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IMPLICIT THEORIES OF INNOVATIVENESS

A cross-cultural study of the mediating role of implicit theories of innovativeness in the relationship between values and attitudes towards innovation

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Abstract

This paper presents a cross-cultural study on the mediating role of implicit theories of innovativeness in the relationship between basic values and specific attitudes towards 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 answered Schwartz Value Survey (SVS) (Schwartz, 1992), measures of attitudes towards innovation (Lebedeva, Tatarko, 2009), and an Adjective Check List (Runco et al., 1993) adapted for measuring implicit theories of innovativeness in the current samples. Main findings include (1) a split in individual and social aspects of implicit theories of innovativeness, (2) different mediation of the effects of Openness to Change and Conservation values, and (3) differences in mediation models between the two samples. Implications of these findings for cross-cultural studies on innovativeness are discussed.

Key words: values, attitudes to innovation, implicit theories, implicit theories of innovativeness, mediation
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A cross-cultural study of the mediating role of implicit theories of innovativeness in the relationship between values and attitudes towards innovation

Groups of people differ in the extent to which they show innovative activity. For example, at the international level, the Global Innovation Index (GII) 2014 shows quite some disparity among the 143 economies that it covers, with countries like Switzerland, the United Kingdom, and Sweden at the top (Dutta, Lanvind, & Wunsch-Vincent, 2014). The BRICS economies show more divergence with, for example, China at 29th, Brazil at 61st and India at 76th positions. Russia, which is the source of data presented in the current paper, is located at the 49th position.

An important question is how 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). However, they may also be explained by psychological factors such as cross-cultural differences in values, implicit theories and attitudes.

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., Lebedeva, Schmidt, 2012; Leung, Morris, 2011; Kharkhurin and Motalleebi, 2009; Shane, 1992). For example, using indices of power distance and individualism developed by Hofstede (2001), Shane (1992) found individualistic and nonhierarchical societies to be more inventive than other societies. Although such accounts are very interesting, we would argue that a more fine-grained analysis is necessary for understanding why and how basic values affect ideas about innovation. To be more specific, in the present paper we explore implicit theories of innovativeness as an intermediate, explanatory variable of cultural differences in innovation attitudes, in-between values and attitudes.
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This paper describes a comparison of two cultural 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 cross-cultural differences in values and attitudes could be explained by including implicit theories of innovativeness. As such, the paper 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 implicit theories of innovativeness 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 et al, 2011). Some have even argued that creativity is a necessary precondition for innovativeness (Styhre & Börjesson, 2006; West, 2004). So, before describing our reasoning on implicit theories of innovativeness, let us first briefly describe insights from implicit theories in cross-cultural creativity research.

Cross-cultural differences in creativity have been explained in terms of values (mostly in the form of the model proposed by Schwartz, 1992). Creative accomplishments have been found to correlate positively with values of self-direction, universalism, and stimulation, and negatively with the values of tradition, security, and power (Dollinger, Burke & Gump, 2006). These findings resonate with those on values and attitudes toward innovation: values of Openness to Change correlated positively and values of Conservation have been found to correlate negatively with attitudes toward innovation in Canada, China, and Russia, irrespective of cross-cultural differences in value priority (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.
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.

The results of a cross-cultural study by Runco and Johnson (2002) of implicit concepts of creativity using an Adjective Check List (Runco, Johnson & Bear, 1993) revealed that teachers and parents in India rated traits like “dreamy” and “impulsive”, that are associated with creativity, as undesirable. In comparison with parents and teachers in the USA, Indian respondents saw other traits, such as “cautious” and “conforming” as both more creative and more desirable. So, this study suggests that there may be cross-cultural differences in implicit theories of creativity that could underlie differences in attitudes towards creativity.

Implicit theories may either facilitate or inhibit creative behavior (Runco et al., 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, Johnson, & Bear, 1993; Sternberg, 1985). It is important for the current paper that the cultural variation in implicit theories may be related to cultural values. For example, Kapur, Subramanyan 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
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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” (Nui & Sternberg, 2002, p. 275). We believe that these insights from
research on implicit theories of creativity can be extended to research on innovation.

