rather than only predict them.

In fact, the negative relationships we found between affective reactance and social outcomes could be similarly interpreted with this alternative causal direction in mind. Namely, in addition to the effect that vigilance in society might have on social progress, social progress may also influence the degree to which individuals feel the need to be vigilant (e.g. Wilkinson, 1999). Specifically, increased social progress may attenuate society members' sense of threat and overall apprehension. Although our supported predictions of societies' rate of development (Hypotheses 4 and 6) correspond with the former causal direction (i.e. that the change orientation dimensions explain the societal outcomes), our data do not allow for causal inferences, and in

reality, both directions of causality are likely to exist. Indeed, many studies have looked into the possibility that over time, ecological changes influence societies' cultural orientations, thus focusing on the impact of ecological change on culture (e.g. Chiu et al., 2011; Grossmann & Varnum, 2015; Inglehart, 1997; Oishi & Graham, 2010; van Herk & Poortinga, 2012). It is therefore likely that while a society's change orientation contributes to ecological changes, it is also influenced by them. Future research with longitudinal data, not only for the outcomes but also for the change orientation dimensions, could offer greater insights on this point.

Theoretical contributions

Overall, our findings highlight the different means through which societies promote stability and provide a meaningful cultural framework for differentiating among societies. In line with arguments about the role of culture in societal regulation (e.g. Matsumoto et al., 2008), the cultural dimensions we identified may not only reflect but also contribute to the establishment of societal norms and the regulation of behaviour with respect to stability and change. Cultural rigidity represents the use and application of established schemas rather than the pursuit and development of new ones. Affective reactance reflects the role of an apprehension from social change. Cultural routine seeking represents the adoption of structure and routines that allow for societies' prosperity. The differential relationships of these dimensions with values in extant cultural frameworks and with societal outcomes emphasize the uniqueness of our framework for predicting social phenomena.

Although this has yet to be tested empirically, we propose that the change orientation dimensions may also be meaningful for understanding how individuals respond to specific change situations. For example, several of our societal change indexes consisted of aggregations of individual-level behaviours, such as mobile phone subscriptions, employees' entrepreneurial activity, and well-being. As such, they complement extant research about the impact of cultural factors on individuals' responses to cultural change (Chen et al., 2016). Given, for example, the negative relationships between cultural rigidity and indexes of technological development, responses to changes that have to do with the introduction of new technology may tend to be unfavourable in societies that are high on cultural rigidity. Contrarily, given the positive relationships between cultural routine seeking and these indexes, responses to such changes, when introduced in high routine seeking societies, may tend to be favourable. With respect to cultural affective reactance, responses to changes in societies that are high on this dimension may be characterized by a high degrees of anxiety and elevated levels of stress. These relationships could be tested in future research of individuals' responses to specific changes, either through the collection of new data to directly tap these variables or by meta-analysing previous research on responses to changes, such as in those often introduced and studied in

organizations, taking into consideration the cultures in which data were collected in each study.

Our framework also points to dimensions of societal changes, differentiating between economic and technological changes as one type, and social and environmental change as another, with divergent implications and different patterns of temporal development for each. Although there are numerous studies of different kinds of changes, including social change (e.g. Greenfield, 2009), organizational change (e.g. Oreg & Sverdlik, 2011; Rafferty, Jimmieson, & Armenakis, 2013), globalization (Chen et al., 2016), developmental changes in the life cycle (e.g. Bardi & Ryff, 2007; Doss, Rhoades, Stanley, & Markman, 2009), cultural transitions (e.g. Cemalcilar & Falbo, 2008; Ethier & Deaux, 1994), and political and societal changes (e.g. Sloutsky & Searle-White, 1993; Wiczorkowska & Burnstein, 2001), each of these has been studied separately with no integration across types of change. Given the different pattern of findings we obtained for different types of change, future research should aim to identify the core dimensions by which changes may be classified.

Limitations and additional future direction

One limitation of our studies is the fact that our samples are not representative of the national cultures to which they belong. Given the difficulty of obtaining representative samples from numerous countries, we relied on matched-samples, which although comparable, are nevertheless not ideal when aiming to characterize a societal dimension. Schwartz's (1992, 2005) studies of values, however, provide some evidence for the external validity of a matched-sample design such as the one we used, whereby findings with undergraduate samples highly corresponded with those obtained with representative national samples. Nevertheless, it would be valuable to replicate our findings with representative samples to more conclusively establish the change orientation framework we propose here.

