



A Cross-Cultural Study of the Mediating Role of Implicit Theories of Innovativeness in the Relationship Between Values and Attitudes Toward Innovation

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Abstract

This article presents a cross-cultural study on the mediating role of implicit theories of innovativeness in the relationship between basic values and specific attitudes toward innovation. Modernized samples (399 Russians from Moscow and Novokuznetsk) and more traditional samples (194 Chechens and Ingushs from North Caucasus and 200 Tuvins from the Tuva Republic) within the Russian Federation completed the Schwartz Value Survey (SVS), measures of attitudes toward innovation, and an Adjective Check List adapted for measuring implicit theories of innovativeness in the current samples. Main findings include (a) a split in individual and social aspects of implicit theories of innovativeness, (b) different mediation of the effects of Openness to Change and Conservation values, and (c) differences in mediation models between the two samples. Implications of these findings for cross-cultural studies on innovativeness are discussed.

Keywords

values, attitudes to innovation, implicit theories, implicit theories of innovativeness, culture, mediation

Groups of people differ in the extent to which they show innovative activity. Some groups, seen as being more “traditional,” display lower levels of innovative activity than other groups, seen as being more “modern.” An important question is how such differences in innovativeness can be explained. They may be explained in terms of economic factors, such as number of inventions and innovations resulting from public and governmental support, the level of demand for innovation, the intensity of research, or stages of a product life cycle (for a review, see Shane, 1992).

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However, they may also be explained by psychological factors such as cross-cultural differences in values, beliefs about innovators, and attitudes toward innovations.

From a psychological perspective, differences in innovativeness have been mainly understood in terms of broad cultural differences such as horizontal/vertical relationships, values, trust, socio-cultural environment, or patterns of education (e.g., Kharkhurin & Motalleebi, 2008; Lebedeva & Schmidt, 2012; Leung & Morris, 2011). For example, using indices of power distance and individualism developed by Hofstede (2001), Shane (1992) found individualistic and non-hierarchical societies to be more inventive than other societies.

Values of collectivism and high power distance have also been related to lower levels of creativity (Goncalo & Staw, 2006; Harzing & Hofstede, 1996; Jaquish & Ripple, 1984; Niu, Zhang, & Yang, 2007). However, various other studies have found no significant cross-cultural differences in creativity (C. Chen et al., 2002; Niu & Sternberg, 2002; Nouri et al., 2013; Riquelme, 2002). Moreover, according to the Thomson Science Innovation Indicator Country Ratings Japan ranks top of the list with regard to the absolute number of patents, while scoring also high on collectivism and power distance—the two characteristics that were related to lower innovativeness. Such inconsistencies support a recent call made by several researchers to identify the moderators of the culture–creativity relationship (Erez & Nouri, 2010; Morris & Leung, 2010; Zhou & Su, 2010).

In the present article we explore implicit theories of innovativeness (ITI) as an intermediate, explanatory variable of differences in the link between values and attitudes toward innovations. This article describes a comparison of two groups (total $N = 793$) in the Russian Federation that differ in levels of modernization, and hence can be expected to differ in terms of the values that they endorse most. We tested to what extent emerging between-group differences in values and attitudes could be explained by including ITI as a mediator in the link between the two. As such, the article presents two innovations: the inclusion of implicit theories as an intermediary variable and the study of (cultural) groups that can be expected to differ in the psychological processes underlying innovativeness. An additional contribution is that the inclusion of these samples may be one step in the direction of extending studies of creativity and innovation beyond Western cultures (see Leung & Morris, 2011).

Implicit Theories of Creativity

The idea to study ITI as an intermediary variable was inspired by research in the domain of creativity. Although distinct, the constructs of innovativeness and creativity are clearly related (De Dreu, Nijstad, & Baas, 2011). Creativity is generally defined as the generation of novel ideas that are useful and appropriate (e.g., Amabile, 1983, 1996; Brown, 1989; Erez & Nouri, 2010; Mayer, 1999; Mumford & Gustafson, 1988). It differs from innovation in the sense that the latter involves not only generation of creative ideas but also their implementation (Amabile, 1996; Erez & Nouri, 2010; Gatignon, Tushman, Smith, & Anderson, 2002). As such, some have argued that creativity is a necessary precondition for innovativeness (Styhre & Börjesson, 2006; West, 2004). So, before describing our reasoning on ITI, let us first briefly describe insights from cross-cultural creativity research.

There is a considerable amount of evidence indicating that culture can both stimulate and frustrate creativity (Leung & Morris, 2011; Rudowicz, 2003). Cultures can differ in the extent to which attention is given to the novelty aspect of creativity and to its usefulness and appropriateness aspects. For example, Paletz and Peng (2008) manipulated the novelty and usefulness of a new product in scenarios in three cultural groups. They found Chinese participants to value novelty more than Americans, whereas American and Japanese participants valued usefulness more than the Chinese.

Cross-cultural differences in creativity have been explained in terms of values, mostly using the theory of basic human values, proposed by Schwartz (1992). The theory describes values as

motivational goals, organized in a motivational circle. This circle can be divided into 10 basic values, as in the original theory (Schwartz, 1992, 1994), but also into a higher (e.g., 19 values in Schwartz et al., 2012) or lower number. One of the most frequently used division is that of four higher order values representing two sets of opposing motivational goals. These are Conservation values (motivation for preservation) versus Openness to Change (motivation for change), and Self-Transcendence values (motivation for helping and caring about others) versus Self-Enhancement values (motivation for one's own success; Schwartz, 1994).

