protected sugar beet seedlings from infection by *R. solani* (fig. S7). Random transposon mutagenesis generated two mutants of strain SH-C52 with no in vitro activity against *R. solani*. The single transposon insertions were mapped to a nonribosomal peptide synthetase (NRPS) gene with 69% sequence identity to *syrE*, the gene of the syringomycin-syringopeptin (*syr-syp*) biosynthetic pathway in *Pseudomonas syringae* pv. *syringae* (*9*). NRPS-mutant O33 colonized the rhizosphere to the same extent as its parental strain SH-C52, but did not protect sugar beet seedlings from fungal infection (fig. S7). Subsequent genetic analyses revealed that the putative biosynthetic pathway consisted of two gene clusters, designated *thaAB* and *thaC1C2D*, which were predicted to encode a nine–amino acid chlorinated lipopeptide (fig. S8).

The multifaceted approach adopted in this study, linking culture-independent and culture-dependent analyses, shows that plants, like mammals and insects (*10*–*12*), can rely on specific constituents of the microbial community for protection against pathogen infections. We showed that the γ-Proteobacteria, and specifically members of the Pseudomonadaceae, protect plants from fungal infection through the production of a putative chlorinated lipopeptide encoded by NRPS genes. Functional analysis further revealed a significant difference in plant disease suppression between haplotypes SH-A and SH-C (fig. S7), suggesting that in situ antifungal activity is governed by individual members of this bacterial taxon. Next to the Pseudomonadaceae, several other bacterial taxa were found in this study to be associated with disease suppressiveness (Fig. 3). Some of these taxa, including the Burkholderiaceae, Xanthomonadales, and Actinobacteria, harbor genera and species with activity against plant pathogenic fungi, including *R. solani* (*13*). These findings suggest that the complex phenomenon of disease suppressiveness of soils cannot simply be ascribed to a single bacterial taxon or group, but is most likely governed by microbial consortia. The observation that bacterial strains, which lack activity against pathogens when tested alone, can act synergistically when part of microbial consortia (*14*) further exemplifies the complexity of adopting Koch's postulates for identification of microorganisms involved in disease suppressiveness of soils. The bacteria and biosynthetic pathway identified here provide a set of microbial and genetic markers to elucidate whether and how plants recruit beneficial soil microorganisms for protection against infections.

References and Notes

1. H. Marschner, *Mineral Nutrition of Higher Plants* (Academic Press, London, ed. 2, 1995).
2. T. Bisseling, J. L. Dangl, P. Schulze-Lefert, *Science* **324**, 691 (2009).
3. R. J. Cook *et al.*, *Proc. Natl. Acad. Sci. U.S.A.* **92**, 4197 (1995).
4. D. Haas, G. Défago, *Nat. Rev. Microbiol.* **3**, 307 (2005).
5. D. M. Weller, J. M. Raaijmakers, B. B. M. Gardener, L. S. Thomashow, *Annu. Rev. Phytopathol.* **40**, 309 (2002).
6. T. C. Hazen *et al.*, *Science* **330**, 204 (2010).
7. K. M. DeAngelis *et al.*, *ISME J.* **3**, 168 (2009).
8. P. D. Schloss, J. Handelsman, *PLOS Comput. Biol.* **2**, e92 (2006).
9. H. Feil *et al.*, *Proc. Natl. Acad. Sci. U.S.A.* **102**, 11064 (2005).
10. R. E. Ley *et al.*, *Science* **320**, 1647 (2008).
11. J. Qin *et al.*, MetaHIT Consortium, *Nature* **464**, 59 (2010).
12. J. J. Scott *et al.*, *Science* **322**, 63 (2008).
13. J. Postma, R. W. A. Scheper, M. T. Schilder, *Soil Biol. Biochem.* **42**, 804 (2010).
14. P. Garbeva, M. W. Silby, J. M. Raaijmakers, S. B. Levy, W. D. Boer, *ISME J.* (2011).

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Supporting Online Material

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Materials and Methods
Figs. S1 to S8
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Differences Between Tight and Loose Cultures: A 33-Nation Study

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With data from 33 nations, we illustrate the differences between cultures that are tight (have many strong norms and a low tolerance of deviant behavior) versus loose (have weak social norms and a high tolerance of deviant behavior). Tightness-looseness is part of a complex, loosely integrated multilevel system that comprises distal ecological and historical threats (e.g., high population density, resource scarcity, a history of territorial conflict, and disease and environmental threats), broad versus narrow socialization in societal institutions (e.g., autocracy, media regulations), the strength of everyday recurring situations, and micro-level psychological affordances (e.g., prevention self-guides, high regulatory strength, need for structure). This research advances knowledge that can foster cross-cultural understanding in a world of increasing global interdependence and has implications for modeling cultural change.

How "other" cultures differ from one's own has piqued the curiosity of scholars and laypeople across the centuries. As long ago as 400 B.C.E., Herodotus documented a wide variety of cultural practices that he observed in his travels in *The Histories* (*1*). Only in the past few decades have scientists begun to move beyond descriptive accounts of cultural differences to empirically assess ways in which national cultures vary. We examine a neglected source of cultural variation that is dominating the geo-political landscape and has the potential to be a major source of cultural conflict: the difference between nations that are "tight"—have strong norms and a low tolerance of deviant behavior—and those that are "loose"—have weak norms and a high tolerance of deviant behavior.

Early anthropological research showed the promise of this distinction. In his study of 21 traditional societies, Pelto (*2*) documented wide variation in the expression of and adherence to social norms. The Hutterites, Hanno, and Lubara were among the tightest societies, with very strong norms and severe sanctions for norm violation, whereas the Kung Bushman, Cubeo, and the Skolt Lapps were among the loosest societies, with ambiguous norms and greater permissiveness for norm violation. Pelto speculated that these societies may have different ecologies, with tight societies having a higher population per square mile and a higher dependence on crops as compared to loose societies. Later research indeed showed that agricultural societies (e.g., the Temne of Sierra Leone), which require strong norms to foster the coordination necessary to grow crops for survival, had strict child-rearing practices and children who were high

on conformity. Hunting and fishing societies (e.g., the Inuit) had lenient child-rearing practices and children who were low on conformity (*3*, *4*).

Despite evidence of the importance of this contrast in traditional societies, there exists no insight into how tightness-looseness operates in modern nations. The goal of this research is to fill this void. Drawing on theorizing in cultural psychology (*5*, *6*), we propose that tightness-looseness is part of a complex, loosely integrated system that involves processes across multiple levels of analysis (Fig. 1). We theorize that the strength of social norms and tolerance of deviant behavior—the core distinction between tight and loose cultures—is afforded by numerous distal ecological and human-made societal threats and societal institutions and practices. The strength of social norms and tolerance of deviant behavior is further reflected and promoted in the predominance of strong versus weak situations that are recurrent in everyday local worlds, and is reinforced through psychological processes that are attuned to situational requirements. We provide an empirical test that shows how ecological, historical, and institutional factors, along with everyday situations and psychological processes, together constitute cultural systems.

We predict that tightness-looseness is afforded by a broad array of ecological and human-made societal threats (or lack thereof) that nations have historically encountered (*4*, *7*). Ecological and human-made threats increase the need for strong norms and punishment of deviant behavior in the service of social coordination for survival—whether it is to reduce chaos in nations that have high population density, deal with resource scarcity, coordinate in the face of natural disasters, defend against territorial threats, or contain the spread of disease. Nations facing these particular challenges are predicted to develop strong norms and have low tolerance of deviant behavior to enhance order and social coordination to effectively deal with such threats. Nations with few ecological and human-made threats, by contrast, have a much lower need for order and social coordination, affording weaker social norms and much more latitude (*8*).

The strength of social norms and tolerance of deviant behavior is also afforded by and reflected in prevailing institutions and practices. Institutions in tight nations have narrow socialization that restricts the range of permissible behavior, whereas institutions in loose nations encourage broad socialization that affords a wide range of permissible behavior (*9*). Relative to loose nations, tight nations are more likely to have autocratic governing systems that suppress dissent, to have media institutions (broadcast, paper, Internet) with restricted content and more laws and controls, and to have criminal justice systems with higher monitoring, more severe punishment (e.g., the death penalty), and greater deterrence and control of crime. Tight nations will also be more religious, thereby reinforcing adherence to moral conventions and rules that can facilitate social order and coordination (*10*). Challenges to societal institutions (e.g., demonstrations, boycotts, strikes) will be much less common in tight nations than in loose ones. These institutions and practices simultaneously reflect and support the strength of norms and tolerance of deviance that exists in nations.

Tightness-looseness is manifested not only in distal ecological, historical, and institutional contexts but also in everyday situations in local worlds (e.g., at home, in restaurants, classrooms, public parks, libraries, the workplace) that individuals inhabit (*5*, *6*). We theorize that tightness-looseness is reflected in the predominance of strong versus weak everyday situations (*11*, *12*). Strong situations have a more restricted range of appropriate behavior, have high censuring potential, and leave little room for individual discretion. Weak situations place few external constraints on individuals, afford a wide range of behavioral options, and leave much room for individual discretion. Situational strength has been long discussed among psychologists, sociologists, and anthropologists (*11*–*14*) but has yet to be linked to cultural variation. Tight nations are expected to have a much higher degree of situational constraint which restricts the range of behavior deemed appropriate across everyday situations (e.g., classrooms, libraries, public parks, etc.). By contrast, loose nations are expected to have a much weaker situational structure, affording a much wider range of permissible behavior across everyday situations. The strength (or weakness) of everyday recurring situations within nations simultaneously reflects and supports the degree of order and social coordination in the larger cultural context.

We further theorize that there is a close connection between the strength (versus weakness) of everyday situations and the chronic psychological processes of individuals within nations. In this view, individuals' psychological processes become naturally attuned to, and supportive of, the situational demands in the cultural system (*15*). Individuals who are chronically exposed to stronger (versus weaker) situations in their everyday local worlds have the continued subjective experience that their behavioral options are limited, their actions are subject to evaluation, and there are potential punishments based on these evaluations. Accordingly, individuals in nations with high situational constraint will have self-guides that are more prevention-focused (*16*) and thus will be more cautious (concerned with avoiding mistakes) and dutiful (focused on behaving properly), and will have higher self-regulatory strength (higher impulse control) (*17*), a higher need for structure (*18*), and higher self-monitoring ability (*19*, *20*). Put simply, the higher (or lower) degree of social regulation that exists at the societal level is mirrored in the higher (or lower) amount of self-regulation at the individual level in tight and loose nations, respectively. Such psychological processes simultaneously reflect and support the strength of social norms and tolerance of deviance in the larger cultural context.

To provide a systematic analysis of tightness-looseness in modern societies, we gathered data

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from 6823 respondents across 33 nations (*20*). Sample characteristics are shown in Table 1 (*21*). In each nation, we surveyed individuals from a wide range of occupations as well as university students. Data on ecological and historical threats and societal institutions were collected from numerous established databases (*20*). When possible, historical data were included (e.g., population density in 1500, history of conflict 1918–2001, historical prevalence of pathogens).

Tightness-looseness (the overall strength of social norms and tolerance of deviance) was measured on a six-item Likert scale that assessed the degree to which social norms are pervasive, clearly defined, and reliably imposed within nations. Example scale items include "There are many social norms that people are supposed to abide by in this country," "In this country, if someone acts in an inappropriate way, others will strongly disapprove," and "People in this country almost always comply with social norms." The results show strong support for the reliability and validity of the measure (*20*). Ecological factor analyses and Procrustes factor analysis in all 33 nations illustrate that the scale exhibits factor validity and measurement equivalence. Analyses show that the strength of social norms and tolerance of deviance is a shared collective construct: There is high within-nation agreement in each nation [$r_{\text{within-group}}(M) = 0.85$], high between-nation variability [$F(32, 6{,}774) = 31.23$, $P < 0.0001$; intraclass correlation (ICC)(1) = 0.13], and high reliability of the tightness-looseness scale means [ICC(2) = 0.97]. The scale has high convergent validity with expert ratings, unobtrusive measures, and survey data from representative samples; is able to adequately discriminate between cultural regions; and is distinct from other cultural dimensions (*20*) (tables S1 and S2).

The degree of constraint across a wide range of everyday social situations was measured through adaptations to Price and Bouffard's established measure (*20*). Participants rated the appropriateness of 12 behaviors (i.e., argue, eat, laugh, curse/swear, kiss, cry, sing, talk, flirt, listen to music, read newspaper, bargain) across 15 situations (i.e., bank, doctor's office, job interview, library, funeral, classroom, restaurant, public park, bus, bedroom, city sidewalk, party, elevator, workplace, movies), resulting in a total of 180 behavior-situation ratings (*20*). For a given situation, the mean appropriateness ratings across behaviors indicate the degree of situational constraint: Low values indicate that there are few behaviors considered appropriate in that situation, whereas high values indicate that a wide range of behaviors are considered appropriate in that situation. Country-level scores of situational constraint were derived by averaging scores across situations. Analyses illustrate that the situational constraint measure is a shared collective construct within nations (*20*): There is high within-nation agreement about the level of constraint in everyday situations in each nation [$r_{\text{within-group}}(M) = 0.99$], high between-nation variability in situational constraint [$F(32, 6790) = 92.9$, $P < 0.0001$; ICC(1) = 0.31], and high reliability of the situational constraint means [ICC(2) = 0.99]. There is strong construct validity of the measure (*20*). Respondents in each nation also provided direct ratings regarding whether the 15 situations had clear rules for appropriate behavior, called for certain behaviors and not others, required people to monitor their behavior or "watch what they do," and allowed individuals to choose their behavior (reverse-coded), the average of which is highly correlated with the behavior-situation ratings ($r = 0.74$, $P < 0.001$). The correlation of the current situational constraint data in the United States with those reported by Price and Bouffard is 0.92 ($P < 0.001$) (*20*), which suggests that the degree of constraint across situations is generally stable across time.