**Implicit theories of innovativeness**

There is some initial evidence to the effect that people differ in implicit theories of
innovativeness. For example, research by Mylopoulos (2007) suggests that workers’ implicit
theories of innovativeness impact their agency towards organizational learning and that implicit
theories are often inconsistent with theories of organizational learning and knowledge building.
Managers can also differ in implicit theories of innovativeness: “poor” innovators see innovation
as dangerous, potentially improper, irresponsible, whereas “good” innovators regard it as
positive, celebratory, encouraging (Salaman & Storey, 2005). In addition, there is evidence to the
effect that culture may affect attitudes toward innovation. For example, Oner (2000) found that
Turkish adults’ attitudes to innovation depended on the type of context: It was welcomed within
the context of work, science and technology, but rejected within the family and interpersonal
relationships. Combining these findings with the aforementioned relationships between cultural
values and attitudes toward innovation inspired the idea that implicit theories of innovativeness
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 (values)
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 positivity with positive attitudes towards 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
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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 Rudowizc’ (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) reactions might be less negative.

The current study

In order to test the mediation model we sought 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. For the measurement of values, the Russian adaptation of the Schwartz Value Survey (SVS) was used (Schwartz, 1992, 1994; Lebedeva, 2001). Attitudes toward innovations were also measured with an instrument validated for application in the Russian context (Lebedeva & Tatarko, 2009). For implicit theories towards innovations no instrument was available and a new instrument was developed on the basis of the Adjective Checklist (ACL) developed by Runco (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 towards innovation, mediated by implicit theories of innovation was 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 towards innovation in
their students.

Method

Participants and Procedure

In total 793 people participated in this study (80% female, median age = 23). Participants
were university students and secondary school teachers from more traditional cultures (namely,
194 Chechens and Ingushs from North Caucasus and 200 Tuvins from the Tuva Republic), and
from less traditional culture (399 Russians from Moscow and Novokuznetsk). An additional 22
respondents were excluded from the analysis because they did not report their ethnicity.

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 15-20 minutes

Materials

Values of Openness to change and Conservation were measured by the Schwartz Value
Survey (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 vs.
Conservation and Self-Enhancement vs. 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 3 items (indices for security, conformity, and
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tradition values) was .82 in modernized and .76 in traditional sample; α for the Openness to change values based on 2 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.

Attitudes to innovation (AI) 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 five-point scale ranging from 1 (“absolutely not like me”) to 5 (“absolutely like me”). In this study 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 AI 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.

Implicit theories of innovativeness (ITI) were measured by a modified Adjective Check List (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 implicit theories of innovativeness 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
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to authorities, independent, conforming, individualistic, persistent, daring, honest, trustful toward people, humorous, obedient, artistic (aesthetic taste). We anticipated these adjectives to be clustered in 2 subsets: (1) individual characteristics of the innovator, which fit into a stereotypical image of an innovator (indicative adjectives, according to Runco et al. (1993), and (2) social characteristics of the innovator, such as respectful to authorities or obedient that would be classified as “contraindicative” from the stereotypical “Western” perspective.

Respondents evaluated the desirability of these 30 characteristics for the “innovator, inventor, a creative person”, using numbers from 1(min) to 7(max). Exploratory factor analysis with fixed two-factor solution (Direct Oblimin rotation with Delta = 0) explained 29.8% of variance in modernized sample (KMO = .85, p<.000), and 29.2% of variance in 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 (1) the item’s loading on the main factor was >.40, and (2) the item’s loading on the other 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 confirmatory factor analysis (CFA).