Creative accomplishments were found to correlate positively with values of self-direction, stimulation, and universalism (values of Openness to Change and Self-Transcendence), and negatively with the values of tradition, security, and power (values of Conservation and Self-Enhancement; Dollinger, Burke, & Gump, 2006). These findings resonate with those on values and attitudes toward innovation: values of Openness to Change were found to correlate positively and values of Conservation negatively with attitudes toward innovation in Canada, China, and Russia, irrespective of cross-cultural differences in value priorities (Lebedeva, 2008, 2009; Lebedeva & Schmidt, 2012). However, unlike research on innovation, cross-cultural creativity research has also extensively focused on the role of implicit theories.

Implicit theories are ideas held by people that are usually not discussed, questioned, or consciously considered (Paletz & Peng, 2008). Implicit theories are used in the evaluation of people's own behavior, and of others' behavior and can be used as the basis of education and skills training (Sternberg, 1985). Paletz and Peng (2008) list examples of implicit theories in cross-cultural research: notions of self-views (Markus & Kitayama, 1991), causal theories (Morris & Peng, 1994), theories of mind (Lillard, 1997), and ways of dealing with ambiguous and seemingly contradictory information (Peng & Nisbett, 1999).

An important reason for studying implicit theories is that there appear to be cross-cultural differences in people's understanding of what creativity is. Western notions tend to portray creativity as the personal quality to generate novel, appropriate, and non-algorithmic solutions to a problem (Mayer, 1999). In this notion, creativity is attributed more to individual than to social or cultural factors (Barron & Harrington, 1981; Gardner, 1993; Sternberg, 1988). However, studies in China and Korea (Chan & Chan, 1999; Rudowicz & Yue, 2000) and in Islamic countries (Khaleefa, Erdos, & Ashria, 1997) demonstrated that this notion might not be universally shared, emphasizing more social facets of creativity. It appears that people in different societies may have differing implicit theories of what creativity is and what it does.

Implicit theories may either facilitate or inhibit creative behavior (Runco, Johnson, & Bear, 1993). For instance, some organizations, such as traditional or conventional families, classrooms, or communities, may operate in ways that discourage the emergence of creative traits. There have been many studies on implicit concepts of creativity in different cultures (Rudowicz, 2003; Runco & Johnson, 2002; Runco et al., 1993; Sternberg, 1985). It is important for the current article that such variation in implicit theories may be related to cultural values. For example, Kapur, Subramanyam, and Shah (1997) reported that Indian scientists described creativity as contributing something new, with the abilities to synthesize and integrate, both of which distinguished creative scientists from just simply being productive scientists. However, they considered themselves less creative than their Western counterparts and attributed this to the "cultural influence of Indian society, in which the obedience, religion, superstition, and social etiquette required for diverse hierarchical relationships are encouraged more than individual development" (Niu & Sternberg, 2002, p. 275).

Of particular interest to the current article are the results of a cross-cultural study by Runco and Johnson (2002) using an Adjective Check List (ACL; see also Runco et al., 1993). This revealed that teachers and parents in India rated creativity-related traits like "dreamy" and "impulsive" to be undesirable. In comparison with parents and teachers in the United States, Indian respondents saw other traits, such as "cautious" and "conforming" as both more creative

and more desirable. We draw upon these insights into the role of implicit theories of creativity, notably the ACL by Runco, and extend this to research on innovation.

Implicit Theories of Innovativeness

There is some initial evidence for an effect of ITI on people's attitudes and sense of agency. For example, Mylopoulos and Scardamalia (2008) interviewed 15 licensed doctors ("clinical faculty" [CF] at the University of Toronto and an affiliated teaching hospital). The sample was limited to CF who were engaged mainly in clinical practice rather than research or administrative. A grounded theory analysis of the interview transcripts suggested that worker's implicit theories of innovation and expertise impacted their sense of agency toward organizational learning and knowledge work. Doctors did not see their activities as innovative, and viewed themselves as knowledge users, but not producers. The authors concluded that "this understanding of innovation and the resulting characterisation of themselves limited participants' engagement in the sort of collaborative knowledge creation process that is central to the practice of knowledge-building communities" (Mylopoulos & Scardamalia, 2008, p. 978).

In another study, Mylopoulos and Regehr (2009) interviewed 25 medical students in their third and fourth year of study aiming to explore students' understanding of innovation at their everyday practices. They found that students' understanding of innovation was similar to the understanding of doctors in the study described before: Innovations were mainly associated with research and discoveries that can be then used by the medical community. Because of this understanding of innovation, students did not see innovativeness as part of their learning, and did not perceive that they are expected to be innovative.

Several factors can affect ITI. Salaman and Storey (2005) found that managers differ in ITI depending on their own experience in innovations. "Poor" innovators see innovation as dangerous, potentially improper, irresponsible, whereas "good" innovators regard it as positive, celebratory, encouraging. Another crucial factor, which we mentioned earlier in the context of studies on implicit theories of creativity, is cultural values.