Psychological processes (prevention focus, self-regulation strength, need for order, self-monitoring) were assessed with well-validated measures (*20*). Procrustes factor analysis of all of the measures across the 33 nations all evidenced high equivalence and high degrees of cross-national variation (*20*).

To test our predictions, we first examine the relationships between tightness-looseness and ecological and historical institutions. Because many of these variables are associated with national wealth, we controlled for nations' GNP per capita to examine their unique relationships with tightness-looseness. We next illustrate how tightness-looseness is related to the strength of everyday situations and examine the cross-level relationship between the strength of situations and numerous psychological processes with the use of hierarchical linear modeling. We provide a test of the overall model with multilevel structural equation analysis (*20*).

Table S3 illustrates that nations that have encountered ecological and historical threats have much stronger norms and lower tolerance of deviant behavior. Tight nations have higher population density in the year 1500 ($r = 0.77$, $P = 0.01$), in the year 2000 in the nation ($r = 0.31$, $P = 0.10$), and in the year 2000 in rural areas ($r = 0.59$; $P = 0.02$), and also have a higher projected population increase ($r = 0.40$, $P = 0.03$). Tight nations have a dearth of natural resources, including a lower percentage of farmland ($r = -0.37$, $P = 0.05$), higher food deprivation ($r = 0.52$, $P < 0.01$), lower food supply and production ($r = -0.36$, $P = 0.05$, and -0.40, $P = 0.03$, respectively), lower protein and fat supply (rs = -0.41 and -0.46, Ps = 0.03 and 0.01), less access to safe water ($r = -0.50$, $P = 0.01$), and lower air quality ($r = -0.44$, $P = 0.02$), relative to loose nations. Tight nations face more disasters such as floods, tropical cyclones, and droughts ($r = 0.47$, $P = 0.01$) and have had more territorial threats from their neighbors during the period 1918–2001 ($r = 0.41$, $P = 0.04$). Historical prevalence of pathogens was higher in tight

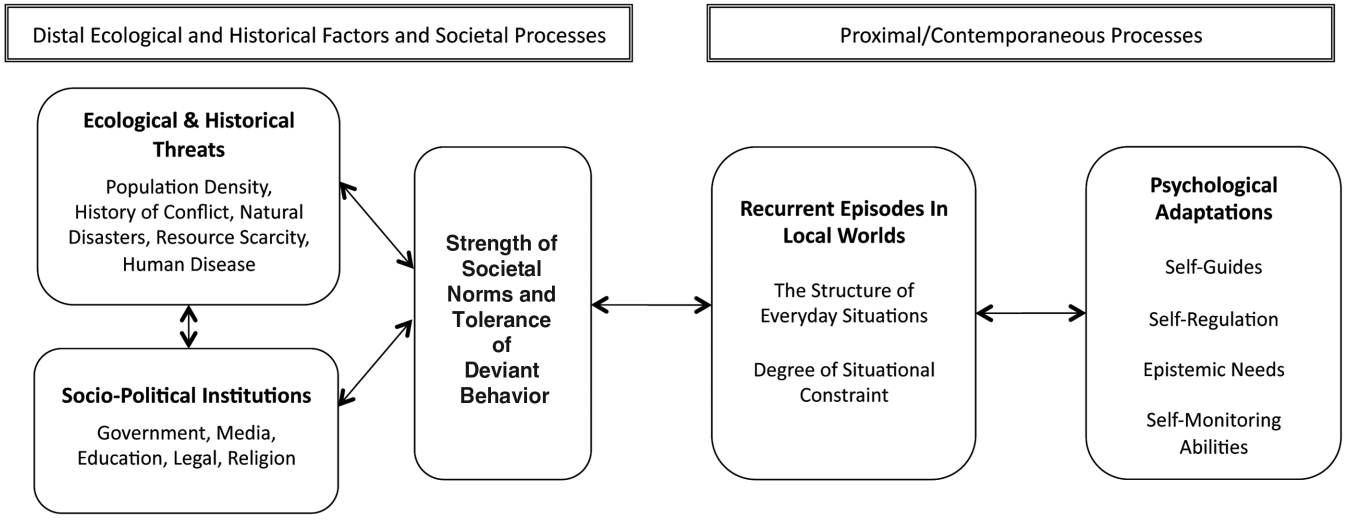

Fig. 1. A systems model of tightness-looseness.

nations ($r = 0.36$, $P = 0.05$), as were the number of years of life lost to communicable diseases ($r = 0.59$, $P < 0.01$), the prevalence of tuberculosis ($r = 0.61$, $P < 0.01$), and infant and child mortality rates (rs = 0.42, $P = 0.02$, and 0.46, $P = 0.01$).

Tightness-looseness is reflected in societal institutions and practices (table S3). Tight nations are more likely to have autocratic rule that suppresses dissent ($r = 0.47$, $P = 0.01$), less open media overall ($r = -0.53$, $P < 0.01$), more laws and regulations and political pressures and controls for media (rs = 0.37 to 0.62, Ps ≤ 0.05), and less access to and use of new communication technologies ($r = -0.38$, $P = 0.04$). Tight nations also have fewer political rights and civil liberties (rs = –0.50 and –0.45, Ps ≤ 0.01). Criminal justice institutions in tight nations are better able to maintain social control: There are more police per capita ($r = 0.31$, $P = 0.12$), stricter punishments (i.e., retention of the death penalty) ($r = 0.60$, $P < 0.01$), and lower murder rates and burglary rates (rs = –0.45 and –0.47, Ps < 0.01) and overall volume of crime ($r = -0.37$, $P = 0.04$). Tight nations are more religious, with more people attending religious services per week ($r = 0.54$, $P < 0.01$) and believing in the importance of god in life ($r = 0.37$, $P < 0.05$) (*20*). The percentage of people participating in collective actions (e.g., signing petitions, attending demonstrations) is much lower in tight nations ($r = -0.40$, $P = 0.03$), and more people report that they would never engage in such actions ($r = 0.36$, $P = 0.05$) in comparison to loose nations.

Tightness-looseness is also related to the strength of everyday recurring situations within nations. As predicted, there is much higher situational constraint in tight versus loose nations ($r = 0.55$, $P < 0.01$) (*22*). In other words, there is much higher constraint across everyday situations—including the bank, public park, library, restaurant, bus, workplace, party, classroom, and the like—in tight nations, and much lower constraint across such everyday situations in loose nations (*20*). Hierarchical linear modeling intercept-as-outcomes models showed that higher levels of situational constraint are significantly related to greater prevention self-guides [higher cautiousness: $\gamma_{01} = 1.48$, $t(31) = 7.54$, $P < 0.01$; higher dutifulness: $\gamma_{01} = 1.11$, $t(31) = 5.05$, $P < 0.01$], greater self-regulation strength [higher impulse control: $\gamma_{01} = 1.18$, $t(31) = 6.60$, $P < 0.01$], higher needs for structure [$\gamma_{01} = 2.67$, $t(31) = 5.76$, $P < 0.01$], and higher self-monitoring [$\gamma_{01} = 0.94$, $t(31) = 3.69$, $P < 0.01$] (*23*). This suggests that societal members' psychological characteristics are attuned to and supportive of the degree of constraint versus latitude in the larger cultural context. Multilevel structural equation analyses that simultaneously tested the proposed relations in Fig. 1 illustrated very good fit to the data (*20*).

In all, the data illustrate that tightness-looseness, a critical aspect of modern societies that has been heretofore unexplored, is a part of a

Table 1. Sample characteristics of the 33 nations.

Nation	Data collection site(s)	Language of survey	Number of participants	Mean age (±SD)	Percentage female	Percentage students	Tightness score
Australia	Melbourne	English	230	25.4 ± 10.0	69.1	63.9	4.4
Austria	Linz	German	194	31.6 ± 11.8	51.5	41.8	6.8
Belgium	Leuven (Flanders region)	Dutch	138	33.3 ± 14.3	73.2	50.7	5.6
Brazil	São Paulo	Portuguese	196	27.5 ± 9.4	72.3	40.3	3.5
Estonia	Tartu	Estonian	188	32.0 ± 16.8	86.6	52.1	2.6
France	Paris, Cergy	English	111	25.2 ± 4.1	37.8	67.6	6.3
Germany (former East)	Chemnitz	German	201	31.6 ± 12.2	66.7	49.3	7.5
Germany (former West)	Rhineland-Palatine/Frankfurt	German	312	32.5 ± 14.5	63.8	51.6	6.5
Greece	Athens	Greek	275	30.9 ± 11.3	56.7	45.1	3.9
Hong Kong	Hong Kong	Chinese	197	27.3 ± 11.7	68.0	53.8	6.3
Hungary	Budapest, Szeged	Hungarian	256	30.8 ± 10.9	42.2	48.0	2.9
Iceland	Reykjavík	Icelandic	144	36.3 ± 13.3	67.4	41.7	6.4
India	Ahmedabad, Bhubneswar, Chandigarh, Coimbatore	Hindi	222	27.8 ± 9.6	54.1	52.3	11.0
Israel	Tel-Aviv, Ramat-Gan, Jerusalem, Petach-Tikva	Hebrew	194	30.2 ± 10.7	60.3	48.5	3.1
Italy	Padova	Italian	217	29.6 ± 10.3	40.1	53.0	6.8
Japan	Tokyo, Osaka	Japanese	246	33.2 ± 14.9	55.7	48.8	8.6
Malaysia	Bandar Baru Bangi	Malay	202	29.5 ± 9.1	49.5	45.0	11.8
Mexico	Mexico City	Spanish	221	27.7 ± 11.6	42.1	40.3	7.2
Netherlands	Groningen	Dutch	207	29.8 ± 11.9	55.6	53.1	3.3
New Zealand	Wellington	English	208	29.9 ± 13.0	64.4	61.1	3.9
Norway	Bergen	Norwegian	252	31.8 ± 11.0	56.7	46.0	9.5
Pakistan	Hyderabad	Urdu	190	30.0 ± 9.8	51.1	52.6	12.3
People's Republic of China	Beijing	Chinese	235	29.4 ± 11.5	45.9	53.2	7.9
Poland	Warsaw	Polish	210	28.5 ± 12.4	65.2	51.9	6.0
Portugal	Braga	Portuguese	207	28.5 ± 11.6	54.6	58.0	7.8
Singapore	Singapore	English	212	26.1 ± 6.7	59.0	49.1	10.4
South Korea	Seoul	Korean	196	26.2 ± 7.5	61.2	73.5	10.0
Spain	Valencia	Spanish	172	30.2 ± 9.6	66.9	40.1	5.4
Turkey	Istanbul	Turkish	195	32.0 ± 14.4	53.3	45.6	9.2
Ukraine	Odessa	Ukrainian	184	30.8 ± 12.7	56.5	44.6	1.6
United Kingdom	Brighton	English	185	29.9 ± 11.5	67.0	51.4	6.9
United States	Washington, DC; Maryland; Virginia	English	199	31.4 ± 13.7	60.3	48.2	5.1
Venezuela	Caracas	Spanish	227	35.8 ± 10.0	60.4	1.3	3.7
Totals/means			**6823**	**30.1 ± 11.3**	**58.6**	**49.2**	**6.5**

system of interrelated distal and proximal factors across multiple levels of analysis. In addition to explicating how tight and loose cultures vary in modern societies, this research has implications for understanding and modeling how tight and loose cultures are maintained and changed. Substantial top-down or bottom-up changes in any of the levels in the model may trigger a rippling effect to other levels, resulting in changes in tight or loose cultures.

As culture is fundamentally a system, causal inferences regarding the direction of the relationships need further examination, particularly given that they are likely reciprocal. Future research should also apply the basic principles of the current work to explore variation in tightness-looseness at other levels of analysis (e.g., regions).

We also note that the samples in this study are not representative of each nation. However, the diverse backgrounds of the participants, high agreement among different subgroups, and correlations with other measures drawn from representative samples lend confidence to the generalizability of the results (*20*).

This research illuminates the multitude of differences that exist across tight and loose cultures. From either system's vantage point, the "other system" could appear to be dysfunctional, unjust, and fundamentally immoral, and such divergent beliefs could become the collective fuel for cultural conflicts. Indeed, as Herodotus (*1*) remarked centuries ago, "if one were to order all mankind to choose the best set of rules in the world, each group would, after due consideration, choose its own customs; each group regards its own as being the best by far" (p. 185). Such beliefs fail to recognize that tight and loose cultures may be, at least in part, functional in their own ecological and historical contexts. Understanding tight and loose cultures is critical for fostering cross-cultural coordination in a world of increasing global interdependence.

