

BRIEF REPORT

Previous studies have found cross-cultural variation in field dependence. In this study, cross-cultural differences were expected depending on the degree of individualism or collectivism of the respective cultures. Samples were taken from two prototypically individualist cultures, the United States and Germany, and two collectivist cultures, Russia and Malaysia. As predicted, field dependence did not differ between those samples that represented the same type of culture, either collectivist or individualist. However, a clear difference could be found between the two types of cultures; that is, U.S. and German participants were more field independent than were Russian and Malaysian participants.

CROSS-CULTURAL VARIATIONS IN IDENTIFYING EMBEDDED FIGURES Comparisons From the United States, Germany, Russia, and Malaysia

ULRICH KÜHNEN

University of Michigan

BETTINA HANNOVER

UTE ROEDER

University of Dortmund

ASHIQ ALI SHAH

International Islamic University Malaysia

BENJAMIN SCHUBERT

ARNOLD UPMEYER

Technical University of Berlin

SALIZA ZAKARIA

International Islamic University Malaysia

“Like wide neckties, [cognitive] styles may come and go, but they never will go completely out of style” (Sternberg & Grigorenko, 1997). Apparently, the interest in the cognitive style of field dependence (Witkin, 1950) has recently increased (Ji, Peng, & Nisbett, in press; Kühnen, Hannover, & Schubert, 2000). Research from various areas suggests that members of individualist and collectivist cultures differ with respect to the degree to which they perceive objects either as single and independent entities or as being related to the context in which they appear. Whereas individualist culture members tend to think analytically and context independently by paying attention primarily to objects and their attributes, collectivist thinking is generally understood as holistic and context dependent in the sense that atten-

AUTHORS' NOTE: The research reported here was supported by a grant of the Deutsche Forschungsgemeinschaft (DFG) to the first two authors (Grant HA 2381/3-1) and by additional funding from Dr. A. Upmeyer of the Technical University of Berlin. Correspondence regarding this article should be addressed to Ulrich Kühnen, Technical University of Berlin, Institute for Psychology, FS 001, 10587 Berlin, Germany; email: kuehnen@umich.edu.

JOURNAL OF CROSS-CULTURAL PSYCHOLOGY, Vol. 32 No. 3, May 2001 366-372
© 2001 Western Washington University

tion is focused on the relations between objects and their entire fields (Kim & Markus, 1999; Kühnen et al., 2000; Nisbett, Peng, Choi, & Norenzayan, 1999). This difference becomes apparent in the variations of self-perception between individualist and collectivist culture members. Whereas individualists perceive the self as primarily unique and independent from others, collectivists experience the self as intertwined with its social environment, thus clearly maintaining an interdependent perspective of the self (Markus & Kitayama, 1991; Triandis, 1999). Differences between the focus of attention on either single objects or the field containing these objects also become evident in the variation of attributions of observed behavior. Because individualists underestimate the impact of contextual influences, they tend to explain behavior as being a result of stable dispositions (Jones & Davis, 1965). This fundamental attribution error has been shown to be less pronounced in collectivist culture members (Choi, Nisbett, & Norenzayan, 1999; Miller, 1984). Similarly, people with a collectivist cultural background have been found to outperform individualist culture members in detecting covariation in the environment (Ji et al., *in press*; Peng, & Nisbett, *in press*).

These differences in cognitive functioning can all be explained by the common principle that members of collectivist cultures are more likely than individualist culture members to perceive objects as being related to their field. Hence, convergent evidence from different research fields that cross-cultural variation in cognitive functioning is related to differences in very basic perceptual processes may explain the reawakened research interest in cross-cultural variation of field dependence (Witkin, 1950).