There are few studies that aim at understanding of the relationship between values and implicit theories. Peng, Ames, and Knowles (2001) argue that cultural values are an important source for theories. Others (Fiske, Kitayama, Markus, & Nisbett, 1998; Nisbett, 2003; Nisbett, Peng, Choi, & Norenzayan, 2001) suggest that cultural values influence implicit theories, which in turn have a more direct impact on judgments (Wong-On-Wing & Lui, 2013). Following this argumentation, we suggest that values as desired trans-situational goals (Schwartz, 1992) contribute to the formation of implicit theories. Cultural meanings that are carried by values underlie moral evaluations that are then reflected in implicit theories, creating evaluations of behaviors or traits (Runco & Johnson, 2002; Wickes & Ward, 2006). Peng et al. (2001) explicitly state that implicit theories may mediate the link between values and inferences.

Combining these findings with the aforementioned relationships between cultural values and attitudes toward innovation inspired the idea that ITI might mediate between general values and specific attitudes toward innovation in the explanation of cross-cultural differences. In other words, cultural differences in the relation between people's trans-situational goals that serve as guiding principles of their lives (i.e., values; Schwartz, 1992) and people's specific opinions toward innovation (attitudes) is mediated by what people see as being characteristics of innovators (implicit theories).

On the basis of previous findings, we could expect values of Openness to Change to correlate positively with positive attitudes toward innovation (Lebedeva & Schmidt, 2012). For Conservation the evidence is mixed; sometimes negative correlations were found (Lebedeva & Schmidt, 2012), sometimes no correlations were found (Shin & Zhou, 2003). This means that the scope for implicit theories to mediate between values and attitudes can be expected to be larger

for Conservation values than for Openness values. This expectation is in line with Rudowicz' (2003) reasoning that reactions to innovation depend on how much threat is posed to the established social, religious, or political order. On the one hand, in societies where people value tradition, security, and conformity (i.e., values of Conservation), any innovation may be met with fear, anxiety, or mistrust. On the other hand, if people regard innovators' traits as culturally approved (i.e., implicit theories), this socially desirable image of an innovator may buffer the negative effect of Conservation values.

The Current Study

The assumption that implicit theories mediate the relationship between values and attitudes to innovation was specified in the mediation model. This model was examined in two samples that can be expected to differ in their endorsement of Conservation and Openness to Change values, namely Ingush and Chechens from North Caucasus and Tuvins from the Republic of Tuva who live in more rural and traditional societies, and Russians from the cities of Moscow and Novokuznetsk who live in more urban, less traditional societies. As such, we operationalized between-group differences in terms of way of life (i.e., traditional rural vs. post-industrial urban) within a single society rather than differences between nations or countries. Please note, however, that the underlying "cultural" variables are values, which can be applied to differences between all kinds of groups. As such, we anticipated the data to be relevant to any group differences based on values, be it within or between societies. The expected differences in endorsement of value dimensions in our samples will be empirically verified.

Values were measured with the Russian adaptation of the Schwartz Value Survey (SVS; Lebedeva, 2001; Schwartz, 1992, 1994) for which evidence of cross-cultural equivalence has been well documented. Attitudes toward innovations were measured with an instrument validated for application in the Russian context (Lebedeva & Tatarko, 2009). For implicit theories toward innovations, no standard instrument was available for assessment in different cultural groups.

The scale "Innovative Qualities of a Person" (Lebedeva & Tatarko, 2009) was developed to measure attitudes to innovation. It consists of short descriptions of a person (e.g., "He/she is ready to take risks for the sake of achievements"; "In his/her view, today's losses are not necessarily bad for the future"; "Desire for learning, inquisitiveness are typical for him/her"). Respondents are asked to assess how much they resemble the person described, using 5-point scale ranging from 1 (*absolutely not like me*) to 5 (*absolutely like me*).

The scale was developed in two stages. At first, we obtained a list of descriptions of a person who has positive attitudes toward innovations from a survey among students from different ethnic groups ($N = 200$) and from a literature analysis. After content analysis, this list was shortened to 15 basic characteristics: the desire to do creative work, independence, coping attitude toward own and others' mistakes, curiosity, encouraging creativity in others, willingness to invest in innovation, the ability to operate in a changing environment, the belief that change is the path to success, focus on the future, willingness to take risks, creativity, open-mindedness, commitment to diversity, tolerance to the unknown, actively seeking new opportunities. These qualities served as a basis for the 15 personality descriptions that form the scale.

Following this first stage we define innovativeness here as an ability of every person to find new creative decisions in changing surroundings and implement them in their own life to satisfy needs and to accomplish the urgent tasks in a new way. Therefore, positive attitudes to innovation we understand as positive evaluations of novelty, risk, change, and orientation to the future. We believe that this broad definition of positive attitudes to innovations captures enough variation of different aspects of the concept to be potentially universal. This is supported by the fact that the initial list was created based on the views of culturally diverse group of people, and also by the later validation of the scale on the samples with different cultural background.¹

To avoid social desirability, which is usually high in traditional cultures, we chose an indirect way of measuring attitudes to innovations: through the assessment of their similarity to a person, who has positive attitudes toward innovation. We borrowed this idea from Schwartz (e.g., Schwartz, Melech, Lehmann, Burgess, & Harris, 2001), who used a similar approach to measure values. In the Portrait Values Questionnaire (PVQ), respondents are asked how much the person described is similar to them. The original questionnaire includes short verbal portraits of 40 different people, gender-matched with the respondent. Each portrait describes a person's goals, aspirations, or wishes that point implicitly to the importance of a certain value. For example, "It is important to her to be rich. She wants to have a lot of money and expensive things" describes a person who cherishes power values.