References and Notes

1. Herodotus, *The Histories* (Oxford, New York, 1998; R. Waterfield, Transl.).
2. P. J. Pelto, *Trans Action* **5**, 37 (1968).
3. H. Barry III, I. L. Child, M. K. Bacon, *Am. Anthropol.* **62**, 51 (1959).
4. J. W. Berry, *Adv. Exp. Soc. Psychol.* **12**, 177 (1979).
5. S. Kitayama, *Psychol. Bull.* **128**, 89 (2002).
6. A. Fiske, S. Kitayama, H. R. Markus, R. Nisbett, in *The Handbook of Social Psychology*, D. Gilbert, S. T. Fiske, G. Lindzey, Eds. (Oxford, New York, 1998), vol. 2, pp. 915–981.
7. H. C. Triandis, *The Analysis of Subjective Culture* (Wiley, New York, 1972).
8. We acknowledge that these relationships are only probabilistic, as cultures can find equifinal solutions to ecological and historical threats (*24*). Moreover, the degree of tightness-looseness in societies can further reinforce the ecological context (*6*), making these relationships potentially reciprocal.
9. J. J. Arnett, *J. Marriage Fam.* **57**, 617 (1995).
10. A. Norenzayan, A. F. Shariff, *Science* **322**, 58 (2008).
11. W. Mischel, in *Personality at the Crossroads*, E. Magnusson, N. S. Endler, Eds. (Erlbaum, Hillsdale, NJ, 1977).
12. R. H. Price, D. L. Bouffard, *J. Pers. Soc. Psychol.* **30**, 579 (1974).
13. E. D. Boldt, *Can. J. Sociol.* **3**, 349 (1978).
14. E. Goffman, *Behavior in Public Places: Notes on the Social Organization of Gatherings* (Greenwood, Westport, CT, 1963).
15. S. Kitayama, H. R. Markus, H. Matsumoto, V. Norasakkunkit, *J. Pers. Soc. Psychol.* **72**, 1245 (1997).
16. E. T. Higgins, *Psychol. Rev.* **94**, 319 (1987).
17. R. F. Baumeister, T. F. Heatherton, *Psychol. Inq.* **7**, 1 (1996).
18. S. L. Neuberg, J. T. Newsom, *Personal. Processes Indiv. Diff.* **65**, 113 (1993).
19. M. Snyder, *J. Pers. Soc. Psychol.* **30**, 526 (1974).
20. See supporting material on *Science* Online.
21. Most samples corresponded to nations; however, where subnational boundaries could be identified on the basis of historical circumstances, they were treated as separate samples (e.g., East and West Germany; Hong Kong and People's Republic of China).
22. For ease of interpretation, the situational constraint score was reversed such that high values are indicative of higher constraint.
23. We also ran these analyses with a split-sample approach (*25*) to eliminate single-source bias as an alternative explanation for our findings. Within each country we randomly assigned participants to one of two groups: One group provided the situational constraint scores and the other group provided the individual-difference scales. These hierarchical linear modeling results were the same as with the full sample.
24. D. Cohen, *Psychol. Bull.* **127**, 451 (2001).
25. C. Ostroff, A. J. Kinicki, M. A. Clark, *J. Appl. Psychol.* **87**, 355 (2002).

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Supporting Online Material

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Supporting Online Material for

Differences Between Tight and Loose Cultures: A 33-Nation Study

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Materials and Methods

Table S1 to S6

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Materials and Methods

Participants. Data were gathered from a total of 6960 respondents in 33 nations across five continents. After removing incomplete surveys with unusable data, the final sample for analyses consisted of 6823 participants. The final sample sizes included: Australia (n = 230), Austria (n = 194), Belgium (n = 138), Brazil (n = 196), Estonia (n = 188), France (n = 111), Former East Germany (n = 201), Former West Germany (n = 312), Greece (n = 275), Hong Kong (n = 197), Hungary (n = 256), Iceland (n = 144), India (n = 222), Israel (n = 194), Italy (n = 217), Japan (n = 246), Malaysia (n = 202), Mexico (n = 221), the Netherlands (n = 207), New Zealand (n = 208), Norway (n = 252), Pakistan (n = 190), People's Republic of China (n = 235), Poland (n = 210), Portugal (n = 207), Singapore (n = 212), South Korea (n = 196), Spain (n = 172), Turkey (n = 195), Ukraine (n = 184), the United Kingdom (UK, n = 185), the United States (US, n = 199), and Venezuela (n = 227). The gender distribution was 58.6% female and 41.4% male. The average percentage of university students in the samples was 49.2%, with adults comprising the remainder (50.8%). The mean age of participants was 30.1 years, and the average amount of work experience was 8 years. With regard to the socio-economic status of the participants, 73.2% reported that they were middle class.

We employed a theoretically based sampling strategy that aimed at maximizing the variability of nations with regard to the expected correlates of tightness-looseness (e.g., population density, scarcity of resources) (*S1*). All data were collected during 2000-2003. Within nations, our participant sampling strategy was aimed at maximizing the variability of participants (*S2*). In each nation, a diverse sample of adults was recruited through a combination of strategies, which included directly recruiting adults who were either waiting in public areas or were enrolled in non-credit continuing education classes. They represented a variety of occupations, including business and financial operations, management and sales (18.4%), education, training and library services (17.2%), office and administrative support (9.8%), architecture (5.8%), food preparation and personal services (5%), computer and mathematical (4.5%), community and social services (3.8%), among others. Collaborators also recruited approximately 100 students who filled out the survey in exchange for course credit (excluding Venezuela, where we were unable to obtain a separate student subsample). These procedures resulted in a sample comprised of approximately 200 respondents in each nation who were diverse with regard to their personal and professional characteristics.

Instruments

Participants responded to our tightness-looseness scale, our measure of situational constraint, individual differences measures, and demographics. The survey instrument was administered in 21 languages. The five English-speaking nations administered the English version of the survey (with spelling and grammar adapted to local norms; i.e., Australia, New Zealand, UK, US). Surveys were also administered in English in Singapore and France where the respondents attended or were affiliated with English-speaking institutions, and English was deemed the most appropriate language by collaborators. Three nations administered a Spanish-language version of the survey (i.e., Mexico, Spain, and Venezuela). Two nations each administered the surveys in Portuguese (i.e., Brazil, Portugal), German (East and West Germany samples, Austria), Dutch (i.e., Belgium, Netherlands), and Chinese (i.e., Hong Kong, PRC). Collaborators

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in the remaining nations administered versions in their local languages: Estonian (Estonia), Greek (Greece), Hungarian (Hungary), Icelandic (Iceland), Hindi (India), Hebrew (Israel), Italian (Italy), Japanese (Japan), Korean (Korea), Malay (Malaysia), Norwegian (Norway), Urdu (Pakistan), Polish (Poland), Turkish (Turkey), and Ukrainian (Ukraine).

We used the translation-backtranslation procedure, which is the most widely accepted method for conducting survey translations (*S3*). This procedure entails having the survey instrument translated from the original language (i.e., English) to the second language (i.e., local languages) by one translator, and then having a second independent translator re-translate the survey back to the original language. In cases where discrepancies between the two versions arose, the translators discussed the discrepancies and resolved them by selecting the most appropriate and understandable translation. In each nation where translation was necessary, collaborators selected the two translators and oversaw this process to ensure that the final version of the survey was translated accurately. Scales in all languages are available from the first author.

Response sets vary across nations, such that individuals in some nations are systematically more likely to provide extreme responses and acquiesce to survey items than in others (*S4-5*). To reduce the influence of cross-cultural response sets on our data, we used procedures outlined by Van de Vijer and Leung (*S5*). We used the within-subject standardization procedure that adjusts the scores for each individual using the mean for that individual across all variables (*S5-6)*. To do so, the mean for each person's responses to all of the items in the survey was first calculated. We then standardized all items in the survey by subtracting each item from that person's mean response to all items. Standardized data were used in all analyses. The results did not change substantially whether standardized or unstandardized scores were used. All data are available from the first author.

Tightness-Looseness Scale: Strength of Social Norms and Tolerance of Deviance

We developed a generalized measure of tightness-looseness that assessed the degree to which social norms are pervasive, clearly defined, and reliably imposed within nations. As per recommendations for scale development, items were generated deductively based on our construct definition in order to maximize content validity (*S7-9*). Nine items were first generated by a set of 5 team members, and thereafter collaborators involved in the study evaluated the items in terms of the degree to which the items mapped onto the construct definition, how clear, concise, readable, distinct, and redundant they viewed each of the items to be, whether the items would be easily understood by respondents in their country as intended (once translated, where appropriate), and the extent to which the items as a set demonstrated content validity and adequate construct coverage. Minor wording changes were made to the items and three items were dropped due to redundancy and/or problems in wording.

The final version of the scale included six statements regarding the clarity and number of social norms, the degree of tolerance for norm violations, and overall compliance with social norms in each nation. The survey respondents received the following instructions:

The following statements refer to *[COUNTRY NAME]* as a whole. Please indicate whether you agree or disagree with the following statements using the following scale. Note that the statements sometimes refer to "social norms," which are standards for behavior that are generally unwritten.

We limited the number of reverse coded items in the scale because psychometric research suggests that

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

1. There are many social norms that people are supposed to abide by in this country.
2. In this country, there are very clear expectations for how people should act in most situations.
3. People agree upon what behaviors are appropriate versus inappropriate in most situations this country.
4. People in this country have a great deal of freedom in deciding how they want to behave in most situations. (Reverse coded)
5. In this country, if someone acts in an inappropriate way, others will strongly disapprove.
6. People in this country almost always comply with social norms.

reverse scoring can introduce method factors that supersede substantive factors (*S10-14*), resulting in a separate dimension that has little theoretical meaning.

In keeping with prevailing standards for scale development (*S7-9*) we established the reliability and validity of the scale by assessing the degree to which the scale has factor validity at the national level, scale equivalence across the 33 nations, adequate reliability, high within-nation agreement and between-nation variability, high convergent validity, and is distinct from other known cultural values and beliefs. Each is discussed in turn below.

Reliability and Validity of the Tightness-Looseness Measure and Scale Equivalence

The validation of a new instrument should involve an empirical evaluation of the underlying factor structure using exploratory factor analysis (*S7-9*). Evidence of construct validity is indicated by the extent to which the factor structure that emerges from exploratory factor analyses aligns with theoretical expectations. We expected that tightness-looseness scores would be explained by one underlying factor at the national level with all items loading in the expected direction. As predicted, an exploratory factor analysis with principal axis estimation indicated a clear one-factor solution, accounting for 62% of the variance ($\lambda_1 = 3.70$, $\lambda_{2\text{-}6} < 1.01$). Item loadings were.68 or greater, with the exception of the reverse-coded item that had a loading of .26 which was in the theorized direction. The scale also demonstrated very good reliability (*S7*) at the national level ($\alpha = .85$).

We also demonstrate validity for the scale by showing its structural equivalence (i.e., similarity in factor structures) across nations. Following established standards, we used Procrustes Factor Analysis (PFA) to examine the measurement equivalence of the scale across cultures (*S5, S15*). PFA is a special form of exploratory factor analysis that involves (a) using individual-level data to calculate an overall, or normative, factor solution across nations and (b) calculating an individual-level factor solution separately in each nation and rotating those solutions so that they match the normative solution as closely as possible. Through this targeted rotation process, one can examine the extent to which the factor solution in each nation deviates from the normative structure. PFA has been used to establish structural equivalence across nations for a wide variety of constructs, and evidence suggests that it is an effective means of establishing structural equivalence across nations (*S2*, *S15-19*). We used the steps outlined below to establish structural equivalence of the tightness-looseness measure.

To conduct the PFA, we first calculated item intercorrelations in all 33 nations. We then transformed the item intercorrelations into z scores, averaged the z-scores across samples, and transformed the z-scores back into correlations to form the normative item intercorrelation matrix. We conducted an exploratory principal axis factor analysis on the normative item intercorrelation matrix to determine the normative factor structure of the scale. Next, we conducted an exploratory principal axis factor analysis separately in nation and then subjected the nation-specific solutions to Procrustes rotation. The Procrustes rotation procedure rotates the country-specific solution so that it matches the normative solution as closely as possible by maximizing the fit of country specific solutions with the normative solution structure (*S5*). To demonstrate scale validity, we calculated the identity coefficient, the most stringent index of the fit between the normative loadings and the Procrustes-rotated nation specific loadings (*S5*). The mean identity coefficient across nations was .97 (*Mdn* = .98, *SD* = .03), and the identity coefficient exceeded recommended .90 cutoff for 32 of the 33 countries. The one exception was Brazil, which had an identity coefficient of .87. In sum, factor analyses at both the national and individual level illustrate strong validity for the measure of tightness-looseness.

Tightness-looseness is a shared cultural construct with high within-nation agreement and high between-nation variance. Tightness-looseness is conceptualized as a shared construct regarding the degree to which social norms are pervasive, clearly defined, and reliably imposed. We used the nation as the level of analysis to test our predictions and provide empirical evidence that justifies this level of analysis below. Although there can be variability in nations, many have argued that there are forces toward integration (e.g., common political and educational systems, media, markets, dominant language, national symbols) that produce substantial sharing of culture within nations (*S6, S20-22*). There is also substantial shared knowledge among people within a nation because they are a coordinating unit in dealing with distinct ecological and territorial threats and in forming and supporting cultural institutions that regulate social behavior. Examining the relationship between national levels of tightness-looseness and ecological and historical factors, socio-political institutions, and citizens' attitudes is thus theoretically justified.

We specifically theorized that tightness-looseness emerges as a referent-shift collective construct

(*S23*) where perceptions of what is normative in a given nation are, generally speaking, shared among its members. Consistent with this level of theory, our level of measurement reflects individuals' ratings of the country as a whole (*S23*). Following recommendations from levels of analysis experts (*S24-25*), we tested our assumption regarding the nation as the appropriate level of analysis by examining whether (a) individuals have low variability in their perceptions of the strength of social norms and degree of tolerance for deviance in their nation (which is indicated by high $r_{wg(j)}$ values; (*S26*) (b) there is significant between-nation variance in the construct (which is indicated by high ICC(1) values), and (c) national means are reliable at the culture level (which is indicated by high ICC(2) values).