Witkin (1950) linked interindividual differences in the degree of field dependence to cross-cultural variation in socialization practices. Witkin and Berry (1975) distinguish tight from loose cultures, with loose cultures fostering independence and self-reliance and tight cultures emphasizing obedience and responsibility. This differentiation is quite similar to the one underlying the individualism-collectivism dimension used in today's cross-cultural research (Berry, 1991, 1994). Reviewing the research that was available at the time, Witkin and Berry (1975) came to the conclusion that members of loose cultures are more field independent than people brought up in tight cultures. Accordingly, one would expect members of collectivist cultures to be more field dependent than individualist culture members.

Consistent with this reasoning, several studies have shown that despite substantial variation of field dependence within cultures, Asian (i.e. collectivist) culture members are more field dependent than members of Western cultures (e.g., Ji et al., *in press*). Other studies, however, could not find this difference. Moreover, Bagley, Iwawaki, and Young (1983) found Japanese children to be more field independent than Americans. A closer look at the differences between the studies with opposite results reveals that there seems to be an interesting asymmetry of the methods used to assess field dependence.

Witkin and his associates (Witkin, 1950; Witkin & Berry, 1975) have developed two different test forms to assess a person's degree of field dependence. In the Rod-and-Frame Test (RFT), the participant's task is to bring a rod into a vertical position while a frame is rotated independently around it. Field dependence can also be measured by the Embedded-Figures Test (EFT). Here, participants have to detach simple geometrical figures from more complex geometrical patterns in which they are embedded. Taking the test format into account, East Asian participants seem to be more field dependent in studies using the RFT (e.g., Ji et al., *in press*), whereas several studies using the EFT failed to find this difference or even found the reverse pattern (e.g., Bagley et al., 1983). The reverse pattern, which appears using the EFT, may be an artifact of certain specific features of the EFT. The higher scores of East Asians, for instance, may simply be a result of a resemblance between the EFT stimuli and East Asian pictographs. As a consequence, East Asians may benefit from their everyday

experience with similar visual patterns when trying to identify the embedded figures in the EFT (Bagley, 1995).

Given the contradicting cross-cultural findings, especially when using the EFT, further investigations are required to de-confound the influence of the general cultural background and specific experience with East Asian pictographs. The present study contributes to this line of research by presenting EFT measures from U.S. American, German, Russian, and Malaysian samples. The latter sample is of particular interest for the above discussion, because Malaysia is an Asian culture with a Latin writing system and thus a possible candidate for de-confounding the effects of culture in general and a certain writing system. Furthermore, little is known until today about Eastern European cultures. We therefore included a Russian sample in our study. The German and the U.S. samples served as individualist standards of comparison.

More specific predictions concerning the relative degree of field dependence in our samples were derived from previous investigations of value endorsements within the respective societies. In Hofstede's (1983) famous study with samples from 50 countries and three regions, the U.S. participants ranked highest on individualism, with the Germans (former West) still belonging to the upper quarter (rank 15), whereas the Malaysian sample (rank 36) belonged to the more collectivist cultures (cited after Smith & Bond, 1994). More recently, similar results were presented by Arrindell et al. (1997). Unfortunately, both studies did not include a Russian sample. There are, however, some recent studies that give support to the classification of Russia as a rather collectivist country. Smith, Trompenaars, and Dugan (1995) administered the Rotter Locus of Control Scale in a multinational survey including a Russian sample. Using the multidimensional scaling technique, they identified among others a dimension corresponding to Hofstede's (1983) individualism-collectivism dimension, on which the Russian sample was situated toward the collectivist pole. Tower, Kelly, and Richards (1997) examined value orientations of Russian and British students on the individualism-collectivism dimension. They found Russian participants to be more collectivist than the British. Searle-White (1996) compared U.S. American and Russian citizens and found his Russian subjects to be in general less protective of their personal sphere. The author interprets this finding as a sign for the collectivist nature of the Russian culture. In a recent cross-cultural study (see Roeder, 2000), the Self-Construal Scale (Singelis, 1994) was administered to Malaysian, Russian, and German university students. Results showed that both Malaysians and Russians described themselves as more interdependent and as less independent than German participants. These findings support our notion that Malaysia and Russia are substantially more collectivist than Germany. Accordingly, when using the EFT in our study, we expected participants from Malaysia and Russia to exhibit stronger degrees of field dependence than participants from the German and the U.S. samples.