Results

Equivalence tests

We tested three scales – Attitudes to innovations (AI), Individual ITI (IITI) and Social ITI (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
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modifications with the explanation are given in the Table A-1 in the Appendix. The final model with an appropriate model fit (CFI = .919, RMSEA = .031) consisted of 10 items for the AI scale, 12 items for IITI scale, and 5 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 (ΔCFI = −.005 and ΔRMSEA = .001, with cut-off values ≥ −.010 in CFI and ≥ .015 in RMSEA (Chen, 2007) indicating noninvariance). Table A-2 in the 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 2 items from the AI scale, 5 items from the IITI scale, and 1 item from the SITI scale were released. After these modifications, partial scalar invariance was achieved with ΔCFI = −.009 and ΔRMSEA = .001 (8 invariant items in AI scale, 7 – in IITI scale, and 4 – 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.

-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. Latent mean comparison revealed significant differences only on Social ITI scale: participants from the traditional sample were more inclined to see an innovator as a socially oriented person. Groups did not differ significantly on Individual ITI.

-Table 2-
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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 towards innovations in the modernized sample ($M = 3.27$) compared to the traditional sample ($M = 3.16$). We also compared frequencies of the reported innovative behavior using Fisher’s $\phi^*$ 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 to 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). The tested model includes Conservation and Openness to change values as exogenous variables, Social and Individual ITI as mediators, and Attitudes to innovation as an endogenous variable. The model fit was satisfactory ($\chi^2/df = 1.82$, CFI = .902, RMSEA = .045, 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 ($\Delta$CFI = .004) and RMSEA = .046 ($\Delta$ 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.

-Figures 1a and 1b-

Standardized regression coefficients from the SEM 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.

-Table 3-

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

Discussion

The departure point of the current paper was the observation that cross-cultural studies of innovativeness often focus on values as the central psychological mechanism. Inspired by cross-cultural research on the related topic of creativity, we asked the question whether the inclusion of implicit theories of innovativeness as a mediator between general values and specific attitudes towards 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 implicit theories of innovativeness, namely what we call individual implicit theories and social implicit theories. Latent mean 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; Rudowicz & Yue, 2000; Khaleefa, Erdos, & Ashria, 1997).

Interestingly, the relevance of the additional, social aspect extends beyond the traditional group. In fact, we observed that in the modernized group social implicit theories of innovativeness had a significant and positive effect on attitudes towards 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 et al., 1993, Runco & Johnson, 2002) may actually be indicative of the
traits of an innovative person. This finding is consistent with research findings in the domain of
the international management. For example, in a 30-nation study of the relationship between
national culture and national preferences for “innovation championing strategies”, Shane,
Venkatraman and Mac-Millan (1995) found that the more uncertainty avoiding, power distant
and collectivistic societies were, the more people preferred champions to work through
organizational norms, rules and procedures and to focus on gaining the support of those in
authority to promote innovation.

We also observed an unexpected, but interesting finding with regard to the effects of
individual and social ITI on attitudes to innovations in the two cultural samples. In the
modernized sample, social implicit theories of innovativeness were positively related to attitudes
towards innovation, but in the traditional sample individual implicit theories of innovativeness
were positively related to attitudes towards innovation. At 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.

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
et al. (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 may have a more distinct effect on the value orientations of their children, because they may communicate more about their values compared to families which 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 towards 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 towards 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. Regarding the role of Openness to change value in social and individual ITI, in the modernized sample’s higher endorsement of these values predicted higher scores on SITI. In the traditional sample, Openness to change was not related to any of 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? 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 – and associated threats are hence also 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 solely 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 (standardized regression coefficient = -.18**), and an indirect positive effect (.08*), mediated by Social Implicit Theories of Innovativeness. This mediation transformed the negative effect of Conservation values on attitudes to innovation into non-significant total effect (-.11). In the traditional sample, Conservation values had both direct (-.16*) and indirect (through Individual ITI; -.05*) negative effects on the attitude, which results in a negative total effect (-.21***).

These findings illustrate the possible double role that Conservation values play in explaining innovativeness through implicit theories. 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. In societies where people value tradition, security, conformity
(values of Conservation in the Schwartz’ model) innovations may cause fear, anxiety or mistrust
and thus be less accepting of innovation. However, if people regard innovators’ traits as
culturally approved (implicit theories of innovators as honest, trustful, etc.) this may facilitate the
acceptance of innovation. But to be able to change peoples’ perception of innovations through
Social implicit theories of innovativeness, society should be at least at the transitional stage of
development.