We first calculated the $r_{wg(j)}$ value for each nation (*S26-27*), which is an index of the extent to which individuals within a given nation agree on the level of tightness-looseness within that nation, and therefore provide similar responses to the tightness-looseness items. For each nation, this index is calculated by comparing the observed variance in tightness-looseness perceptions to the variance that would be expected by chance. If there was no agreement in perceptions of tightness-looseness within a given nation, all response options for the tightness-looseness measure would be selected with equal frequency. Thus, the distribution that would be expected by chance is a uniform distribution. Specifically:

$$r_{WG(J)} = \frac{J[1 - (\overline{s_{X_J}^2} / \sigma_{EU}^2)]}{J[1 - (\overline{s_{X_J}^2} / \sigma_{EU}^2)] + (\overline{s_{X_J}^2} / \sigma_{EU}^2)}$$

where $\overline{s_{X_J}^2}$ is the mean of the observed variances of the *J* items and σ_{EU}^2 is the expected variance of the uniform distribution that would be expected if there was no agreement in tightness-looseness. The expected variance of the uniform distribution equals $(A^2 - 1)/12$, where *A* equals the number of response options for each of the *J* items. The tightness-looseness items had six response options, which means that $\sigma_{EU}^2 = 2.92$. We calculated $r_{wg(j)}$ in each nation (M = .85, Mdn = .86, SD = .08), and found that the mean $r_{wg(j)}$ value across all nations exceeded the recommended cutoff point of .70 (*S25*). Across nations, tightness-looseness scores from the student and working adult subsamples are highly correlated (r = .83), as are the scores of females and males (r = .84), suggesting substantial cultural unity (*S20*). This illustrates that there is high within-nation agreement on tightness-looseness.

We calculated two additional aggregation statistics, ICC(1) and ICC(2). Two types of inferences can be drawn from the ICC(1) statistic (*S24*). First, ICC(1) is an index of the degree of variance in tightness-looseness that is explained by cultural membership. Second, ICC(1) is an inter-rater reliability index that reflects the extent to any individual response is a reliable indicator of the mean tightness-looseness score for a given nation. ICC(2) is similarly a reliability index, but it reflects the extent to which the national-level mean scores for tightness-looseness are reliable. ICC(1) and ICC(2) are both a function of the degree of variance in tightness-looseness that resides within versus between nations. Thus, the first step in calculating ICC(1) and ICC(2) is to conduct a one-way random-effects analysis of variance (ANOVA) in which nation membership is used to explain individuals' responses on the tightness-looseness measure. The following formulas (*S28*) can then be used to calculate ICC(1) and ICC(2).

Specifically:

$$ICC(1) = \frac{MSB - MSW}{MSB + [(k-1) * MSW]}$$

and

$$ICC(2) = \frac{MSB - MSW}{MSB}$$

where *MSB* is the between-nation mean square, *MSW* is the within-nation mean square, and *k* is the average number of individuals per nation in the sample. The one-way ANOVA for the tightness-looseness measure produced a highly significant *F*-value [$F(32, 6{,}774) = 31.23$, $P < .0001$], indicating that there is high between-nation variability in tightness-looseness. Moreover, the ICC(1) value exceeded the recommended cutoff of .06 [ICC(1) = .13], indicating that 13% of the variance in tightness-looseness is explained by nations and that the tightness-looseness scale has high inter-rater reliability. In addition, the ICC(2) value far exceeded the recommended cutoff of .70 [ICC(2) = .97], thus indicating that the national-level mean scores of tightness-looseness scores are highly reliable. Collectively, these results provide strong justification for aggregation, and show that tightness-looseness is a shared, reliable construct with significant between-nation variance (*S24-25*). Tightness and looseness index scores across the 33 nations can be found in Table 1 in the main text. Higher values indicate greater tightness. The tightness and looseness index scores are the original standardized scores multiplied by 10 for easier reference.

Tightness-looseness scores have convergent validity. Table S1 shows that the tightness-looseness scale demonstrated strong convergent

validity. Scores on the measure are highly correlated with expert ratings on tightness-looseness of nations (given by Harry Triandis, a leading cultural psychologist) (r = .61, P < .01). Convergent validity data also suggest that there are greater pressures toward uniformity in tight as compared to loose nations. There are fewer people who report they write with their left-hand in tight than loose cultures (r = -.61, P = .05) (*S29*). In addition, there is much greater accuracy of public clocks in tight as compared to loose nations (r = -.60; P < .01; lower values are indicative of greater accuracy) (*S30*), illustrating a greater collective concern with order and uniformity in the former as compared to the latter. The tightness-looseness scale also correlates with higher monitoring (more police per capita), more severe punishments (e.g., the death penalty), and fewer challenges to societal institutions (see the main text and table S3).

Table S1 shows that the tightness-looseness scores are correlated in expected ways with other data that reflect higher compliance with norms and intolerance for deviance. Data from representative samples from the World Values Survey (*S31)* show that people in nations that score higher on our tightness-looseness measure find socially deviant behavior to be much less justifiable. Respondents were specifically asked to rate how justifiable each of the following behaviors is: claiming government benefits to which you are not entitled, avoiding a fare on public transport, cheating on taxes if you have a chance, buying stolen goods, someone accepting a bribe in the course of one's duties, homosexuality, prostitution, abortion, divorce, euthanasia (or ending the life of the incurably sick), and suicide. People in tight nations find these behaviors much less justifiable than people in loose nations (r = -.48, P < .01), and the variability of responses to these questions is lower in tight nations (r = -.56, P <. 01), suggesting a higher degree of consensus in negative attitudes toward deviance. Greater restriction on behavior in tight nations is also evident in more restricted sexual behavior (e.g., more negative attitudes toward casual sex, fewer sexual partners) (r = -.44, P = .04) (*S32)*, and lower alcohol consumption rates as compared to loose nations (r = -.46, P = .01) (*S33*).

Other convergent data show that there is a much greater concern with social order in nations that are higher on the measure of tightness-looseness. People in tight nations more strongly endorse the belief that the most important responsibility of government is to maintain order in society (r = .61, P < .01), and are more likely to believe that political systems with "a strong leader who does not have to bother with parliament and elections" as well as "army rule systems" are more favorable (r = .38, P = .04) (*S31*). The measure also shows that tight nations are much less open to outside influences given their potential threat to social order. Individuals in tight nations believe their way of life needs to be protected against foreign influence (r = .57, P = .02) (*S34*), and prefer to not have immigrants as neighbors (r = .43, P = .02) (*S31*). Tight nations indeed have a smaller population of international migrants (r = -.32, P = .08) (*S35*), and they are more likely to believe that their culture is superior to others (i.e., more likely to agree with the statement that "Our people are not perfect, but our culture is superior to others") (r = .60, P = .01) (*S34*).

The tightness-looseness scale also discriminates between cultural regions in expected ways. Nations were categorized into cultural regions according to the Global Leadership and Organizational Behavior Effectiveness (GLOBE) clusters (*S36*) as well as the Inglehart-Wenzel's cultural zones (*S37*). A one-way ANOVA was performed on regions that have more than one nation. There were significant differences in the measure of tightness and looseness across the GLOBE clusters [F(6, 25) = 7.94, P < .01]. The data showed that Southern Asian and Confucian Asian nations are the tightest (M = 11.69, SD = 0.62 and M = 8.64, SD = 1.84 respectively) and Eastern European nations are loosest (M = 3.60, SD = 1.65). Nordic/Germanic European (M = 6.04, SD = 2.21), Latin European (M = 5.87, SD = 1.80), Anglo (M = 5.09, SD = 1.30), and Latin American (M = 4.78, SD = 2.11) nations are in the mid-range. Turkey was not included in this analysis because it was the only nation in the Middle East cluster, but as expected, is tight (M = 9.2), similar to the South Asia cluster. The Inglehart-Wenzel cultural zone classification showed the same pattern of results [F(6, 26) = 9.62, P < .01]. South Asian nations (M = 10.92, SD = 1.22) are tightest, followed by Confucian nations (M = 8.21, SD = 1.52), Catholic Europe (M = 5.95, SD= 1.46), Protestant Europe (M = 5.75, SD = 2.40), English speaking nations (M = 5.09, SD = 1.30), and Latin American nations (M = 4.78, SD= 2.11). Nations in the Ex-communist cultural zone (i.e., Estonia, Ukraine) are the least tight (M = 2.13, SD = 0.69).

Tightness-looseness is related to but distinct from other cultural dimensions. Analyses show that tightness-looseness is distinct from other available culture level data, including Hofstede's (*S38*) five dimensions, Schwartz's value dimensions (*S39*), Leung and Bond's (*S2*) five social axiom dimensions, the nine value dimensions examined by the GLOBE project (*S36*), Smith, Dugan, and Trompenaar's (*S40*)

dimension of loyal involvement versus utilitarian involvement, Inglehart and Baker's (*S41*) two value dimensions, and Smith, Peterson, and Schwartz's (*S42*) five sources of guidance. Tightness-looseness was expected to have only small to moderate correlations with some of these dimensions, illustrating its validity as a novel construct.

Distinction from Hofstede's cultural values. We expected tightness-looseness to be related to but distinct from Hofstede's (2001) five value dimensions (*S38*). Collectivism refers to the degree to which individuals feel strong ties to their ingroups (*S38*), and does not pertain to how pervasive social norms are or how much tolerance there is for deviant behavior. Tightness-looseness and collectivism have been also been empirically differentiated in traditional societies in research using the Human Area Relations Files. Carpenter (*S43*) showed that the correlation between the constructs is .44. In modern nations, tightness and collectivism are also expected to be related but distinct constructs. Indeed, Table S2 illustrates that individualism (the opposite pole of collectivism) was moderately and negatively correlated with the tightness-looseness measure (r = - .47, P = .01). The distinction between collectivism and tightness can also be discerned in comparative correlations with other national variables. Collectivism, for example, is highly correlated with national wealth whereas tightness has no relationship with national wealth (see data in economic indicators section below). Tightness, but not collectivism, is correlated with variables such as history of conflict on one's territory, greater monitoring (population per police officer), and greater desire for societal order (controlling for wealth) (all data are available from the first author) (*S44*).

Tightness-looseness was also expected to be related to but distinct from power distance, or the extent to which power is distributed equally in societies (*S38*). Although tight societies may be more hierarchical given that hierarchy helps to reinforce order and coordination, this need not always be the case (cf. Pelto's example of Israeli Kibbutzim, which traditionally were highly egalitarian) (*S45*). As expected, Table S2 shows that tightness-looseness and power distance are distinct and moderately and positively correlated (r = .42, P = .02).

We did not expect any strong relationship between tightness-looseness and masculinity-femininity, which is the degree to which societies emphasize competition and materialism versus cooperation and fairness (*S38*). Theoretically, tightness-looseness can emphasize either of these two poles of Hofstede's dimension. Finally, tightness-looseness was expected to be related to but distinct from uncertainty avoidance (*S38*). Although tight societies may be higher on uncertainty avoidance (i.e., the level of stress that is experienced in a society in the face of an unknown future), it is also possible that the converse is true. That is, because tight societies have many clear norms, stress deriving from uncertainty may be dramatically reduced amongst its citizens. Singapore, for example, is expected to be tight, yet it ranked lowest on Hofstede's index of uncertainty avoidance. We also did not anticipate any strong relationship between tightness-looseness and Hofstede's dimension of long-term orientation. The results presented in Table S2 show that uncertainty avoidance, masculinity and long/short-term orientation each was not significantly related to tightness-looseness (P's > .16).

Distinction from cultural values dimensions of Schwartz, GLOBE, Smith, Dugan, & Trompenaars, and Inglehart and Baker. We expected that tightness-looseness is related to but distinct from Schwartz's (*S39*) dimensions of harmony, conservatism, hierarchy, mastery, affective and intellectual autonomy, and egalitarian commitment, with the strongest correlations expected between tightness-looseness and conservatism (i.e., emphasis on maintaining status quo, group solidarity and traditions) and hierarchy (i.e., more accepting of unequal distribution of power and resources), similar to the predictions for Hofstede's collectivism and power distance dimensions above. As shown in Table S2, tightness-looseness is related to but distinct from all of these value dimensions. Tightness-looseness has moderate correlations with Schwartz's (*S39*) scores on conservatism, hierarchy and egalitarian commitment (r = .43, P = .04, r = .47, P = .03, and r = -.41, P = .06, respectively). Affective and intellectual autonomy, mastery, and harmony are not related to tightness-looseness (r's = -.28 to .18, P's > .16).

We also expected low to moderate correlations with GLOBE's "as is" value dimensions (e.g., family collectivism, institutional collectivism, performance orientation, power distance, gender egalitarianism, assertiveness, uncertainty avoidance, future orientation, and humane orientation; *S36*), with the strongest correlations anticipated for family and institutional collectivism and power distance for reasons cited above.

Correlations with the GLOBE cultural dimensions of how things are, or the "as is" value dimensions, (*S36*) were consistent with expectations. Tightness-looseness is moderately correlated with family collectivism, or the degree to which individuals express pride, loyalty and

cohesiveness to in-groups (r = .49, P =.01) as well as institutional collectivism, or the degree to which institutional practices encourage and reward the collective distribution of resources and collective action (r = .43, P = .03). Tightness-looseness is also moderately related to GLOBE's future orientation (r = .47, P = .02). There are also trends that tighter nations are more focused on performance and excellence (performance orientation; r = .35, P = .08) but have less investment in minimizing gender inequality (r = -.35, P = .08). Assertiveness, power distance, uncertainty avoidance, and humane orientation are not significantly related to tightness-looseness (r's = -.29 to .32, P's > .11).

Tightness-looseness was expected to be related to but distinct from Smith et al.'s (*S40*) dimension of loyal involvement versus utilitarian involvement, with tighter nations having more loyal involvement and looser nations having more utilitarian involvement. As expected, Table S2 also shows that tightness-looseness is moderately correlated with Smith et. al.'s scores on loyal versus utilitarian involvement, with tightness associated with being involved in organizations based on loyalty over utilitarian goals (r = .45, P = .02).