In our study we applied this approach to measure respondents' attitudes toward innovation and following Schwartz approach we infer respondents' own attitudes from their self-reported similarity to people described implicitly in terms of particular attitudes toward innovation (e.g., "He/she is not afraid to make mistakes, and responds to them constructively"). Like in PVQ, respondents are asked to compare the portrait to themselves rather than themselves to the portrait. Comparing other to self directs attention only to aspects of the other that are portrayed. So, the similarity judgment is also likely to focus on this attitude. Thus, they capture the person's attitudes without explicitly identifying them as the topic of investigation.

To measure ITI, a new instrument was developed on the basis of the ACL developed by Runco et al. (1993). The instrument was specifically designed to encompass both individual (e.g., optimism, intuition, independence) and social (e.g., ability to inspire, trust in other people, honesty) characteristics of innovators so as to be able to capture possible cultural differences in implicit theories. Development of this instrument is described in more detail in the method section. We tested whether the pathways from values of Openness to Change and Conservation to attitudes toward innovation, mediated by implicit theories of innovation, were similar in traditional and non-traditional samples.

Participants were recruited in regional universities and secondary schools in Moscow, Novokuznetsk, Grozny (Chechnya), Nazran (Ingushetia), and Kizil (Tuva Republic). Students and teachers were chosen as respondents because secondary school teachers are the ones who transmit cultural values and concepts to future generations; they are actively involved in socio-cultural socialization of children and adolescents, their ideas about creativity and innovation affect the development of creative abilities and the formation of attitudes toward innovation in their students.

Method

Participants and Procedure

In total 793 people participated in this study (80% female, median age = 23). A questionnaire in Russian was administered to respondents individually or in small groups of five to seven people in the presence of the interviewer. The average time for filling in the questionnaire was 15 to 20 min. Participants were university students and secondary school teachers from more traditional societies (194 Chechens and Ingushs from North Caucasus and 200 Tuvins from the Tuva Republic), and from a more modernized society (399 Russians from Moscow and Novokuznetsk).

An additional 22 respondents were excluded from the analysis because they either did not report their ethnicity or the response was not valid. The percentage of missing values in the remaining data varied from 0% to 3.6%, depending on the item. The only item with exceptionally high rate of missing values (13.9%) was the measure of innovative behavior ("Have you ever proposed or implemented any new ideas in your team?"). We discuss this item in the results section. The missing values were deleted pairwise.

Materials

Values of Openness to Change and Conservation were measured by the SVS (Schwartz, 1992), translated and adapted for Russian samples (Lebedeva, 2001). SVS is designed to measure 10 values according to Schwartz (1992) value theory. These values can be grouped in four higher order values, or value orientations, such as Openness to Change versus Conservation and Self-Enhancement versus Self-Transcendence. SVS consists of two lists of values including 57 values in total. The first list contains terminal values, expressed as nouns. The second list contains instrumental values, expressed as adjectives. The respondent is asked to assess the degree of importance of each value as a guiding principle of his/her life. For the answer a scale from -1 to 7 is used; the higher the points the more important the value. Cronbach's α for Conservation values based on three items (indices for security, conformity, and tradition values) was .82 in modernized and .76 in traditional sample; α for the Openness to Change values based on two items (indices for self-direction and stimulation values) was .63 in both groups. The index for two value orientations was calculated based on the centered scores. We treat these two value orientations as observed variables (vs. latent) in the model.

Attitudes to innovation were measured with the "Innovative qualities of a person" scale (Lebedeva & Tatarko, 2009), which consists of 15 statements. Respondents were asked to assess how much they resembled the person whose personality traits were described using a 5-point scale ranging from 1 (*absolutely not like me*) to 5 (*absolutely like me*). We will test the configural and metric invariance of the scale in two groups using confirmatory factor analysis (CFA).

The questionnaire also included a single question on innovative behavior: Have you ever proposed or implemented any new ideas in your team?, scored "Yes" or "No." The correlation between the attitudes to innovation scale and this behavioral measure was .35 in the modernized sample, and .29 in the traditional sample (both correlations are significant at $p < .001$), suggesting evidence for construct validity for the attitude measure in both samples.

ITI were measured by a modified ACL (Runco et al., 1993). The original ACL was developed by Runco et al. (1993) to measure parents' and teachers' implicit theories of creativity used 36 indicative and 36 contraindicative adjectives. In the adaptation of this instrument for measuring ITI, we first asked 100 people from different regions of Russia studying at the Higher School of Economics in Moscow to select traits from the ACL, and add traits of their own, that they regarded as important to innovators. This resulted in a list of 30 adjectives, which included various adjectives that were new in comparison with the ACL (e.g., optimistic, inspirational, logical, intuitive, independent, respectful to authorities, honest, obedient). The final list included the following 30 characteristics: energetic, active, curious, ambitious, courageous, self-confident, highly motivated, enthusiastic, optimistic, inspirational, open to new things, intelligent, logical, intuitive, imaginative, inclined to risk, resourceful, thinks clearly, leadership qualities, respectful to authorities, independent, conforming, individualistic, persistent, daring, honest, trustful toward people, humorous, obedient, artistic (aesthetic taste). We anticipated these adjectives to be clustered in two subsets: (a) individual characteristics of the innovator, which fit into a stereotypical image of an innovator (indicative adjectives, according to Runco et al., 1993), and (b) social characteristics of the innovator, such as respectful to authorities or obedient that would be classified as "contraindicative" from the stereotypical "Western perspective," but not from the "Russian perspective." So, all the traits included in the adapted version of ACL were potentially indicative for ITI in the Russian context.