Before closing, it is important to notice that our findings are certainly not without
limitations. One limitation is that we used self-reported attitudes towards 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.

Another limitation is that at the level of latent mean scores no differences were found
between the two samples in the attitudes towards innovation, although in the comparison of
observed means (calculated based on 8 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 towards 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% versus
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% versus
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

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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 implicit theories of innovativeness in cross-cultural
research.
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IMPLICIT THEORIES OF INNOVATIVENESS


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IMPLICIT THEORIES OF INNOVATIVENESS

Table 1. Comparison of mean scores of values in the traditional and modernized samples

<table>
<thead>
<tr>
<th></th>
<th>Modernized sample</th>
<th>Traditional sample</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Conservation values</td>
<td>3.94***</td>
<td>0.57</td>
<td>4.28***</td>
</tr>
<tr>
<td>Openness to Change values</td>
<td>3.78***</td>
<td>0.83</td>
<td>3.45***</td>
</tr>
</tbody>
</table>
### IMPLICIT THEORIES OF INNOVATIVENESS

Table 2. Differences between traditional and modernized samples in latent constructs

<table>
<thead>
<tr>
<th></th>
<th>Latent means&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Observed means&lt;sup&gt;b&lt;/sup&gt;</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference</td>
<td>P-value</td>
<td>Modernized</td>
<td>Traditional</td>
<td>P-value</td>
<td>Cohen’s D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Individual ITI</td>
<td>0.141</td>
<td>.101</td>
<td>5.45</td>
<td>.90</td>
<td>5.56</td>
<td>.87</td>
<td>.093</td>
<td>.12</td>
</tr>
<tr>
<td>Social ITI</td>
<td>0.567</td>
<td>.000</td>
<td>4.09</td>
<td>1.25</td>
<td>4.55</td>
<td>1.21</td>
<td>.000</td>
<td>.37</td>
</tr>
<tr>
<td>Attitudes to Innovations</td>
<td>-0.128</td>
<td>.145</td>
<td>3.27</td>
<td>.67</td>
<td>3.16</td>
<td>.70</td>
<td>.023</td>
<td>.16</td>
</tr>
</tbody>
</table>

<sup>a</sup> Modernized sample is a reference group, thus positive coefficients indicate higher and negative coefficients lower scores for traditional sample.  
<sup>b</sup> Observed means were calculated based on the items that demonstrated full metric and scalar invariance (8 items for AI scale, 7 items for IITI scale, and 4 items for SITI scale).
IMPLICIT THEORIES OF INNOVATIVENESS

Table 3. Standardized coefficients of direct, indirect and total effects of values on attitudes to innovation in two samples

<table>
<thead>
<tr>
<th></th>
<th>Modernized sample</th>
<th>Traditional sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation → Attitudes to innovation (direct effect)</td>
<td>-.184**</td>
<td>-.156*</td>
</tr>
<tr>
<td>Conservation → Attitudes to innovation (indirect effect) Through Social ITI</td>
<td>.084*</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>-.006</td>
<td>-.052*</td>
</tr>
<tr>
<td>Total indirect</td>
<td>.078*</td>
<td>-.052*</td>
</tr>
<tr>
<td>Conservation → Attitudes to innovation (total effect)</td>
<td>-.106</td>
<td>-.208***</td>
</tr>
<tr>
<td>Openness to change → Attitudes to innovation (direct effect)</td>
<td>.431***</td>
<td>.241***</td>
</tr>
<tr>
<td>Openness to change → Attitudes to innovation (indirect effect) Through Social ITI</td>
<td>.066</td>
<td>-.001</td>
</tr>
<tr>
<td></td>
<td>-.007</td>
<td>.005</td>
</tr>
<tr>
<td>Total indirect</td>
<td>.059</td>
<td>.004</td>
</tr>
<tr>
<td>Openness to change → Attitudes to innovation (total effect)</td>
<td>.490***</td>
<td>.245***</td>
</tr>
</tbody>
</table>
IMPLICIT THEORIES OF INNOVATIVENESS