Finally, we expected that tightness-looseness would have low to moderate correlations with Inglehart and Welzel's traditional versus secular rational values and survival versus self-expression values (*S37, S41*), which reflect the contrast between economic and physical security with an emphasis on subjective well-being, self-expression, and quality of life. Table S2 indeed shows that Tightness-looseness is uncorrelated with Inglehart and Welzel's traditional versus secular-rational and survival versus self-expression values (*S37*) (r's = -.11 and -.13, P's > .50). In sum, tightness-looseness is related to but distinct from extant value dimensions.

Distinction from social axioms and sources of guidance. Tightness-looseness is expected to be related to but distinct from social axioms (*S2*). We expected that people in tight nations will have higher fate control beliefs, given that fatalism has been associated with the perception that others have total control over one's actions (*S46-47*). By contrast, given there is more latitude in loose cultures, we expected that people in loose nations will have higher flexibility beliefs. Finally, we expected that tightness-looseness will be positively related to spirituality given that this construct is highly related to religious practices and observance. We did not have any predictions regarding the relationship between tightness-looseness and beliefs in rewards for good effort and application of relevant knowledge (reward for application) or expectations about negative outcomes in life (cynicism). As predicted, tightness-looseness is related to but distinct from social axiom dimensions. Table S2 shows that nations higher on tightness are more likely to endorse beliefs in fate (r = .44, P = .03), and spirituality and supernatural forces (r = .52, P <.01). Tightness-looseness, however, is not correlated with flexibility (r = -.20, P = .33) or cynicism (r = .14, P = .49). Tightness-looseness did correlate with beliefs in reward for application (r = .60, P <.01).

Lastly, we examined the relationship between tightness-looseness and sources of guidance in nations. Smith et al. demonstrated that cultures vary in the sources of guidance upon which they rely when managing everyday events, including vertical sources (e.g., reliance on formal rules and superiors), unwritten rules, specialists, other coworkers, and beliefs that are widespread in one's nation (*S42*). We expected that in tight nations people will be particularly likely to rely on beliefs that are widespread in their nation as well as vertical sources (i.e., the extent to which managers rely on formal rules and procedures), for similar reasons for power distance and hierarchy described above. As expected, tightness-looseness is positively related to the reliance on beliefs that are thought to be widespread in one's nation (r = .54, P < .01) and to the use of vertical sources (r = .40, P= .03). Tightness-looseness was unrelated to the tendency to consult unwritten rules, specialists and coworkers (r's = -.18 to .18, P's > .35).

We also note that the tightness-looseness scale is not significantly correlated with the acquiescence index constructed by Hofstede (*S6*) (r = .16, n = 26, P = .43) or with the acquiescence index constructed by Smith (*S48*) based on Schwartz's value survey (r = .14, n = 31, P = .45)

Economic Indicators. We did not expect tightness-looseness to be highly related to how well a nation performs economically. Table S2 shows that tightness-looseness was not related to Gross National Product (GNP) per capita (r = .05, P = .79) or global growth competitiveness (r = -.08, P = .68).

In sum, the results illustrate that the tightness-looseness measure is both reliable and valid. The factor analysis results provided evidence of factor validity and scale equivalence; aggregation statistics showed high within-nation agreement, high between nation variability, and high reliability of the national means. Analyses of the scale illustrate that it has high convergent validity and is also distinct from other extant culture constructs, including cultural values, axioms, and sources of guidance.

Together, these steps illustrate that the measure of tightness-looseness demonstrates strong validity and reliability (*S7-9*).

Situational Constraint Measure

A central feature of situations that has received attention in psychology and numerous disciplines is the extent to which situations differ in the range of behavioral responses that are considered appropriate, or the extent to which the situation *constrains* or *affords* opportunities for behavioral options (*S49-S54*). When situations are strong, there is a restricted range of behavior that is deemed appropriate, leaving little room for individual discretion in determining behavior. Because such situations have strong behavioral demands, deviations from expected patterns are associated with an increased propensity for social censure (*S49*). By contrast, weak situations are ambiguously structured, place few external constraints on individuals, and afford a wide range of behaviors that are appropriate (*S49*). This dimension of situations has been referred to as the *strength of situations* (*S49*), or situational constraint (*S50*).

In their seminal paper, Price & Bouffard (*S50*) showed that situational constraint can be reliably assessed. Based on daily diary studies, they selected situations that were commonly recurring including being in a class, in the park, on a bus, at a family dinner, in the park, on a date, in church, at a job interview, on a sidewalk, at the movies, in a bar, in an elevator, in a restroom, in one's room, in a dormitory lounge, and at a football game. Participants in their study rated the appropriateness of numerous behaviors (run, talk, kiss, write, eat, sleep, mumble, read, fight, belch, argue, jump, cry, laugh, shout) across each of the situations for all possible behavior-in-situation judgments on a scale of 0 (the behavior is extremely in appropriate in this situation to 9 (the behavior is extremely appropriate in this situation). For a given situation, one can collapse the mean appropriateness ratings across behaviors; a low value is indicative of the fact that there are few behaviors that are considered appropriate in that situation. By contrast, high values on a given situation indicate that a wide range of behaviors are considered as appropriate in that situation. They showed that situations such as *church*, *job interview,* and *elevator* are high on situational constraint whereas *own room*, *park*, and *dorm lounge* are low on situational constraint. Price & Bouffard also showed construct validity for the measure. After computing situational constraint for each situation from the behavior-situation matrices, a different set of participants provided direct ratings on the same situations. They were asked to rate all 15 situations on such items as "To what extent does the situation require that people monitor their own behavior or 'watch what they do?"; "To what extent would the approval of other people make a difference in what most people would do in the situation?"; "To what extent does the situation call for or demand certain behaviors and not others?"; and "To what extent is the situation loaded in terms of its potential for embarrassment?" As predicted, situations higher on constraint (from the behavior-situation matrices) were judged to be much more loaded for personal embarrassment, to elicit higher self-monitoring, to be associated with approval-disapproval by others, and to demand certain behaviors and not others. In all, they illustrated that situational constraint is a valid construct that can be reliably assessed.

We built on this work and suggest that although all cultures invariably have strong and weak situations, tight cultures maintain a much higher overall degree of situational constraint across everyday situations, whereas loose cultures maintain a much lower overall degree of situational constraint across everyday situations. Importantly, we theorize (and test the assumption) that perceptions of situational constraint are generally shared among individuals in cultures—that is, situational constraint is a collective construct.

We based our survey assessment of situational constraint upon the methodology developed by Price and Bouffard (*S50*), and we employed additional steps (e.g., diary pilot study, focus groups, iterative process for selecting final behaviors and situations) to ensure that the stimuli and methodology would be cross-culturally valid (*S4*).

Selection of Behavior and Situation Stimuli: Pilot Study and Multi-Nation Focus Groups. We began with the set of 15 behaviors and 15 situations used by Price and Bouffard (*S50*). In order to generate a more extensive list of behaviors and situations to evaluate for inclusion in this cross-cultural study, we had six individuals each complete a behavior and situation diary for a 24-hour period. They kept lists of all behaviors that they performed and the situations in which they performed these behaviors. All participants' lists were compiled and synonyms were merged. Next, four multi-cultural individuals reviewed these lists and added behaviors and situations that had potential for cross-cultural generalizability. Based upon these methods, a total of 34 behaviors and 35 situations were chosen for further investigation in multi-nation focus groups across the 33 nations. We limited the list of behaviors to those that can physically be performed in any setting (e.g., we excluded running

and exercising because they cannot be performed on a bus).

In line with recommendations for selecting stimuli in cross-cultural research (*S4*), collaborators ran focus groups in their nations to ensure that the behaviors and situations chosen for the investigation were meaningful and appropriate in each nation, and to add any additional relevant behaviors and situations. Each focus group was conducted in the respondents' native language. The stimuli were translated and bi-lingual collaborators coordinated the sessions. Each behavior and situation was evaluated for: (1) whether it could be translated into the native language, (2) whether it was relevant in that culture, and (3) whether there was more than one interpretation for the situation being evaluated. Collaborators provided a report that summarized their focus group discussions and provided any additional behaviors and situations to consider. The data from the focus groups were compiled and the list of behaviors and situations was updated and re-evaluated. Additional rounds of feedback from collaborators were used to evaluate additional behaviors and to refine the lists.

The final list of situations and behaviors included those stimuli that were translatable, relevant, unambiguous in all cultures, and representative of a wide variety of behaviors and situations. We also ensured that the final lists were representative of theoretical dimensions of behaviors and situations identified in the literature. For example, Wish and colleagues (*S55-56*) identified *formal vs. informal* and *intense vs. superficial* (i.e., situations involving close personal connections vs. situations involving the general public or acquaintances) as key dimensions upon which interpersonal situations varied, and thus the list includes a range of formal, informal, personal, and public situations. Similarly, the degree to which behaviors are *cooperative and helpful vs. competitive and/or neglecting* has been identified as a key dimension of behaviors (*S55-56*; labeled as *associative* vs. *disassociative* by Triandis, *S57*; see also *S58*), and the final list of behaviors reflects variance on this dimension. For purposes of this study, we included 15 situations and 12 behaviors that were shown to be clearly understood and relevant in each nation, and they also represented of a range of theoretically-based dimensions of behaviors and situations. The 15 situations included bank, doctor's office, job interview, library, funeral, classroom, restaurant, public park, bus, bedroom, city sidewalk, party, elevator, workplace, and movies. The 12 behaviors included argue, laugh, curse/swear, kiss, cry, sing, talk, flirt, listen to music, read newspaper, bargain, and eat.

Behavior x Situation Matrices. The measure was administered to participants through the behavior x situation matrix procedure validated by Price and Bouffard (*S50*). Judgments about the appropriateness of each of the 12 behaviors in each of the 15 situations, which comprised the measure, were made for all possible combinations (N=180 judgments). Participants were specifically asked:

> From various sources in our everyday lives we have all developed a subjective "impression" or "feeling" for the appropriateness of any given behavior in a particular situation. In this study, we are interested in *your* judgment of the appropriateness of some particular behaviors in some particular settings. Your task in each case is simply to rate, on a scale from 1 through 6, the appropriateness of the particular behavior in the situation that is given. The rating scale is as follows:
>
> 1 = *extremely inappropriate*, 2 = *very inappropriate*, 3 = *somewhat inappropriate*, 4 = *somewhat appropriate*, 5 = *very appropriate*, and 6 = *extremely appropriate*

They responded to the question "How appropriate is this behavior in this setting?" for each of the 180 behavior x situation pairings. For example, participants were asked to judge how appropriate it was to curse in a library, eat in a bank, talk in the movies, cry in a public park, etc. for all possible behavior and situation pairs (see Table S4 for example items). Consistent with Price and Bouffard, we calculated the situational constraint of each situation by averaging the appropriateness ratings of all behaviors for a given situation. We calculated average situational constraint scores for each country by averaging across situations. The scores were reversed for presentation in the main text such that high values are indicative of high constraint.

We theorized that situational constraint is a shared collective construct (*S23*) where perceptions of the range of behaviors seen as appropriate across situations in a given nation is, generally speaking, shared among its members. Analyses strongly supported this assumption. We calculated aggregation statistics separately for each of the 15 situations in each of the 33 countries, treating each of the 12 behaviors as items. The mean and median of the $r_{wg(j)}$ values across countries for each situation ranged from .95-.96. Furthermore, all $r_{wg(j)}$ values were greater than the recommended cutoff point of .70. We also assessed aggregation statistics for the overall situational constraint measure. To assess within country agreement for the overall scores we

calculated an $r_{wg(j)}$ value for each country, treating the 15 situations as items. The $r_{wg(j)}$ values provided strong evidence of agreement for all 33 countries (M = .99, Mdn = .99, SD = .00).

The one-way ANOVA for the situational constraint measure produced a highly significant F-value [$F(32, 6790) = 92.9$, $P < .0001$], indicating that there is high between-nation variability in situational constraint. Moreover, the ICC(1) value exceeded the recommended cutoff of .06 [ICC(1)=.31], indicating that 31% of the variance in situational constraint is explained by nations and that the situational constraint measure has high inter-rater reliability. The ICC(1) values calculated across countries separately for each situation, ranged from .09 to .36. The ICC(2) value for the overall situational measure was .99, far exceeding the recommended cutoff of .70, and the ICC(2) values for the specific situations ranged from .95 to .99. Collectively, these results provide strong justification for aggregation, and namely that situational constraint is a shared, reliable construct with significant between-nation variance.

As per Price and Bouffard (*S50*), we established the construct validity of the situational constraint measure by asking participants to provide direct ratings of each of the situations. The validation questions included: (1) To what extent does the setting allow people to behave as they choose? (2) To what extent does the setting have clear rules regarding appropriate behavior? (3) To what extent does the setting call for or demand certain behaviors and not others? (4) To what extent does the setting require that people monitor their own behavior or "watch what they do"? Participants responded to these questions on a scale ranging from 1 (*not at all*) to 5 (*very much*). See Table S5 for example items. To avoid participant fatigue, four different versions of the survey were created, such that each participant provided ratings for only one of the situational constraint validity questions for all 15 situations.

The measure of situational constraint showed strong construct validity. Mean ratings for each situation in each country were correlated with the index of situational constraint for the situation from the behavior-situation matrices. The four ratings, namely whether the 15 situations allowed individuals to choose their behavior (rating 1), have clear rules regarding appropriate behavior (rating 2), call for certain behaviors and not others (rating 3), and require people to monitor their behavior or "watch what they do" (rating4) were all highly intercorrelated and loaded onto a single factor ($\lambda_1 = 2.71$, $\lambda_{2\text{-}4} < .70$; explaining 68% of the variance) and were averaged for an overall direct rating of situational constraint. The direct ratings on situations and behavior-situation ratings were correlated at .74 ($P < .001$), illustrating construct validity for the measure (*S50*).