METHOD

PARTICIPANTS

Students of different subject areas from the following universities participated in the study: 60 students from the University of Michigan, Ann Arbor, in the United States (34 female, 26 male); 80 students from the University of Dortmund, Germany (48 female, 31 male, 1 without indication of sex); 107 students from the University of Rostov, Russia (92 female, 15 male); and 175 students from the International Islamic University Malaysia,

Kuala Lumpur (136 female, 39 male). The sample from the International Islamic University Malaysia only consisted of members of the ethnic majority in Malaysia, excluding Chinese students from this university. This was a necessary measure to assure the de-confounding of collectivism and the pictographical writing system. The students were either asked to participate during introductory classes in psychology or on the respective university campus.

MATERIAL AND PROCEDURE

Field dependence was measured using Horn's (1962) self-administered version of the EFT developed by Witkin (1950). In this EFT version, the stimuli consist of two columns containing a total of 40 geometrical patterns. In each pattern, one out of five simple target figures, which are depicted at the head of the page, is embedded. The participant's task is to identify as many of the embedded figures as possible within 2 minutes. The more embedded figures a person can find, the more field independent his or her perception is. In the beginning of the experiment, a detailed explanation with two examples of the task was given to the participants. The participants were then asked to start working on the test. After 2 minutes, they were asked to stop and were debriefed, thanked, and dismissed.

RESULTS

The number of embedded figures that had been identified correctly was calculated for each participant. Using a 4 (country) $\times$ 2 (gender) ANOVA, we compared the scores of the four samples. Because former studies had shown that men in general tend to be more field independent than are women (see Voyer, Voyer, & Bryden, 1995, for a review), participants' gender was introduced as a factor to be able to control the unequal distribution of gender in our different country samples. As predicted on the basis of the assumed individualism-collectivism of our samples, Malaysian ($M = 15.67$, $SD = 7.34$), and Russian ($M = 17.36$, $SD = 7.20$) participants identified fewer embedded figures than did German ($M = 25.33$, $SD = 6.42$) and U.S. students ($M = 27.52$, $SD = 5.80$), $F(3, 413) = 66.6$, $p < .001$. There was no significant main effect for the participants' gender, $F(1, 413) = 1.06$, $p = .30$, nor an interaction $F < 1$. Using a Scheffé test, we investigated which country samples differed significantly from one another. Field dependence did not differ within those sample pairs representing cultures of one kind or the other. Neither the difference between Malaysian and Russian ($Diff = -1.68$, $SD = .85$), $p = .27$, nor between German and U.S. students ($Diff = -2.19$, $SD = 1.18$), $p = .33$, proved to be significant. However, there were substantial differences in field dependence between the collectivist and the individualist countries. The Malaysian participants were more field dependent than both those in the German sample ($Diff = -9.65$, $SD = .94$), $p < .001$, and the U.S. sample ($Diff = -11.84$, $SD = 1.04$), $p < .001$. Similar results were obtained when comparing the Russian sample with the German sample ($Diff = -7.97$, $SD = 1.02$), $p < .001$, and with the U.S. participants ($Diff = -10.16$, $SD = 1.12$), $p < .001$.

DISCUSSION

In line with the hypotheses, which were derived from investigations of individualism-collectivism, we found Malaysian and Russian participants to exhibit stronger degrees of field dependence than did Germans and Americans. As predicted, differences between the two samples representing a culture of one kind were not significant. To our knowledge, this is the

first study presenting field-dependence data of an Eastern European culture. The present results are in line with recent cross-cultural findings that Russia can be characterized as a more collectivist culture than Western Europe or the United States. This may be partly a result of the former communist system, which organized, for example, the educational system and the economy according to collective principles. Further investigations of the psychological effects of the Eastern European cultural transitions are required.