Figure 1a. Interrelations of values, IITI, SITI and attitude to innovations in modernized sample

Figure 1b. Interrelations of values, IITI, SITI and attitude to innovations in traditional sample

Note: Significant effects are in bold.
APPENDIX

Testing configural and metric invariance of the scales

Table A71. Model fit indices for different stages of model specification, modification, and assessment

<table>
<thead>
<tr>
<th></th>
<th>χ²</th>
<th>df</th>
<th>χ²/DF</th>
<th>CFI</th>
<th>ΔCFI</th>
<th>RMSEA</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3867.7</td>
<td>1252</td>
<td>3.089</td>
<td>.678</td>
<td>.052</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3676</td>
<td>1182</td>
<td>3.110</td>
<td>.687</td>
<td>.052</td>
<td>Item 2 from AI scale is removed, because β &lt; .30</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2011.8</td>
<td>642</td>
<td>3.134</td>
<td>.746</td>
<td>.053</td>
<td>Based on modification indices (MI), all the items that produce cross-loadings are removed (items 1, 8, 13, and 15 from AI scale; items 3, 11, 14, and 17 from IITI scale; item 29 from SITI scale)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1019.2</td>
<td>580</td>
<td>1.757</td>
<td>.919</td>
<td>.031</td>
<td>Error correlations are specified¹</td>
<td></td>
</tr>
</tbody>
</table>

¹ We specified error correlations based on two principles: (1) items that follow one another in the questionnaire correlate, and (2) items that have commonalities besides their meaning related to the latent factor correlate. Based on the first principle, we added 14 error correlations, and 11 from them are statistically significant at least in one of the samples. Based on the second principle, we added 17 correlations, all of which are significant at least on one sample. In the SITI scale we added correlations between 2 items that can be grouped as sub-scale “charisma”: humorous and artistic; and another two items both of which are about attitudes to other people: trust toward people and respectful to authorities. In the IITI scale two items were grouped as they both are related to intelligence: intelligent and thinks clearly. Other two items are related through their active behavioral component: active and persistent. Other 4 variables are related through the concept of daring to be different, to think out of the box: courageous, imaginative, inclined to risk, daring. In AI scale 4 items correlate through the common notion of tolerance for uncertainty: “He/She likes to do things in his/her own original ways”, “Diversity in life is important to him/her”, “He/She isn’t afraid of being face to face with something new and unexplored”, “He/She is not afraid to make mistakes, and responds to them constructively”. Finally, another 3 items are related through a creativity component in them: “It is important to him/her to produce new ideas, and be engaged in creative work”, “He/She likes to do things in his/her own original way”, “He/She is creative, always trying to make something new and unusual”, “Desire for learning, inquisitiveness are typical for him/her”, and all these items correlate negatively with the item “He/She is ready to take risks for the sake of achievements”, as creativity in Russian context usually opposes to the motivation for achievement.
IMPLICIT THEORIES OF INNOVATIVENESS

5  1067.5  604  1.767  .914  .005  .032  Model 4 with all the measurement weights constrained, to estimate full metric invariance

6  1270.3  631  2.013  .882  .032  .036  Model 5 with all the intercepts constrained, to estimate full scalar invariance

7  1135.7  623  1.823  .905  .009  .033  Model of partial scalar invariance (based on MI, intercepts of the items 8, 12, 15, 16, and 24 from IITI scale, items 5 and 14 from AI scale, and items 26 from SITI scale are not constrained to be equal)

Note: Models 1 to 4 establish configural invariance, model 5 – metric invariance, model 6 and 7 – scalar invariance.