Respondents evaluated the desirability of these 30 characteristics for the "innovator, inventor, a creative person," using numbers from 1 (*least desirable*) to 7 (*most desirable*). Exploratory factor analysis with fixed two-factor solution (Direct Oblimin rotation with Delta = 0) explained 29.8% of variance in the modernized sample (Kaiser-Meyer-Olkin index [KMO] = .85, $p < .000$), and 29.2% of variance in the traditional sample (KMO = .85, $p < .000$). For further analysis of

configural and metric invariance we chose only those adjectives that did not produce cross-loadings. The criteria for including adjectives were (a) the item's loading on the main factor was $>.40$, and (b) the item's loading on the second factor was $<.40$ in both samples. The first factor included "active," "curious," "courageous," "self-confident," "highly motivated," "enthusiastic," "optimistic," "open to new things," "intelligent," "intuitive," "imaginative," "inclined to risk," "resourceful," "thinks clearly," "persistent," "daring." This factor was named "individual implicit theories of innovativeness (IITI)." The second factor included "respectful to authorities," "conforming," "honest," "trustful toward people," "humorous," "obedient," "artistic," and was named "social implicit theories of innovativeness (SITI)." These two factors will be further tested for configural and metric invariance in CFA.

Results

Equivalence Tests

We tested three scales—Attitudes to Innovations, IITI, and SITI in a multi-group simultaneous CFA. At the first stage, we specified a model with three correlated latent constructs for each of the three scales. The fit for the original model and all the modifications with the explanation are given in the Table A-1 in the Online Appendix. The final model with an appropriate model fit (comparative fit index [CFI] = .919, root mean square error approximation [RMSEA] = .031) consisted of 10 items for the Attitudes to Innovation scale, 12 items for IITI scale, and five items for SITI scale. Error correlations were added strictly within the items of each scale, and are described in the footnote of the Table A-1.

Evidence for full metric invariance was obtained for all the three scales ($\Delta = -.005$ and $\Delta\text{RMSEA} = .001$, with cut-off values $\geq -.010$ in CFI and $\geq .015$ in RMSEA indicating non-invariance; F. F. Chen, 2007). Table A-2 in the Online Appendix represents invariant measurement weights for all the three scales, with standard errors and p values. Evidence for full scalar invariance was not obtained for all scales. The intercepts of two items from the Attitudes to Innovation scale, five items from the IITI scale, and one item from the SITI scale were released. After these modifications, partial scalar invariance was achieved with $\Delta\text{CFI} = -.009$ and $\Delta\text{RMSEA} = .001$ (eight invariant items in Attitudes to Innovation scale, seven in IITI scale, and four in SITI scale).

Comparison of Means Between Groups

Student's t test for independent samples was used to compare all observed means. Samples differed on the values measures. The modernized sample scored significantly higher on Openness to Change values and lower on Conservation values than the traditional sample. Means and effect sizes are shown in the Table 1.

As invariance tests demonstrated only partial scalar invariance, we estimated latent means' differences between the two groups (using MPlus, version 6), and complemented these results with the comparison of observed means for these latent constructs, calculated on those items that did display scalar invariance. The results are presented in the Table 2. Latent mean comparison revealed significant differences only on SITI scale: Participants from the traditional sample were more inclined to see an innovator as a socially oriented person. Groups did not differ significantly on IITI.

There was no significant difference between groups on the Attitude scale in latent means comparison, although comparison of observed means revealed slightly more positive attitudes toward innovations in the modernized sample ($M = 3.27$) compared with the traditional sample ($M = 3.16$). We also compared frequencies of the reported innovative behavior using Fisher's ϕ^*

Table 1. Comparison of Mean Composite Scores of Values in the Traditional and Modernized Samples.

	Modernized sample		Traditional sample		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Conservation values	3.94***	0.57	4.28***	0.46	0.66
Openness to Change values	3.78***	0.83	3.45***	0.76	0.42

Note. *** $p < .001$

Table 2. Differences Between Traditional and Modernized Samples in Latent Constructs.

	Latent means ^a		Observed means ^b					
			Modernized		Traditional		<i>p</i> value	Cohen's <i>d</i>
	Difference	<i>p</i> value	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
IITI	0.141	.101	5.45	.90	5.56	.87	.093	.12
SITI	0.567	.000	4.09	1.25	4.55	1.21	.000	.37
Attitudes to Innovations	-0.128	.145	3.27	.67	3.16	.70	.023	.16

Note. ITI = implicit theories of innovativeness; IITI = individual implicit theories of innovativeness; SITI = social implicit theories of innovativeness.

^aModernized sample is a reference group, thus positive coefficients indicate higher and negative coefficients lower scores for traditional sample.