In our study, Malaysians exhibited the strongest degree of field dependence. This result is consistent with the findings of Hofstede (1983) and Arrindell et al. (1997), whose comparisons with other countries showed the strongest endorsement of collective values in Malaysians. Malaysia is an Asian culture using the Latin writing system. Based on our results, the higher EFT performance of Asians compared with Westerners found by Bagley et al. (1983) could be traced back to their Asian participants' familiarity with the pictographical writing system.

We are, however, aware of the limitations of the interpretation of our data. First, we did not measure individualism-collectivism directly but based our assumptions about the respective differences between our samples on previous investigations. Second, our samples are presumably not representative of their cultures. Obviously, student samples can hardly be treated as if they were representative for the entire culture.

The present results are consistent with the notion that culture affects individual experiences on a very basic perceptual level, which is a notion recently substantiated by convergent evidence from various research fields. We therefore regard our study as one small piece in a growing mosaic, showing that members of individualist cultures tend to perceive objects context independently, as single entities, whereas members of collectivist cultures focus on the relation between objects and the entire field.

REFERENCES

- Arrindell, W. A., Hatzichristou, C., Wensink, J., Rosenberg, E., van Twillert, B., Stedema, J., & Meijer, D. (1997). Dimensions of national culture as predictors of cross-national differences in subjective well-being. *Personality and Individual Differences*, 23(1), 37-53.
- Bagley, C. (1995). Field independence in children in group-oriented cultures: Comparisons from China, Japan, and North America. *Journal of Social Psychology*, 135(4), 523-525.
- Bagley, C., Iwawaki, S., & Young, L. (1983). Japanese children: Group-oriented but not field-dependent? In C. Bagley & G. Verma (Eds.), *Multi-cultural childhood: Education, ethnicity and cognitive styles* (pp. 27-37). Aldershot, UK: Gower Press.
- Berry, J. W. (1991). Cultural variations in field dependence-independence. In S. Wapner & J. Demick (Eds.), *Field dependence-independence, cognitive style across the life span* (pp. 289-308). Hillsdale, NJ: Lawrence Erlbaum.
- Berry, J. W. (1994). Ecology of individualism and collectivism. In U. Kim, H. C. Triandis, C. Kagitcibasi, S.-C. Choi, & G. Yoon (Eds.), *Individualism and collectivism: Theory, method, and applications*. Thousand Oaks, CA: Sage.
- Choi, I., Nisbett, R. E., & Norenzayan, A. (1999). Causal attribution across cultures: Variation and universality. *Psychological Bulletin*, 125(1), 47-63.
- Hofstede, G. (1983). Dimensions of national cultures in fifty countries and three regions. In J. Deregowski, S. Dzuirawiec, & R. Annis (Eds.), *Explications in cross-cultural psychology*. Lisse, Switzerland: Swets and Zeitlinger.
- Horn, W. (1962). *Leistungspruefsystem, L-P-S: Handanweisung fuer die Durchfuehrung, Auswertung und Interpretation* [A performance testing system: Manual for administration, scoring, and interpretation]. Goettingen, Germany: Verlag Hogrefe.
- Ji, L. J., Peng, K., & Nisbett, R. E. (in press). Culture, control, and the perception of relationships in the environment. *Journal of Personality and Social Psychology*.
- Jones, E. E., & Davis, K. E. (1965). From acts to dispositions: The attribution process in person perception. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 2, pp. 219-266). New York: Academic Press.