Another limitation of our sample is that although it consists of more than 6000 participants, from 27 countries, including longitudinal outcome data for each country, 27 is nevertheless a modest sample size for our country-level analyses. Furthermore, although our sample includes a rather diverse set of countries, these do not represent all extant national cultures, and despite the representation of most continents, none of our samples were from Africa. Moreover, whereas they capture diversity across geographical regions, they capture only a limited degree of variation within geographical regions. The inclusion of additional countries, both in unrepresented global regions and within those that we did sample, would be necessary for determining the robustness of the change orientation dimensionality and interpretation we offer.

A more general limitation of studies in which comparisons are made between country-level averages of individuals' scores involves various response style and item biases, which may lead to inadequate comparability of country-level samples (He et al., 2017). Some of the problems that may result from these biases have been tested in

the earlier work on the dispositional resistance to change trait, in which its scale's measurement invariance was established across 17 countries (Oreg et al., 2008, 2010), suggesting that the scale's items take on the same psychological meanings across cultures. In addition, He et al. (2017) recently tested a set of procedures that could potentially resolve such biases and increase sample comparability. Of the procedures they tested, three proved to be the most promising for alleviating the cross-cultural incomparability, one of which—treating data as ordered categories—could be applied with our data. We therefore converted our data to ordered categories and retested all of the relationships between the three change orientation dimensions and the other cultural dimensions and country-level change indexes. Virtually, all of our results remained intact (see these results in <http://osf.io/a3gnj>). Although neither this nor any other procedure could entirely resolve all comparability issues, the findings from these supplemental analyses nevertheless alleviate such concerns and increases our confidence in the validity of our findings.

Following the establishment of the construct of cultural change orientation, future research could test our propositions about the mechanisms through which the three change orientation dimensions are formed and maintained. Although our findings correspond with the existence of such mechanisms, we did not test them directly. These can be explicitly addressed in future research through studies that compare how individuals from different cultures experience change, through a more explicit examination of the link between stability and change, and through the examination of objective means (e.g. sanctions, punishments) with which societies may instil fear of change among their members.

CONCLUSIONS

We developed the concept of cultural change orientation, which comprises three dimensions. Cultural rigidity involves a societal inaction and reluctance to change beliefs, norms, and procedures; cultural affective reactance involves a societal vigilance and anxiety about change; and cultural routine seeking involves a societal emphasis on the voluntary adoption of structure and routines. The three dimensions show meaningful relationships with cultural dimensions from existing frameworks (i.e. Schwartz's, Hofstede's, GLOBE, Inglehart, and Big Five country profiles) and are nevertheless distinct from them. The dimensions proved to be useful for predicting a variety of country-level change indexes and in several cases also the rate of growth of these indexes. Cultural rigidity and cultural routine seeking are both linked with countries' economic and technological development, such that cultural rigidity is negatively, and routine seeking positively, associated with them. Affective reactance is negatively associated with countries social and environmental changes.

In line with recent investigations of country profiles of the five-factor model, our framework and the process

through which it was developed demonstrate the usefulness of personality constructs for uncovering and better understanding societal cultural phenomena. As our findings demonstrate, however, the transition from an individual-level personality trait to a cultural dimension is not always straightforward and may involve changes in both the dimensionality and meanings of the construct. As such, our findings join extant caveats about the mere aggregation of concepts and call for a more elaborate process for establishing and validating culture-level constructs.

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- (2) I'll take a routine day over a day full of unexpected events any time.
 - (3) I like to do the same old things rather than try new and different ones.
 - (4) Whenever my life forms a stable routine, I look for ways to change it.*
 - (5) I'd rather be bored than surprised.
 - (6) If I were to be informed that there's going to be a significant change regarding the way things are done at school, I would probably feel stressed.
 - (7) When I am informed of a change of plans, I tense up a bit.
 - (8) When things don't go according to plans, it stresses me out.
 - (9) If one of my professors changed the grading criteria, it would probably make me feel uncomfortable even if I thought I'd do just as well without having to do extra work.
 - (10) Changing plans seems like a real hassle to me.
 - (11) Often, I feel a bit uncomfortable even about changes that may potentially improve my life.
 - (12) When someone pressures me to change something, I tend to resist it even if I think the change may ultimately benefit me.
 - (13) I sometimes find myself avoiding changes that I know will be good for me.
 - (14) I often change my mind.*
 - (15) I don't change my mind easily.
 - (16) Once I've come to a conclusion, I'm not likely to change my mind.
 - (17) My views are very consistent over time.