^bObserved means are means of composite scores calculated based on the items that demonstrated full metric and scalar invariance (eight items for Attitudes to Innovation scale, seven items for IITI scale, and four items for SITI scale).

criteria. The test revealed no significant differences in the reported innovative behavior (such behavior was reported by 56.8% of modernized and 57.2% of members of traditional samples). However, respondents from the traditional sample did not respond to this question significantly more often than respondents from the modernized sample (21.1% of missing values compared with 6.5% in the modernized sample).

Relationships Among Values, Implicit Theories, and Attitudes

We conducted multiple group structural equations modeling of latent variables in MPlus (version 6), using full information maximum likelihood estimation (ML). The tested model includes Conservation and Openness to Change values as exogenous variables, SITI and IITI as mediators, and attitudes to innovation as an endogenous variable. The model fit was satisfactory ($\chi^2/df = 1.82$, CFI = .902, RMSEA = .045, standardized root mean square residual [SRMR] = .054). Figures 1a and 1b show the standardized regression coefficients with associated significance levels in two samples (coefficients are based on metrically invariant model with CFI = .898 (Δ CFI = .004) and RMSEA = .046 (Δ RMSEA = .001). The model in the modernized sample explained 38% of the variance and in the traditional sample 25% of the variance in attitudes to innovations.

Standardized regression coefficients from the structural equation model with the two groups can be found in Table 3. There were relations that were similar in the two groups as well as relations that were divergent.

With respect to the similar relations, values of Openness to Change had a direct, positive influence and Conservation values a direct negative influence on attitudes to innovations in both

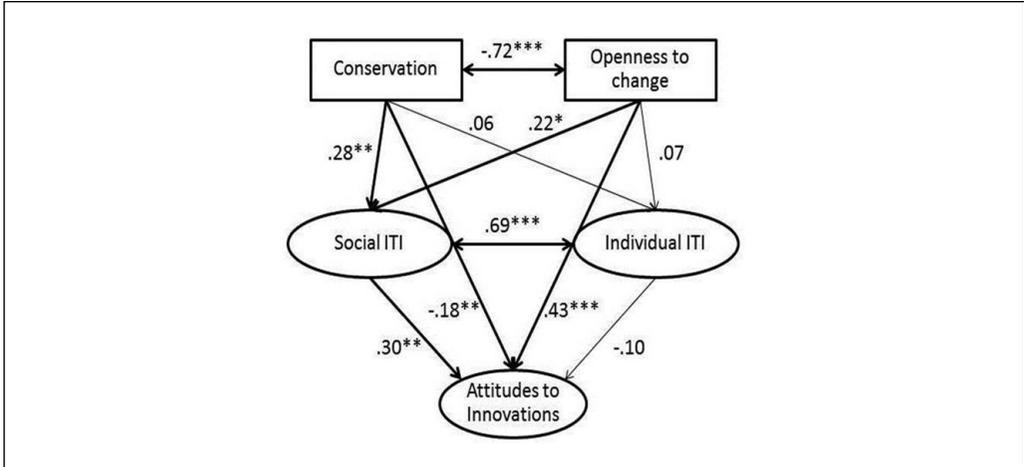


Figure 1a. Interrelations of values, IITI, SITI, and attitude to innovations in modernized sample.
 Note. IITI = individual implicit theories of innovativeness; SITI = social implicit theories of innovativeness.

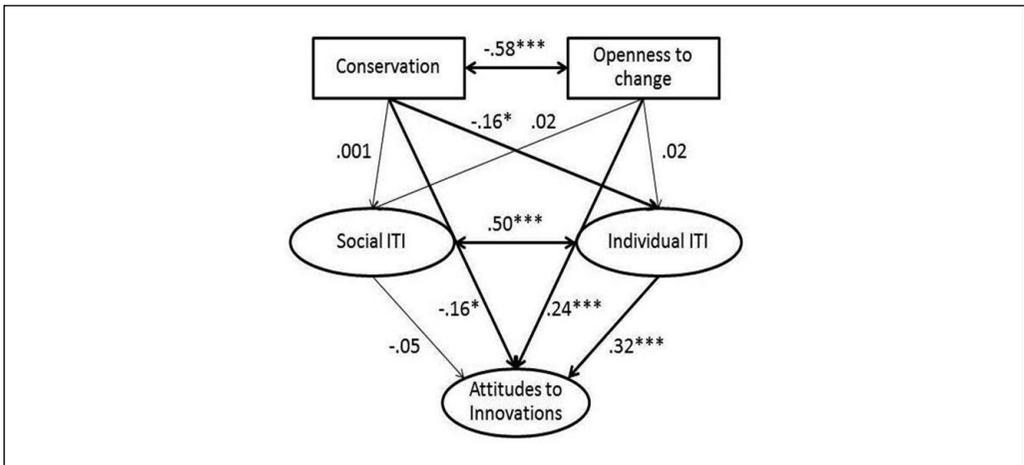


Figure 1b. Interrelations of values, IITI, SITI, and attitude to innovations in traditional sample.
 Note. Significant effects are in bold. IITI = individual implicit theories of innovativeness; SITI = social implicit theories of innovativeness.

samples. With respect to divergent relations, in the modernized sample, SITI had a significant positive influence on the attitudes to innovations, and IITI had no effect; conversely, in the traditional sample IITI had a positive effect on attitudes to innovation whereas SITI had no effect. Associations of values with SITI and IITI differed as well: In the modernized sample both Conservation values and Openness to Change values had positive effect on SITI, whereas in the traditional sample only Openness to Change values had negative effect on IITI.