As another indication of construct validity, we compared the situational constraint scores found in the present data in the United States, with those reported by Price and Bouffard (*S50*) collected in the United States more than 30 years ago. We assessed eight of the 15 situations originally studied by Price and Bouffard. As shown in Table S6, the rank order of the situations assessed in 2003 and 1974 were highly similar. The correlation between the degree of constraint for the eight situations assessed in 1974 and 2003 was .92 ($P < .001$). This suggests that the degree of constraint across situations is stable across time.

Situational Constraint Affordances of Psychological Processes

We assessed a number of psychological constructs to test our theory, including aspects of prevention focus, self-regulation strength, epistemic needs, and self-monitoring ability.

Situational Constraint Affordances of Prevention Focus: Cautiousness and Dutifulness. Higgins (*S59*) argued that people with strong normative ought self-guides are concerned with conforming to normative rules, injunctions, and prescribed duties and obligations. Normative guides thus represent the "generalized other" and evoke a prevention focus (*S59*). We assessed aspects of prevention regulatory focus through measures from the cautiousness and dutifulness subscales from Goldberg's validated International Personality Item Pool (*S60-61*). We theorized that individuals in nations that have high situational constraint will be more cautious and dutiful as compared to individuals in nations that have low situational constraint. Example cautiousness items include, "I am very careful to avoid making mistakes" and "I choose my words with care," "I reflect on things before acting," "I act without thinking (reverse coded)". Example dutifulness items include, "I behave properly" and "I stick to the rules," "I pay no attention to what is asked" (reverse coded). All items were rated on a 6-point scale where 1 = *strongly disagree* and 6 = *strongly agree*.

Situational Constraint Affordances of Self-Regulation Strength. We theorized that individual in nations where there is high situational constraint will have higher self-regulatory strength (self-control) than individuals in nations where there is low situational constraint. Having high self-control is adaptive to the preponderance of strong situations

and is functional to the extent that it helps individuals avoid the possibility of being censored for inappropriate behavior. By contrast, in cultures characterized by primarily weak situations, individuals will have less of a need to show restraint, and thus, will tend to be lower on self-control. We assessed participants' self-regulation strength through the impulse self-control subscale from Goldberg's International Personality Item Pool (*S60-61*). Example impulse self-control items include, "I keep my emotions under control" and "I easily resist temptations" All items were rated on a 6-point scale where 1 = *strongly disagree* and 6 = *strongly agree*.

Situational Constraint Affordances of Epistemic Needs. We expected that individuals' epistemic needs, or the desire for clear knowledge and information, will be related to the degree of situational constraint within nations. We assessed an aspect of epistemic needs, the need for structure, to examine this prediction. Individuals who have a high need for structure prefer an ordered environment and rely on formalized social scripts in their interactions with others (*S62*). Such tendencies are adaptive to strong situations with high censoring of behavior. Accordingly, individuals in nations with high situational constraint were expected to have a greater preference for structure. By contrast, individuals in nations with low situational constraint were theorized to have a lower need for structure as this is adaptive to a weaker normative environment wherein there is a wide range of behavior that are permissible. We assessed participants' desire for order and discomfort with ambiguity through the Neuberg and Newsom's (*S62*) personal need for structure (PNS) scale. Participants responded to 8 items on a 6-point scale where 1 = *strongly disagree* and 6 = *strongly agree*. Example items include: "I enjoy having a clear and structured mode of life", "I like to have a place for everything and everything in its place", "I find that establishing a consistent routine enables me to enjoy life more", and "I don't like going into a situation without knowing what I can expect from it."

Situational Constraint Affordances of Self-Monitoring Ability. Cultural differences in situational constraint were expected to be related to individuals' self-monitoring abilities, or the ability to monitor and adjust one's behavior to the context. Individuals in nations with high situational constraint will engage in more frequent self-monitoring, as the need to comply with social norms so as to avoid punishment is much greater. In comparison, individuals in nations with a low situational constraint experience less of a need to constantly monitor their behavior to ensure compliance with social norms, and thus should exhibit overall lower self-monitoring ability. We assessed participants' self-monitoring ability with Lennox and Wolfe's (*S63*) revised version of Snyder's (*S64*) self-monitoring scale, which assesses the ability to modify one's self-presentation. Sample items are "Once I know what a situation calls for, it's easy for me to regulate my actions accordingly," "I have found that I can adjust my behavior to meet the requirements of the situations I find myself in," and "I have trouble changing my behavior to suit different people and different situations" (reverse coded). Participants responded to these items on a 6-point scale where 1 = *certainly not, always false* to 6 = *certainly, always true*.

We conducted a Procrustes Factors Analysis for all scales, including prevention focus (cautiousness, dutifulness), self-regulation strength (impulse control), need for structure, and self-monitoring ability. For the personal need for structure scale, the normative EFA revealed that, as expected, the 8 items loaded cleanly onto two factors: desire for structure and response to lack of structure. When the cultural samples were subjected to procrustes rotation, the identity coefficient for the desire for structure factor exceeded the .90 cutoff for all 33 countries, but the identity coefficient for the response to lack of structure factor only met the .90 cutoff for 17 countries. Thus, the desire for structure factor demonstrated structural equivalence, but the response to lack of structure factor did not. Accordingly, we only report analyses for the desire for structure scale. We note, however, that the response to lack of structure scale revealed parallel effects in all of our analyses (all data are available from the first author). Each of the remaining scales loaded onto a single factor in the normative solution. Procrustes rotations were conducted separately for each of these scales, and for each scale the identity coefficient met the .90 criteria in all countries. Thus, each of these scales demonstrated structural equivalence. Based on the analyses, some items were dropped due to low loadings in the normative solution. In the final solutions the cautiousness scale included nine items (α = .85), the dutifulness scale included 10 items (α = .86), the impulse control scale included five items (α = .73), and the self-monitoring scale had five items (α = .77).

Hierarchical linear modeling (HLM) analyses indicated that there were large cultural differences in all of the psychological adaptations. The ICC(1) values all exceeded the recommended cutoffs for ICC (1) of .06 (cautiousness = .12; dutifulness = .13; impulse control=.08; desire for

structure=.19; and self-monitoring-=.10, *P*'s all <.01).

Sources and Descriptions of Archival Data

Ecological archival data. Population density was gathered from a published source for the year 1500 (*S65*), from the United Nations for the year 2000 (*S66*), and from the World Bank's World Development Indicators for rural areas in the year 2000 (*S67*). All population density measures were transformed by a natural log function to reduce skewness in distribution. Data on arable land, food production, food supply, protein and fat supply, and food deprivation in year 2002 were taken from the Food and Agriculture Organization of the United Nations (*S68*). Population pressure, air quality and natural disaster vulnerability were obtained from the 2005 Environmental Sustainability Index Report (*S69*). Data on percentage of farmland and access to safe water were taken from Kurian's world ranking (*S70*). The index of historical prevalence of pathogens was taken from Murray and Schaller's research, in which they constructed the disease prevalence index based on early epidemiological atlases (*S71*). The World Health Organization (WHO) provided data for years of life lost to communicable disease in 2002 and prevalence of tuberculosis per 100,000 in 2000 (*S72*). Mortality rate for infants from 2000-2005 and children under 5 in the year of 2000 were also gathered from the United Nations (*S66*). The number of threats from neighboring nations for integration and annexation, or territorial threats, from 1918-2001, was gathered from the International Crisis Behavior Archives (*S73*).

Socio-Political Institutions and Practices. Autocratic polity 2002 data were gathered from the Polity IV Project (*S74*). Openness of the media, political rights and civil liberties ratings were obtained from the 2001 Freedom of the Press historical data and the 2001-2002 Freedom of the World comparative and historical data at Freedom House.org respectively (*S75*). Digital access index was gathered by the 2005 Environmental Sustainability Index Report (*S69*). Murder, crime, and burglary rates as well as population per police officer were gathered from Kurian's world ranking (*S70*). Acquittal rates per 100,000 populations in 1999-2002 were gathered from the United Nation Office on Drugs and Crime (*S76*). Retention of death penalty was gathered from the website of the Amnesty International Organization (*S77*).

Data on the importance of God, the frequency of religious service attendance, and institutional challenge and dissent were taken from the 1995 wave of World Values Survey (*S31*). Data were used from this wave because it provided the most data points. However, Israel, Malaysia, Hong Kong, and Singapore were not surveyed in this wave of WVS. Responses to the same questions, where available, were taken from the 2000 wave of WVS for Israel and Singapore and the 2005 wave for Malaysia and Hong Kong. For ratings of religiosity, respondents rated how important God is in their life and indicated how often they attended religious services apart from weddings, funerals, and christenings.

For the measure of institutional challenge and dissent, we examined the percentages of respondents in each nation who indicated that they have participated or would never participate in different forms of political actions (i.e., signing petitions, boycotting, attending demonstrations, joining strikes, occupying buildings). In addition, we computed average percentages of the five forms of political actions to form two overall indices of participation and unwillingness to participate in these actions (*S31*).

Economic Indicators. GNP data was gathered from the Kurian's world ranking (*S70*) and the growth competitiveness index was taken from the 2002-2003 Global Competitiveness Report (*S78*).

Multilevel Structural Equation Analyses

In order to provide an overall test of the relations depicted in Figure 1, we performed multilevel structure equation modeling (SEM) using the Mplus 5.2 software package (*S79-81*). We first created a composite of ecological and historical threats comprised of standardized values of historical population density in 1500, food deprivation index, years of life lost to communicable disease, vulnerability to disaster, and historical territorial conflicts (α = .93). The selection of these variables was theoretically driven as they represent different type of threats that nations face. Factor analysis of these variables showed that they loaded onto one factor accounting for 79.63% of total variance (λ_1 = 3.96, $\lambda_{2\text{-}5}$ < 1) with factor loadings ranging from .71 to .97. A composite of socio-political institutions was also created with the same approach. It was comprised of standardized values of autocracy, media openness (reversed), retention of the death penalty, challenges to institutions through participating in collective actions (reversed) and crime rate (reversed) (α = .86). Factor analysis showed that these variables loaded onto one factor accounting for 65.64% of total variance (λ_1 = 3.19, $\lambda_{2\text{-}5}$ < 1) with factor loadings ranging from .67 - .89. To control for GNP in these two macro factors, we used the unstandardized residuals from GNP in our model.

According to the theory of tightness-looseness, ecological and historical threats and socio-political institutions enhance the strength of societal norms and the degree of intolerance of deviant behavior. The strength of social norms and tolerance of deviance in nations is theorized to affect the strength of everyday situations in local worlds, which affords and sustains particular psychological processes. We tested this macro to micro cultural pathway for each of the psychological variables (e.g., cautiousness, dutifulness, impulse control, need for structure and order, and self-monitoring ability). The goodness of fit indices of the five models suggest very good fit to the data (cautiousness: χ^2 = 10.12, df =5, *P* = .07, CFI = .925, RMSEA = .012; dutifulness: χ^2 = 8.76, df=5, *P* = .12, CFI = .931, RMSEA = .011; impulse control: χ^2 = 8.52, df=5, *P* = .13, CFI = .950, RMSEA = .010; need for structure and order: χ^2 = 7.03, df=5, *P* = .22, CFI = .959, RMSEA = .008; self-monitoring ability: χ^2 = 9.39, df=5, *P* = .09, CFI = .902, RMSEA = .012). Path coefficients were all in the theorized direction: Ecological and historical threats and socio-political institutions are each associated with greater societal tightness-looseness (.21, *SE* = .07, *P*<.01 and .12, *SE* = .06, *P*=.04 respectively). Societal tightness is associated with higher situational constraint (.30, *SE* = .08, *P*<.01), which is associated with each of the psychological processes variables (cautiousness: 1.43, *SE* = .15, *P*<. 01; dutifulness: 1.04, *SE* = .23, *P* < . 01; impulse control: 1.16, *SE* = .17, *P* <.01; need for structure and order: 2.65, *SE* = .49, *P*<.01; and self-monitoring ability: .86, *SE* = .25, *P*<. 01). These multilevel structural equation analyses illustrate support for the relations theorized in Figure 1.

Table S1. Tightness-looseness convergent validity data. The column Sources presents the source from which the variables were drawn. The column N indicates the number of available data points for analysis across the 33 nations. † *P* = or < .10, * *P* = or < .05, ** *P* = or < .01.

Correlates	**Sources**	**N**	**Correlations**	***P*-values (2-tailed)**	***Effect size* (η^2)**
Expert Rating	Harry Triandis	1	.61	.01**	.37
Pressure toward Uniformity					
Percentage of population using left hand (log)	Perelle and Ehrman (1994)	11	-.61	.05*	.37
Accuracy of clocks in major cities	Levine & Noranzayan (1999)	17	-.60	.01**	.36
Attitude Toward Deviant Behavior					
Justifiability of morally relevant behavior (Mean ratings)	World Value Survey (1995)	32	-.48	.01**	.23
Justifiability of morally relevant behavior (SD of ratings)	World Value Survey (1995)	32	-.56	.01**	.31
"Unrestricted" sociosexuality orientation	Schmitt (2004)	23	-.44	.04*	.19
Alcohol consumption (liter per capita)	World Health Organization (2004)	31	-.46	.01**	.21
Desire for Order					
Preferences of political systems that have a strong leader or are ruled by the army	World Value Survey (1995)	30	.38	.04*	.14
Most important responsibility of government is to maintain order of society	World Value Survey (1995)	18	.61	.01**	.37
Attitudes Toward "Different" People					
Agreement on ways of life needs to be protected from foreign influence	Pew Global Attitude Project (2002)	16	.57	.02**	.32
Would not want to have immigrants as neighbors	World Value Survey (1995)	31	.43	.02**	.18
Percentage of population of international migrants (log)	United Nations (2002)	32	-.32	.08†	.10
Agreement on one's culture is superior	Pew Global Attitude Project (2002)	16	.60	.01**	.36

Table S2. Correlations between tightness-looseness and other cultural dimensions. The column Sources presents the published source from which the cultural dimension values were drawn. The column N indicates the number of available data points for analysis across the 33 nations.
† *P* = or < .10, * *P* = or < .05, ** *P* = or < .01.