*These items are reverse coded.

APPENDIX A: RESISTANCE TO CHANGE SCALE ITEMS

- (1) I generally consider changes to be a negative thing.

APPENDIX B: YEARS FOR WHICH OUTCOME DATA WERE AVAILABLE

Country	GDP	Mobile cellular subscriptions (per 100 people)	Number of patent applications	Research and development expenditure (% of GDP)	High-technology exports (in US\$)	Proportions of women in parliament	Alternative and nuclear energy (% of total energy use)
Australia	1990–2012	1990–2011	1995–2010	1996, 1998, 2000, 2002, 2004, 2006, 2008	1990–2010	1990, 1997–2000, 2002–2012	1990–2011
Brazil	1990–2012	1990–2011	1990–2010	1996–2008	1990–2010	1990, 1997–2012	1990–2010
Canada	1990–2012	1990–2011	1990–2010	1996–2009	1990–2010	1990, 1997–1999, 2001–2012	1990–2011
Chile	1990–2012	1990–2011	1990–2010	1996–2008	1990–2010	1997–2012	1990–2011
China	1990–2012	1990–2011	1990–2010	1996–2008	1992–2010	1990, 1998–2012	1990–2010
Croatia	1990–2012	1990–2011	1992–2010	1999–2009	1992–2010	1997–2012	1990–2010
Czech	1990–2012	1990–2011	1993–2010	1996–2009	1993–2010	1997–2012	1990–2011
Germany	1990–2012	1990–2011	1990–2010	1996–2009	1990–2010	1997–2012	1990–2011
Greece	1990–2012	1990–2011	1990–2010	1997, 1999, 2001, 2003–2007	1990–2010	1990, 1997–2012	1990–2011
Hong Kong	1990–2012	1990–2011	1990–2010	1998–2009	1990–2010	—	1990–2010
Iran	1990, 1993–2012	1990–2011	1990–2006	1998–2008	1997–2006, 2010	1997–2012	1990–2010
Israel	1990–2012	1990–2011	1990–2010	1996–2009	1990–2010	1990, 1997–2012	1990–2011
Japan	1990–2012	1990–2011	1990–2010	1996–2008	1990–2010	1990, 1997–2012	1990–2011
Lithuania	1990–2012	1990–2011	1991–2010	1996–2009	1992, 1994–2010	1997–2012	1990–2010
Mexico	1990–2012	1990–2011	1990–2010	1996–2007	1990–2010	1990, 1997–2012	1990–2011
Netherlands	1990–2012	1990–2010	1990–2009	1996–2009	1990–2010	1990, 1997–2012	1990–2011
Norway	1990–2012	1990–2011	1990–2010	1997, 1999, 2001–2009	1990–2010	1990, 1997–2012	1990–2011
Poland	1990–2012	1990–2011	1990–2010	1996–2010	1992–2010	1990, 1997–2012	1990–2011
Portugal	1990–2012	1990–2011	1990–2010	1996–2009	1990–2010	1990, 1997–2012	1990–2011
Russia	1990–2012	1990–2011	1991–2010	1996–2009	1996–2010	1990, 1997–1998, 2000–2012	1990–2010
Slovakia	1990–2012	1990–2011	1993–2010	1996–2009	1994–2010	1997–2012	1990–2011
Slovenia	1990–2012	1990–2011	1991–2010	1996–2009	1992–1993, 1995–2010	1997–1999, 2001–2012	1990–2011
Spain	1990–2012	1990–2011	1990–2010	1996–2009	1990–2010	1990, 1997–2012	1990–2011
Turkey	1990–2012	1990–2011	1990–2009	1996–2009	1990–2010	1990, 1997–2001, 2003–2012	1990–2011
Ukraine	1990–2012	1990–2011	1992–2010	1996–2009	1996–2010	1997, 1999–2001, 2003–2012	1990–2010
UK	1990–2012	1990–2011	1990–2010	1996–2009	1990–2010	1990, 1997–2012	1990–2011
US	1990–2012	1990–2011	1990–2010	1996–2008	1990–2010	1990, 1997–1999, 2001–2012	1990–2011