Discussion

The departure point of the current article was the observation that cross-cultural studies of innovativeness often focus on values as the central psychological mechanism. Inspired by research on the related topic of creativity, we asked the question whether the inclusion of ITI as a mediator

Table 3. Standardized Coefficients of Direct, Indirect, and Total Effects of Values on Attitudes to Innovation in Two Samples.

	Modernized sample	Traditional sample
Conservation → Attitudes to innovation (direct effect)	-.184**	-.156*
Conservation → Attitudes to innovation (indirect effect)		
Through SIT1	.084*	.000
Through IITI	-.006	-.052*
Total indirect	.078*	-.052*
Conservation → Attitudes to innovation (total effect)	-.106	-.208****
Openness to Change → Attitudes to Innovation (direct effect)	.431***	.241***
Openness to Change → Attitudes to Innovation (indirect effect)		
Through SIT1	.066	-.001
Through IITI	-.007	.005
Total indirect	.059	.004
Openness to Change → Attitudes to innovation (total effect)	.490****	.245****

Note. ITI = implicit theories of innovativeness; IITI = individual implicit theories of innovativeness; SIT1 = social implicit theories of innovativeness.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Total effects are in bold.

between general values and specific attitudes toward innovation could provide a more detailed picture of where and how cultural samples are similar or different in innovativeness. The answer to this question is clearly affirmative, although the extent to which implicit theories are important differs according to the specific value under study.

We found two distinct aspects of ITI, namely what we call individual implicit theories and social implicit theories. Latent means comparison revealed that social implicit theories were rated significantly higher in the traditional sample. This may imply that the notion of an innovator is broader in this group, including not only individual but also social characteristics. This interpretation would be in line with previous studies showing the importance of social facets of creativity in some non-Western cultures (e.g., Chan & Chan, 1999; Khaleefa, Erdos, & Ashria, 1997; Rudowicz & Yue, 2000) as well as with a broader literature suggesting that non-Western perceptions of people's competences and personalities tend to include more socially oriented factors (e.g., Berry & Bennett, 2002; Nel et al., 2012).

Interestingly, the relevance of the additional, social aspect extends beyond the traditional group. In fact, we observed that in the modernized group, SIT1 had a positive effect on attitudes toward innovation. This is a potentially important result because it shows that, in contrast to research in the field of creativity that we based our ideas on, items that were mainly regarded as contraindicative traits of a creative person (Runco & Johnson, 2002; Runco et al., 1993) may actually be indicative of the traits of an innovative person.

We also observed an unexpected, but interesting finding with regard to the differential effects of IITI and SIT1 on attitudes toward innovations in the two cultural samples. In the modernized sample, as we mentioned, SIT1 were positively related to attitudes toward innovation, but in the traditional sample IITI were positively related to attitudes toward innovation. At a first glance, this might seem counterintuitive given the observation that, if anything, the traditional sample scores higher on social implicit theories of innovation than the modernized sample.

One possible explanation for these findings could be that it is a statistical artifact, in the sense that only those measures that show enough variation (e.g., no ceiling or floor effects) can statistically be associated with other measures. However, in view of the observed means and associated variances, this explanation does not seem very plausible. A second possibility is that the attitudes toward innovation represent a different construct in the traditional and modernized samples—that there is a conceptual non-equivalence. We did not find evidence for structural non-equivalence in our data, however, so it would be hard to see how differences in the construct of attitudes toward innovation could have affected our results.

Another possibility is that these findings represent a substantive issue. Interestingly, similar findings have been found in other cross-cultural research. For example, a study by Albert, Trommsdorff, and Wisnubrata (2009) found that inter-generational transmission of individualist values was higher in Indonesia (where they are less typical of cultural values) than in Germany. Aside from statistical artifacts, they forwarded the possibility that parents may have a distinct impact on values of offspring for those specific values which society does not necessarily transmit. Another example is a study by Boehnke, Hadjar, and Baier (2007) that found similar effects in an intracultural study. They suggested that families that do not conform to the modal value climate of a culture might have a more distinct effect on the value orientations of their children, because they may communicate more about their values compared with families that are close to the *Zeitgeist*. This is in line with the findings by Bardi and Schwartz (2003) who report that values that are not normative have a larger effect on individual behavior than normative value orientations. So, while somewhat unexpected, the observations in our data that social implicit theories of innovation had a positive effect on attitudes in the modernized sample and that individual implicit theories of innovation had a positive effect on attitudes in the traditional sample may point to a hitherto underexplored consistency in cross-cultural research. Of course, because we did not have a priori expectations about these findings it would be best to refrain from any further speculation until more targeted studies have been done.

With regard to the relationship between values of Openness to Change and attitudes toward innovation, the picture of the relationships in Figure 1 is relatively straightforward. Confirming earlier research on this topic (Lebedeva & Schmidt, 2012), higher endorsement of Openness to Change values relates to more positive attitudes toward innovation in both modernized and traditional samples. Apparently, it is quite general for people across cultural contexts to value innovativeness more when they see self-direction and stimulation values as more important in their lives. None of the indirect effects of Openness to Change values through ITI on the attitudes to innovation were significant (see table 3). Regarding the role of Openness to Change value in social and IITI, in the modernized sample's higher endorsement of these values predicted higher scores on SITI. This can be explained by the non-typicality of SITI in the modernized sample. In the traditional sample, Openness to Change was not related to any of the two types of ITI.