Table A-2. Unstandardized regression weights, standard errors, and P-values for each item in the metrically invariant SCFA model

<table>
<thead>
<tr>
<th>Items</th>
<th>Beta</th>
<th>St. Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes to Innovation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N3: He/She is ready to take risks for the sake of achievements</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N4: It is important to him/her to produce new ideas</td>
<td>0.909</td>
<td>0.092</td>
<td>0.000</td>
</tr>
</tbody>
</table>
IMPLICIT THEORIES OF INNOVATIVENESS

and be engaged in creative work

N5: He/She likes to do things in his/her own original way

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N5</td>
<td>0.851</td>
<td>0.092</td>
</tr>
</tbody>
</table>

N6: Diversity in life is important to him/her

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N6</td>
<td>0.777</td>
<td>0.089</td>
</tr>
</tbody>
</table>

N7: He/She is not afraid of being face to face with something new and unexplored

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N7</td>
<td>0.698</td>
<td>0.088</td>
</tr>
</tbody>
</table>

N9: He/She is creative, always trying to make something new and unusual

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N9</td>
<td>0.919</td>
<td>0.097</td>
</tr>
</tbody>
</table>

N10: He/She does not bow before authorities, he/she is independent

<p>| | | |</p>
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<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N10</td>
<td>0.601</td>
<td>0.081</td>
</tr>
</tbody>
</table>

N11: He/She is not afraid to make mistakes, and responds to them constructively

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N11</td>
<td>0.596</td>
<td>0.082</td>
</tr>
</tbody>
</table>

N12: Desire for learning, inquisitiveness are typical for him/her

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N12</td>
<td>0.959</td>
<td>0.098</td>
</tr>
</tbody>
</table>

N14: He/She is ready to invest money in innovations

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N14</td>
<td>0.733</td>
<td>0.090</td>
</tr>
</tbody>
</table>

**Individual ITI**

D2: active

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D2</td>
<td>1.000</td>
</tr>
</tbody>
</table>

D5: courageous

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D5</td>
<td>1.177</td>
<td>0.141</td>
</tr>
</tbody>
</table>

D6: self-confident

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D6</td>
<td>1.198</td>
<td>0.134</td>
</tr>
</tbody>
</table>

D7: highly motivated

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D7</td>
<td>1.695</td>
<td>0.180</td>
</tr>
</tbody>
</table>

D8: enthusiastic

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D8</td>
<td>1.971</td>
<td>0.202</td>
</tr>
</tbody>
</table>

D9: optimistic

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D9</td>
<td>1.735</td>
<td>0.185</td>
</tr>
</tbody>
</table>

D12: intelligent

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D12</td>
<td>0.919</td>
<td>0.114</td>
</tr>
</tbody>
</table>

D15: imaginative

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D15</td>
<td>1.365</td>
<td>0.157</td>
</tr>
</tbody>
</table>
IMPLICIT THEORIES OF INNOVATIVENESS

<table>
<thead>
<tr>
<th></th>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>D16: inclined to risk</td>
<td>1.677</td>
<td>.191</td>
<td>.000</td>
</tr>
<tr>
<td>D18: thinks clearly</td>
<td>1.342</td>
<td>.151</td>
<td>.000</td>
</tr>
<tr>
<td>D24: persistent</td>
<td>1.349</td>
<td>.141</td>
<td>.000</td>
</tr>
<tr>
<td>D25: daring</td>
<td>1.516</td>
<td>.197</td>
<td>.000</td>
</tr>
</tbody>
</table>

Social ITI

<table>
<thead>
<tr>
<th></th>
<th>Value 4</th>
<th>Value 5</th>
<th>Value 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>D20: respectful to authorities</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D26: honest</td>
<td>1.019</td>
<td>.122</td>
<td>.000</td>
</tr>
<tr>
<td>D27: trustful toward people</td>
<td>.841</td>
<td>.106</td>
<td>.000</td>
</tr>
<tr>
<td>D28: humorous</td>
<td>1.066</td>
<td>.134</td>
<td>.000</td>
</tr>
<tr>
<td>D30: artistic (aesthetic taste)</td>
<td>1.096</td>
<td>.136</td>
<td>.000</td>
</tr>
</tbody>
</table>