Cultural Dimensions	**Sources**	**N**	**Correlations**	***P-values (2-tailed)***	***Effect size*** (η^2)
Cultural Values					
Individualism	Hofstede (2001)	30	-.47	.01**	.22
Power distance	Hofstede (2001)	30	.42	.02*	.18
Uncertainty avoidance	Hofstede (2001)	30	-.27	.16	.07
Masculinity index	Hofstede (2001)	30	-.08	.68	.01
Long-term orientation index	Hofstede (2001)	14	-.05	.87	.00
Harmony	Schwartz (1994)	22	-.26	.24	.07
Conservatism	Schwartz (1994)	22	.43	.04*	.18
Hierarchy	Schwartz (1994)	22	.47	.03*	.22
Mastery	Schwartz (1994)	22	.18	.42	.03
Affective autonomy	Schwartz (1994)	22	-.23	.30	.05
Intellectual autonomy	Schwartz (1994)	22	-.28	.20	.08
Egalitarian commitment	Schwartz (1994)	22	-.41	.06	.17
Family collectivism	House et al. (2004)	26	.49	.01**	.24
Institutional collectivism	House et al. (2004)	26	.43	.03*	.18
Performance orientation	House et al. (2004)	26	.35	.08†	.12
Power distance	House et al. (2004)	26	.32	.11	.10
Gender egalitarianism	House et al. (2004)	26	-.35	.08†	.12
Assertiveness	House et al. (2004)	26	-.29	.15	.08
Uncertainty avoidance	House et al. (2004)	26	.32	.12	.10
Future orientation	House et al. (2004)	26	.47	.02*	.22
Humane orientation	House et al. (2004)	26	.30	.13	.09
Loyalty vs. utilitarian involvement	Smith, Dugan, & Trompenaars (1996)	26	.45	.02*	.20
Traditional/secular rational values	www.worldvaluessurvey.org (Wave 4 data, 2000)	30	-.11	.54	.01
Self-expression values	www.worldvaluessurvey.org (Wave 4 data, 2000)	30	-.13	.50	.02

Cultural Dimensions	**Sources**	**N**	**Correlations**	***P-values (2-tailed)***	***Effect size (η^2)***
Social Axioms					
Fate control	Leung & Bond (2004)	25	.44	.03*	.19
Spirituality	Leung & Bond (2004)	25	.52	.01**	.27
Reward for application	Leung & Bond (2004)	25	.60	.01**	.36
Cynicism	Leung & Bond (2004)	25	.14	.49	.02
Flexibility	Leung & Bond (2004)	25	-.20	.33	.04
Sources of Guidance					
Vertical sources	Smith et al. (2002)	29	.40	.03*	.16
Beliefs that are widespread in my nation	Smith et al. (2002)	29	.54	.01**	.29
Unwritten rules	Smith et al. (2002)	29	.18	.35	.03
Specialists	Smith et al. (2002)	29	-.18	.35	.03
Coworkers	Smith et al. (2002)	29	-.16	.41	.03
National Wealth and Growth Competitiveness					
Gross National Product per capita	Kurian's World Ranking (2001)	33	.05	.79	.00
Global growth competitiveness	Global Competitiveness Report (2002-2003)	30	-.08	.68	.00

Table S3. Partial correlations between tightness-looseness and ecological, historical, and socio-political variables adjusted for Gross Nation Product (GNP) per capita. For ease of interpretation, correlations with natural disaster vulnerability, openness of media, political rights, and civil liberties have been reversed with a higher number indicating higher values. The label "(Log)" following national indicators means that the variable was transformed by the natural log function to correct for skewed distribution. † *P* = or < .10, * *P* = or < .05, ** *P* = or < .01.

National Indicators	Source	N	Correlations	P-value (2-tailed)	*Effect size* (η^2)
Population Density and Pressure					
Population density in 1500 (Log)	McEvedy and Jones (1978)	11	.77	.01**	.59
Population density (Log)	United Nations (2000)	32	.31	.10†	.10
Rural population density (Log)	World Bank (2000)	30	.59	.01**	.35
Population pressure by 2050	Environmental Sustainability Index (2005)	30	.40	.03*	.16
Natural Resources					
Arable land	Food and Agriculture Organization of the United Nation (FAOSTAT) (2002)	31	-.10	.59	.01
Percentage of farmland	Kurian's World Ranking (2001)	31	-.37	.05*	.14
Food deprivation	FAOSTAT (2002)	30	.52	.01**	.27
Food supply	FAOSTAT (2002)	30	-.36	.05*	.13
Food production index	FAOSTAT (2002)	31	-.40	.03*	.16
Protein supply	FAOSTAT (2002)	30	-.41	.03*	.17
Fat supply	FAOSTAT (2002)	30	-.46	.01**	.21
Access to safe water	Kurian's World Ranking (2001)	31	-.50	.01**	.25
Air quality	Environmental Sustainability Index (2005)	30	-.44	.02*	.19
History of Territorial Conflict					
Total number of territorial threats	International Crisis Behavior Data (1918-2001)	27	.41	.04*	.17
Environmental and Health Vulnerabilities					
Natural disaster vulnerability	Environmental Sustainability Index (2005)	30	.47	.01**	.22
Historical prevalence of pathogens	Murray and Schaller (2010)	32	.36	.05*	.13
Life lost to communicable diseases (Log)	World Health Organization (2002)	31	.59	.01**	.35
Prevalence of tuberculosis per 100,000 population (Log)	World Health Organization (2000)	31	.61	.01**	.37
Infant mortality rate (Log)	United Nations (2000-2005)	32	.42	.02*	.18
Children under 5 mortality rate (Log)	United Nations (2000-2005)	32	.46	.01*	..21

National Indicators	Source	N	Correlations	P-value (2-tailed)	*Effect size* (η^2)
Government and Media					
Autocratic polity	Polity IV Project (2002)	30	.47	.01**	.22
Openness of the media (total)	Freedom House (2001)	29	-.53	.01**	.28
Broadcast media laws and regulations	Freedom House (2001)	29	.49	.01**	.24
Broadcast media political pressures and controls	Freedom House (2001)	29	.62	.01**	.38
Print media laws and regulations	Freedom House (2001)	29	.37	.05*	.14
Print media political pressures and controls	Freedom House (2001)	29	.46	.01**	.21
Digital access index: access and use of new information and technology	Environmental Sustainability Index (2005)	30	-.38	.04*	.14
Political and Civil Liberties					
Political rights	Freedom House (2001-2002)	30	-.50	.01**	.25
Civil liberties	Freedom House (2001-2002)	30	-.45	.01**	.20
Criminal Justice					
Police presence per capita	Kurian's World Ranking (2001)	27	.31	.12	.10
Acquittal rate per 100,000	UN office on Drugs & Crime (1999-2002)	27	.03	.88	.00
Retention of the Death Penalty	Amnesty International online (2002)	29	.65	.01**	.36
Murder per 100,000	Kurian's World Ranking (2001)	31	-.45	.01**	.20
Burglaries per 100,000	Kurian's World Ranking (2001)	28	-.47	.01**	.22
Volume of crime per 100,000	Kurian's World Ranking (2001)	32	-.37	.04*	.14
Religion					
Importance of God	World Value Survey (1995)	30	.37	.05*	.14
Percentage of attending religious services at least once a week	World Value Survey (1995)	31	.54	.01**	.29
Challenge to Institutions					
Percentage reported have participated in collective action (total)	World Value Survey (1995)	31	-.40	.03*	.16
Sign petition	World Value Survey (1995)	31	-.41	.02*	.17
Boycott	World Value Survey (1995)	31	-.02	.91	.00
Attend demonstration	World Value Survey (1995)	31	-.48	.01**	.23
Join strikes	World Value Survey (1995)	29	-.22	.25	.05
Occupy building	World Value Survey (1995)	29	-.16	.41	.03

National Indicators	Source	N	Correlations	P-value (2-tailed)	*Effect size* (η^2)
Percentage reported would never participate in collective action (total)	World Value Survey (1995)	31	.36	.05*	.13
Sign petition	World Value Survey (1995)	31	.40	.03*	.16
Boycott	World Value Survey (1995)	31	.04	.83	.00
Attend demonstration	World Value Survey (1995)	31	.48	.01**	.23
Join strikes	World Value Survey (1995)	29	.19	.34	.04
Occupy building	World Value Survey (1995)	29	.12	.54	.01

Table S4. Example Behavior x Situation Ratings

	How appropriate is this behavior in this setting?					
	Extremely Inappropriate	**Very Inappropriate**	**Somewhat Inappropriate**	**Somewhat Appropriate**	**Very Appropriate**	**Extremely Appropriate**
1. Eat in an elevator	1	2	3	4	5	6
2. Talk (have a conversation) in the library	1	2	3	4	5	6
3. Curse/swear (use foul language) at the workplace	1	2	3	4	5	6
4. Laugh out loud in the classroom	1	2	3	4	5	6
5. Flirt at a funeral ceremony	1	2	3	4	5	6
6. Argue in a job interview	1	2	3	4	5	6
7. Listen to music on headphones in a restaurant	1	2	3	4	5	6
8. Cry (shed tears) at the doctor's office	1	2	3	4	5	6
9. Read newspaper in a public park	1	2	3	4	5	6
10. Curse/swear (use foul language) in one's bedroom	1	2	3	4	5	6
11. Sing on a city sidewalk	1	2	3	4	5	6
12. Laugh out loud on a bus	1	2	3	4	5	6
13. Kiss (on the mouth) in a restaurant	1	2	3	4	5	6
14. Bargain (exchange goods, services, or privileges) at the movies	1	2	3	4	5	6

Table S5: Example construct validation items

	To what extent does the situation require that people monitor their own behavior or "watch what they do"?				
	Not at All		**Somewhat**		**Very Much**
1. Bank	1	2	3	4	5
2. Doctor's Office	1	2	3	4	5
3. Job Interview	1	2	3	4	5
4. Library	1	2	3	4	5
5. Funeral	1	2	3	4	5
6. Classroom	1	2	3	4	5
7. Restaurant	1	2	3	4	5
8. Public Park	1	2	3	4	5
9. Bus	1	2	3	4	5
10. Own Bedroom	1	2	3	4	5
11. City Sidewalk	1	2	3	4	5
12. Party	1	2	3	4	5
13. Elevator	1	2	3	4	5
14. Movies	1	2	3	4	5
15. Workplace	1	2	3	4	5

Table S6. Comparison of constraint across U.S. Situations in 1974 with Gelfand et. al's situational constraint data. The situational constraint scores are the original standardized scores and multiplied by 10 for easier reference. The correlation between situational constraint in Gelfand et al.'s U.S. data and Price & Bouffard (1974) = .92 (P <.001).

Situations	Gelfand et al. (2011)		Price & Bouffard (1974)	
	Score	Rank	Score	Rank
Church	--	--	2.19	1
Job Interview	-15.3	1	2.47	2
Funeral	-11.8	2	--	--
Family Dinner	--	--	3.85	4
Classroom	-6.8	3	3.88	5
Library	-6.0	4	--	--
Bank	-3.3	5	--	--
Movie	-2.4	6	3.95	6
Restroom	--	--	3.97	7
Doctor's Office	-1.8	7	--	--
Workplace	-1.5	8	--	--
Elevator	2.0	9	3.58	3
Restaurant	2.5	10	--	--
Bus	4.2	11	4.51	9
Party	9.0	12	--	--
City sidewalk (Sidewalk)	9.7	13	4.39	8
Date	--	--	4.87	10
Bar	--	--	4.87	11
Football game	--	--	5.33	12
Dorm lounge	--	--	5.66	13
Public Park	12.6	14	6.58	14
Bedroom (Own room)	20.0	15	7.5	15

REFERENCES FOR SUPPORTING ONLINE MATERIALS

S1. K. Boehnke, P. Lietz, M. Schreier, A. Wilhelm, in *Cross-Cultural Research Methods in Psychology,* D. Matsumoto & F. Van de Vijver, Eds. (Cambridge University Press, Cambridge UK, 2011), 101-129.

S2. K. Leung, M. H. Bond, Social axioms: A model of social beliefs in multi-cultural perspective. *Adv. Exp. Soc. Psychol.* **36**, 119–197 (2004).

S3. R. W. Brislin, in *Handbook of Cross-Cultural Psychology: Theory and Method*, H. C. Triandis, J. W. Berry, Eds. (Allyn & Bacon, Boston, MA, 1980), 389-444.

S4. M. J. Gelfand, J. L. Raver, K. H. Ehrhart, in *Handbook of Research Methods in Industrial and Organizational Psychology*, S. G. Rogelberg, Ed. (Blackwell, Malden, Massachusetts, 2002), 216-246.

S5. F. J. R. Van De Vijver, K. Leung, *Methods and Data Analysis for Cross-Cultural Research* (Sage, Thousand Oaks, CA, 1997).

S6. G. Hofstede, *Culture's Consequences* (Sage, Beverly Hills, CA, 1980).