Interestingly, Conservation values were related to ITI in both samples, but in different ways: positively with SITI in the modernized sample, and negatively with IITI in the traditional sample. Why do we observe these differential effects of values in two samples? According to Rudowicz (2003), the scope of modification, adaptation, and renovation depends on how much threat is posed to the established social, religious, or political order. We suggest that these findings may be explained through the level of threat associated with innovations in two cultural groups. When a culture is in a transitional stage (which is the case with Russians that constitute our modernized sample), people are looking for coping mechanisms that can help them to accept the inevitable exposure of their lives to innovations. In this case, the socially desirable image of an innovator is what helps people to deal with this. So, both people who endorse Conservation and Openness to Change values find support in this socially desirable image.

Contrary, in the traditional sample, where the level of innovations is relatively low, people try to keep the status quo, and do not look for the ways to accept innovations. That may be the reason

why we observe only a negative effect of Conservation values on IITI: individualistic image of an innovator is a threat to those who highly value security, conformity, and traditions.

In contrast with the exclusively direct effects of Openness to Change values on attitudes toward innovation, relationship between values of Conservation and these attitudes was mediated by ITI in both samples. Previous findings on this relationship were mixed, with some studies reporting negative correlations (Lebedeva & Schmidt, 2012) and other studies reporting no correlations (Shin & Zhou, 2003). In our study, samples differed as well. In the modernized sample, Conservation values had direct negative ($\beta = -.18^{**}$) and an indirect positive effect ($\beta = .08^*$), mediated by SITI. This mediation transformed the negative effect of Conservation values on attitudes to innovation into non-significant total effect ($\beta = -.11$). In the traditional sample, Conservation values had both direct ($\beta = -.16^*$) and indirect (through IITI; $\beta = -.05^*$) negative effects on the attitude, which results in a negative total effect ($\beta = -.21^{***}$).

These findings illustrate the possible double role that Conservation values play in explaining innovativeness through implicit theories. In societies where people value tradition, security, and conformity (values of Conservation in the Schwartz' model), innovations may cause fear, anxiety, or mistrust and thus be less accepted. However, if people regard innovators' traits as culturally approved (implicit theories of innovators as honest, trustful, etc.), this may facilitate the acceptance of innovations. But to be able to change peoples' perception of innovations through SITI, society should be at least at the transitional stage of development. Such changes might be provided through interplay of human capital (innovators) and institutional support (image of innovators in accordance with basic cultural values) which is crucial for knowledge and innovation diffusion and for national innovation development' policies (Kwan & Chiu, 2015).

Before closing, it is important to notice that our findings are certainly not without limitations. One limitation lies in the nature of our measures. We used self-reported attitudes toward innovation as our main dependent measure. Of course, we would hope that the findings generalize to actual innovative behavior. The fact that we also included a single-item behavioral measure of innovative behavior that correlated substantially with the attitude items is encouraging in this regard. A related limitation lies in the fact that the present study used a new measure of implicit theories and a relatively new measure of attitudes toward innovation, next to the established SVS. The usefulness of the first two scales in other cross-cultural research still needs to be established. In this regard, we consider it hopeful that the present study found some interesting results that are in line with related literature on the topic.

Another limitation is that at the level of latent mean scores no differences were found between the two samples in the attitudes toward innovation, although in the comparison of observed means (calculated based on eight invariant items) a significant but small (Cohen's $d = 0.2$) difference was found, with modernized sample showing slightly more positive attitudes toward innovation. Aside from the possibility that the samples really do differ in endorsement of values but not in attitudes toward innovation, another possible explanation could be higher social desirability effects with the traditional sample. Some indications to this effect are the higher amount of missing values on the behavioral measure in the traditional sample (21.1% vs. 6.5% in the modernized sample) and the observation that, of those who did respond, fewer people from the traditional samples reported absence of innovative experiences (33.8% vs. 40.4% in the modernized sample).

In sum, cross-cultural differences in innovative behavior are an interesting and potentially important topic to study. Apart from economic causes of such differences there may be psychological ones. This study aimed to contribute to our understanding of the psychology behind innovative behavior by studying implicit theories of innovation as a mediator between general values and specific attitudes. We believe that we found some interesting results in terms of differences between values, between samples, and between mediating processes that we hope to be illustrative of the potential of studying ITI in cross-cultural research.

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Note

1. The scale was tested in a series of cross-cultural studies in 2009-2011 ($N = 2,280$) with ethnic Russians ($n = 1,490$, $\alpha = .80$), North Caucasians ($n = 301$, $\alpha = .83$), Canadians ($n = 96$, $\alpha = .78$), and Chinese ($n = 100$, $\alpha = .80$) managers from Moscow branch of international company Ernst and Young ($n = 293$, $\alpha = 0.79$). The scale showed an acceptable cross-cultural validity (see Lebedeva, Osipova, & Cherkasova, 2012; Lebedeva & Schmidt, 2012; Lebedeva & Tatarko, 2009, for further details).

Supplemental Material

Supplementary material is available online.

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