- Kim, H. & Markus, H. R. (1999). Deviance or uniqueness, harmony or conformity? A cultural analysis. *Journal of Personality and Social Psychology*, 77, 785-800.
- Kühnen, U., Hannover, B., & Schubert, B. (2000). *A semantic-procedural interface model of the self: the role of self-knowledge for context-dependent versus context-independent modes of thinking*. Manuscript submitted for publication, University of Michigan.
- Markus, H., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224-253.
- Miller, J. G. (1984). Culture and the development of everyday social explanation. *Journal of Personality and Social Psychology*, 46, 961-978.
- Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (1999). *Culture and systems of thought: Holistic versus analytic cognition*. Manuscript submitted for publication, University of Michigan.
- Roeder, U. R. (2000). Kontextabhängigkeit—Konstruktion und Validierung eines Messinstruments[Context dependency—Construction and validation of a new scale]. In H. Metz-Goeckel, B. Hannover, & S. Leffelsend (Eds.), *Selbst, Motivation und Emotion. Dokumentation des 4. Dortmunder Symposions fuer Paedagogische Psychologie 2000*. Berlin, Germany: Logos.
- Searl-White, J. (1996). Personal boundaries among Russians and Americans: A Vygotskian approach. *Cross-Cultural Research*, 30, 184-208.
- Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin*, 20, 580-591.
- Smith, P. B., & Bond, M. H. (1994). *Social psychology across cultures: Analysis and perspectives*. Boston: Allyn & Bacon.
- Smith, P. B., Trompenaars, F., & Dugan, S. (1995). The Rotter Locus of Control Scale in 43 countries: A test of cultural relativity. *International Journal of Psychology*, 30, 377-400.
- Sternberg, R. J., & Grigorenko, E. L. (1997). Are cognitive styles still in style? *American Psychologist*, 52, 700-712.
- Tower, R. K., Kelly, C., & Richards, A. (1997). Individualism, collectivism and reward allocation: A cross-cultural study in Russia and Britain. *British Journal of Social Psychology*, 36(3), 331-345.
- Triandis, H. C. (1999). Cross-cultural psychology. *Asian Journal of Social Psychology*, 2(1), 127-143.
- Voyer, D., Voyer, S., & Bryden, M. P. (1995). Magnitude of sex-differences in spatial abilities—A metaanalysis and consideration of critical variables. *Psychological Bulletin*, 117, 250-270.
- Witkin, H. A. (1950). Individual differences in the case of perception of embedded figures. *Journal of Personality*, 19, 1-15.
- Witkin, H. A., & Berry, J. (1975). Psychological differentiation in cross-cultural perspective. *Journal of Cross-Cultural Psychology*, 6, 4-87.

Ulrich Kühnen received his Ph.D. from the Technical University of Berlin, Germany, where he is now holding a position as an associate professor. His main research interests include social cognition of the self and the interplay of culture and cognition and implicit attitudes. He was research fellow at the University of Michigan, Ann Arbor.

Bettina Hannover, Ph.D., is a professor of social psychology at the University of Dortmund, Germany. In her work, she combines basic research on self-related cognitive and motivational processes with applied research on gender roles.

Ute Roeder is an associate researcher of social psychology at the University of Dortmund, Germany. Her research focuses on the self-concept, in particular its structural aspects, and on self-related interpersonal differences.

Ashiq Ali Shah is a professor and the head of the psychology department at the International Islamic University Malaysia. He has previously taught at the Technical University of Berlin, Germany, and at the National Institute of Psychology, Islamabad, Pakistan. He has worked as a research consultant for UNESCO and UNICEF. He received his Ph.D. from the Technical University of Berlin. His research interests concern attitudes, depression, psychological problems, and cultural determinants of thought and behavior.

Benjamin Schubert is a scholar of the "Studienstiftung des deutschen Volkes" and is currently pursuing his Ph.D. at the Technical University of Berlin. His main research interests are social cognition of the self and cross-cultural research, especially the influence of culture on cognitive processes.

Arnold Upmeyer, A.J., Ph.D., is a professor of social and applied psychology at the Technical University of Berlin, Germany. His main interests are attitudes and behavior, social influence, social judgment, intelligent tutoring systems, and user modeling.

Saliza Zakaria received her master's degree in counseling and clinical psychology from the International Islamic University Malaysia. Her research interests include cross-cultural studies on depression and adolescence and a recent interest in psychoimmunology.