S7. R. F. DeVellis, *Scale Development: Theory and Applications* (Sage, Thousand Oaks, CA, 2003).

S8. L. J. Cronbach, P. E. Meehl, Construct validity in psychological tests. *Psychol. Bull*. **52,** 281-302 (1955).

S9. T. R. Hinkin, A review of scale development practices in the study of organizations. *J. Manage.* **21,** 967-988 (1995).

S10. S. L. Magazine, L. J. Williams, M. L. Williams, A confirmatory factor analysis examination of reverse coding effects in Meyer and Allen's Affect and Continuance Commitment Scales. *Educational Psychol. Measurement* **56**, 241-250 (1996).

S11. H. W. Marsh, Positive and negative global self-esteem: A substantively meaningful distinction or artifactors? *J. Person. Social Psychol.* **70**, 810-819 (1996).

S12. N. W. Schmitt, D. M. Stults, Factors defined by negatively keyed items: The results of careless respondents? *Appl. Psychol. Measurement* **9**, 367-373 (1985).

S13. D. P. Schmitt, J. Allik, Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: Exploring the universal and cultural-specific features of global self-esteem. *J. Person. Social Psychol.* **89**, 623-642 (2005).

S14. P. Spector, P. V. Katwyk, M. Brannick, P. Chen, When two factors don't reflect two constructs: How item characteristics can produce artifactual factors. *J. Management* **23**, 659-677 (1997).

S15. R. R. McCrae, A. B. Zonderman, P. T. Costa Jr, M. H. Bond, S. V. Paunonen, Evaluating replicability of factors in the revised NEO personality inventory: Confirmatory factor analysis versus procrustes rotation. *J. Person. Social Psychol.* **70**, 552-566 (1996).

S16. H. J. Eysenck, S. B. G. Eysenck, in *Recent Advances in the Cross-Cultural Study of Personality*, J. N. Butcher, C. D. Spielberger, Eds. (Erlbaum, Hillsdale NJ, vol. 2, 1983), 41-69.

S17. R. R. McCrae, P. T. Costa, G. H. Del Pilar, J. P. Rolland, W. D. Parker, Cross-cultural assessment of the five factor model: The Revised NEO Personality Inventory. *J. Cross-Cultural Psychol.* **29**, 171-188 (1988).

S18. K. Van Der Veer, R. Ommundsen, K. S. Larsonv, Structure of attitudes toward illegal immigration: Development of cross-national cumulative scales. *Psychol. Rep*. **94***,* 897-906 (2004).

S19. T. Lajunen, D. Parker, H. Summala, The Manchester driver behaviour questionnaire: A cross-cultural study. *Accident Anal. Prev.* **36**, 231-238 (2004).

S20. S. H. Schwartz, in *Comparing Cultures, Dimensions of Culture in a Comparative Perspective,* H. Vinken, J. Soeters, P. Ester, Eds. (Brill, Leiden, The Netherlands, 2004), 43-73.

S21. M. Javidan, R. J. House, P. W. Dorfman, P. J. Hanges, M. Sully de Luque, Conceptualizing and measuring cultures and their consequences: A comparative review of GLOBE's and Hofstede's approaches. *J. Int. Business Stud.* **37**, 897-914 (2006).

S22. E. Van de Vliert, *Climate, Affluence, and Culture* (Cambridge Univ. Press, New York, 2009).

S23. D. Chan, Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *J. Appl. Psychol*. **83**, 234-246 (1998).

S24. P. D. Bliese, in *Multilevel Theory, Research and Methods in Organization*, K. J. Klein & S. W. Kozlowski, Eds. (Jossey-Bass, San Francisco, CA, 2000), 349-381.

S25. K. J. Klein, et al., in *Multilevel Theory, Research and Methods in Organization,* K. J. Klein, S. W. J. Kozlowski, Eds. (Josey-Bass, San Francisco, CA, 2000), 512-553.

S26. L. R. James, R.G. Demaree, G. Wolf, Estimating within-group interrater reliability with and without response bias. *J. Appl. Psychol*. **69**, 85-98 (1984).

S27. J. M. LeBreton, L. R. James, L.R., M. K. Lindell, Recent issues regarding r_{WG}, $r^*_{WG,}$ $r_{WG(J)}$, and $r^*_{WG(J).}$ *Org. Res. Methods* **8***,* 128-138 (2005).

S28. J. J. Bartko, On various intraclass correlation reliability coefficients, *Psychol. Bull*. **83,** 762-765 (1976).

S29. I.B. Perelle, L. Ehrman, An international study of human handedness: The data. *Behav. Genetics* **24**, 217-227 (1994). Additional country data on human handedness were provided by Damian Murray and Mark Schaller.

S30. R. V. Levine, A. Norenzayan, The pace of life in 31 countries. *J. Cross-Cult. Psychol.* **30**, 178-205 (1999).

S31. World Value Survey, Official Data File. V.3. World Values Survey Association (Online database, www.worldvaluessurvey.org) (1995). When Wave 3 data were unavailable, we used data from subsequent wave.

S32. D. P. Schmitt, Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behav. Brain. Sci.* **28**, 247-311 (2004).

S33. World Health Organization, *Global Status Report on Alcohol* (Department of Mental Health and Substance Abuse, Geneva, Switzerland, 2004).

S34. Pew Research Center, *Pew Global Attitude Project* (Washington DC, 2002; http://people-press.org/dataarchive/#2002).

S35. United Nations, Department of Economic and Social Affairs, Population Division. *Trends in International Migrant Stock: The 2008 Revision* (United Nations database, 2009; POP/DB/MIG/Stock/Rev.2008).

S36. R. J. House, P. J. Hanges, M. Javidan, P. W. Dorfman, V. Gupta, *Culture, Leadership, and Organizations: The GLOBE Study of 62 Cultures* (Sage, San Francisco, CA, 2004).

S37. R. Inglehart, C. Welzel, *Modernization, Cultural Change, and Democracy: The Human Development Sequence* (Cambridge University Press, New York, 2005).

S38. G. Hofstede, *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations* (Sage, London, 2001).

S39. S. H. Schwartz, in *Individualism and Collectivism: Theory, Method, and Applications*, U. Kim, H. C. Triandis, C. Kagitiçibasi, S. Choi, & G. Yoon, Eds. (Sage, Thousand Oaks, CA, 1994), 85-119.

S40. P. B. Smith, S. Dugan, F. Trompenaars, National culture and the values of organizational employees: A dimensional analysis across 43 nations. *J. Cross-Cultural Psychol.* **27***,* 231–264 (1996).

S41. R. Inglehart, W. E. Baker, Modernization, cultural change, and the persistence of traditional values. *Am. Sociol. Rev.* **65***,* 19-51 (2000).

S42. P. B. Smith *et. al*, Cultural values, sources of guidance and their relevance to managerial behavior: A 47-nation study. *J. Cross-Cultural. Psychol.* **33***,* 188-208 (2002).

S43. S. Carpenter, Effects of cultural tightness and collectivism on self-concept and causal attributions. *Cross-Cultural Res*. **34**, 38-56 (2000).

S44. The nature of the relationship between tightness and collectivism warrants future empirical attention. It is possible that tightness-looseness can increase collectivism to the extent that having strong norms and greater intolerance of deviant behavior might render a greater sense of interdependence and embeddedness of the self in groups. On the other hand, collectivism could also have an influence on the development of tightness. The priority on in-group goals over self-interest could also lead people to comply with societal norms and punish deviant behavior to a greater extent. The constructs might also be related because they share some similar antecedents. For example, certain historical and human-made threats (e.g., high levels of contagious diseases such as tuberculosis) may produce cultural adaptations that include both developing strong norms with low tolerance for deviant behavior (tightness) as we have shown, as well as developing strong ingroup ties (collectivism), producing a moderate correlation between tightness and collectivism.

S45. P. J. Pelto, The difference between 'tight' and 'loose' societies. *Trans-Action* **5***,* 37-40 (1968).

S46. A. Aycan ***et. al,.*** Impact of culture on human resource management practices: A 10-country comparison. *Appl. Psychol. Int. Review* **49**, 192-222 (2000).

S47. G. Acevedo, Turning anomie on its head: Fatalism as Durkheim's concealed and multidimensional alienation theory. *Sociol. Theory* **23**, 75-85 (2005).

S48. P. B. Smith, Acquiescent response bias as an aspect of cultural communication style. *J. Cross-Cultural Psychol*. **35**, 50-61 (2004).

S49. W. Mischel, in *Personality at the Crossroads*, E. Magnusson, N. S. Endler, Eds. (Erlbaum, Hillsdale, NJ, 1977), pp. 333-352.

S50. R. H. Price, D. L. Bouffard, Behavioral appropriateness and situational constraint as dimensions of social behavior. *J. Person. Social Psychol.* **30**, 579-586 (1974).

S51. E. Goffman, *Behavior in Public Places: Notes on the Social Organization of Gatherings* (Greenwood, Westport, CT, 1963).

S52. J. Adamopoulos, The perception of interpersonal behavior: Dimensionality and importance of the social environment. *Enviro. Behav*. **14,** 29-44 (1982).

S53. R. G. Barker, *Ecological Psychology: Concepts and Methods for Studying the Environment of Human Behavior* (Stanford University Press, Stanford, CA, 1968).

S54. R. H. Price, The taxonomic classification of behaviors and situations and the problem of behavior-environment congruence. *Human Relations*, **27**, 567-585 (1974).

S55. M. Wish, Comparisons among multidimensional structures of interpersonal relations. *Multivariate Behav. Rev*. **11**, 297-324 (1976).

S56. M. Wish, M. Deutsch, S. J Kaplan, Perceived dimensions of interpersonal relations. J. Person. Social Psychol. **33**, 409-420 (1976).

S57. H. Triandis, V. Vassiliou, M. Nassiakou, Three cross-cultural studies of subjective culture. *J. Person. Social Psychol.* **8**, 1-42 (1968).

S58. M. Argyle, M. Henderson, M. Bond, Y. Ilzuka, A. Contarello, Cross-cultural variations in relationship rules. *Int. J. Person.* **21,** 287-315 (1986).

S59. E. T. Higgins, Self-discrepancy: A theory relating self and affect. *Psychol. Rev.* **94**, 319-340 (1987).

S60. L. R. Goldberg, in *Personality Psychology*, I. Mervielde, I. J. Deary, F. de Fruyt, F. Ostendorf, Eds. (Tilburg University Press, Tilburg, 1999), 7-28.

S61. L. R. Goldberg *et al.,* The international personality item pool and the future of public-domain personality measures. *J. Res. Personal.* **40**, 84-96 (2006).

S62. S. L. Neuberg, J. T. Newsom, Personal need for structure: Individual differences in desire for simple structure. *J. Person. Social Psychol*. **65**, 113-131 (1993).

S63. R. Lennox, R. Wolfe, Revision of the Self-Monitoring Scale. *J. Person. Social Psychol.* **46**, 1349-1364 (1984).

S64. M. Snyder, Self-monitoring of expressive behavior. *J. Person. Social Psychol*. **30,** 526-537 (1974).

S65. C. McEvedy, R. Jones, *Atlas of World Population History* (Penguin, New York, 1978).

S66. United Nations, Department of Economic and Social Affairs, *World Population Prospects: The 2008 Revision* (United Nations Population Division, New York, 2009; data.un.org).

S67. The World Bank, *World Development Indicators, 2000* (Online database, databank.worldbank.org/ddp/home.do#ranking).

S68. United Nations Food and Agriculture Organization, *2002 Food Balance Sheets* (Online database, faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor).

S69. Yale Center for Environmental Law and Policy, *2005 Environmental Sustainability Index* (New Haven, CT, 2005; www.yale.edu/esi).

S70. G. T. Kurian, *The Illustrated Book of World Rankings* (Sharpe, New York, ed. 5, 2001).

S71. D. R. Murray, M. Schaller, Historical prevalence of infectious diseases within 230 geopolitical regions: A tool for investigating origins of culture. *J. Cross-Cultural Psychol.* **41**, 99-108 (2010).

S72. World Health Organization data, *World Health Statistics 2008* (Online data base, http://data.un.org/).

S73. Center for International Development and Conflict Management, *Dyadic-Level Crisis Data* (International Crisis Behavior Data, 2003, Online database, http://www.cidcm.umd.edu/icb/data/).

S74. Center for Systemic Peace, *Polity IV Project 1800-2007* (Online database, http://www.systemicpeace.org/inscr/inscr.htm).

S75. Freedom House, *Freedom in the World 2002 Edition & Freedom of the Press 2001 detailed data and sub-scores* (Online database, http://www.freedomhouse.org).

S76. United Nations Office on Drugs and Crime, *Eighth United Nations Survey of Crime Trends and Operations of Criminal Justice Systems* (Division for Policy Analysis and Public Affairs, 2001-2002).

S77. Amnesty International. *Abolitionist and Retentionist Countries* (Online data, www.amnesty.org/en/death-penalty/abolitionist-and-retentionist-countries).

S78. M. E. Porter, J. D. Sachs, J. W. McArthur, *The Global Competitiveness Report 2002-03* (World Economic Forum, 2002-03).

S79. L. K. Muthén, B.O. Muthén, *Mplus User's Guide* (Muthén & Muthén. Los Angeles, CA, ed. 5, 2007).

S80. D. Kaplan, P. R. Elliott, A didactic example of multilevel structural equation modeling applicable to study of organizations. *Structural Equation Modeling,* **4***,* 1-24 (1997).

S81. K. J. Preacher, M.J. Zyphur, Z. Zhang, A general multilevel SEM framework for assessing multilevel mediation. *Psych. Methods,* **3**, 209-233 (2010).