

• 主编特邀(Editor-In-Chief Invited) •

编者按: 跨文化/文化心理学自 20 世纪中叶创立以来, 在人类行为的共同性、差异性以及心理功能在多大程度上存在文化特异性的问题上一直存在持续争论。虽然探讨文化差异充满魅力, 但迄今的研究往往偏向于寻找行为的差异而不是跨文化的不变性, 跨文化比较研究中的文化偏误、缺乏等价性等问题及其对数据解释的影响并未得到充分的关注。德国雅各布大学心理学系、不莱梅国际社会科学研究生院 的晏松教授和荷兰蒂尔堡大学、比利时鲁汶天主教大学跨文化心理学荣誉教授 Ype H. Poortinga 两人长期致力于文化对于基础认知过程的影响及心理数据跨文化比较的方法研究, 本刊特邀两位教授撰写此文。作者通过跨文化心理学的历史回顾, 基于跨文化研究的成果和发展, 对目前文化心理学研究中存在的倾向, 尤其是如何组织和解释所发现的行为差异, 进行了详细而深入的剖析。我们希望通过晏松教授等人的文章, 进一步推动跨文化心理学的研究, 推动对行为与文化之间关系问题的深入探索。

Cultural differences in behavior: A few big elephants or an army of ants?

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Abstract: This overview of research on the relationship between behavior and culture is organized as follows. The first section relates how cross-cultural psychology, or cultural psychology, since it emerged in the mid 20th century has reflected a continuous tension between how and how much humans are the same psychologically and to what extent there is cultural specificity in psychological functioning. The second section on the charm of differences argues that research is often biased towards finding differences rather than cross-cultural invariance. The third section briefly outlines problems of cultural bias, or lack of equivalence, in assessment across cultural populations and its implications for interpretation of data. The fourth section makes explicit a theme that is embedded in other sections and reflected in the title, namely the psychological organization of cross-cultural differences. The section challenges the tendency to conceive of such differences as being organized in broad dimensions or psychological functions. This tendency to over-generalize is illustrated in the fifth section for various traditions of research, including the recent tradition of cultural neuroscience where the increasing contributions of Chinese researchers are particularly evident. An outlook and some conclusions are presented in the final section.

Key words: (cross)-cultural psychology; cross-cultural invariance; cultural difference; psychological organization; overgeneralization

The discovery of cultural differences in psychology

Cross-cultural psychology as a recognizable

field of research became established about half a century ago. The *International Association for Cross-Cultural Psychology* held its first conference in Hong Kong in 1972. The *International Journal of Psychology*, with an initial focus on cross-cultural research, started in 1967, followed by the *Journal of Cross-Cultural Psychology* in 1970. Until that time the study of culture from a psychological perspective mainly had been the domain of cultural anthropo-

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logists using the method of ethnography. A psychoanalytic approach and the Rorschach projective technique had been characteristic features of such research (Bock, 1999). Like the anthropologists before them, psychologists have been pursuing mainly differences in behavior. However, their focus is not on the analysis of a single cultural population with holistic methods, but on comparative designs and psychological methods, such as tests and questionnaires, and experimental tasks. In the typical cross-cultural study data are collected on samples of respondents, often university students, deemed representative of larger cultural populations, usually countries or even regions of the world. Initially the large majority of studies was based on two populations only; gradually it is becoming customary to include samples from numerous countries, at least in some areas of cross-cultural psychology.

Early research by and large was undertaken by western psychologists using western instruments based on western theories. Gradually two positions were articulated, called universalism and relativism. In universalism the focus was on how different ecological and socio-cultural environments impact on common human psychological functions and processes, and how these environments cause, enable, or facilitate differences in manifest behavior. In relativism the focus was on how psychological functions and processes vary as a consequence of interactions between organism and context, and as such are inherently cultural. The relativist position was defended not only by cultural anthropologists emphasizing the uniqueness of each cultural system, but also by psychologists, especially in the non-western world, who observed that prevailing western concepts and methods did not fit local realities. "Indigenous" psychologies were developed in various countries, such as India (Sinha, 1997), Mexico (Diaz-Guerrero, 1993), and the Philippines (Enriquez, 1990). Not surprisingly, there are also numerous writings on the psychology of Chinese people (e.g., Bond, 1996; Hwang, 2001; Yang, 1999).

If specificity of psychological traits and

processes is assumed, qualitative research methodology is required, with methods and instruments that are tuned conceptually and in content to local understanding (e.g., Valsiner & Rosa, 2007). Indigenous approaches in this sense have to be distinguished from local research meant to be part of a common science of psychology. Furthermore, the term indigenization is also used for the local development in a country of psychology as a discipline and profession with education programs in universities, research institutes and a market for professional psychological services (e.g., Adair, Puhan, & Vohra, 1993). Indigenization in the sense of Adair and colleagues has led to rapid development of psychology in China and increasing visibility on the international scene (e.g., Blowers, 2010; Jing & Zhang, 1998).

Cultural specificity of psychological traits and processes featured strongly in the school of cultural psychology that emerged in the USA in the early 1990s; in the words of one of its early authors, Shweder (1990), "culture and psyche make each other up". However, soon researchers from this school became engaged in culture-comparative research that is incompatible with a strong relativist position. There is now explicit recognition by virtually all researchers that human phylogenetic history imposes constraints on variability of human behavior (e.g., Kitayama & Cohen, 2007) and the earlier dichotomy of universalism versus relativism has lost some of its conceptual distinctiveness. At the same time, awareness has grown that "western" psychology is to be viewed as another indigenous psychology; like all other approaches it has time- and location bound elements (e.g., Berry, Poortinga, Breugelmans, Chasiotis, & Sam, 2011).

The charm of cultural differences

Cross-cultural psychology as it emerges from the literature is almost exclusively devoted to the study of *differences* in behavior. A telling study has been reported by Brouwers, van Hemert, Breugelmans, and van de Vijver (2004). These authors analyzed

hypotheses and outcomes in a set of 80 culture-comparative articles published in the *Journal of Cross-Cultural Psychology*. They found that in a clear majority of these articles (69%) the authors only had formulated hypotheses postulating differences between cultures. In contrast, when the hypotheses were tested, the findings in the majority of articles (71%) pointed to similarities (invariance) as well as differences. Even more striking, there was not a single article in the entire set where only cross-cultural invariance had been predicted and/or found, although the distribution of differences and invariant results compellingly suggests that there should have been at least some such articles. The most likely explanation is that studies finding “no differences” do not get published, pointing to serious publication bias.

In our view the analysis by Brouwers *et al.* (2004) exemplifies that we tend to exaggerate the differences between our in-group and other groups (as a negative outcome of social categorization, cf. Tajfel & Turner, 1979; Tajfel & Wilkes, 1963), and that psychologists, like lay people, tend to be impressed with the importance and perceived size of cross-cultural differences. This prior belief is contradicted by empirical results in key areas of cross-cultural research. For example, Fischer and Schwartz (2011) reported that on the Schwartz Value Survey scale (Schwartz, 1992) country level differences accounted for not more than 12% of the total variance in a data set based on samples from 67 countries. This means that individual differences in values within a country are considerably larger than differences between countries. Similarly, in the domain of personality McCrae and colleagues have found for the Big Five dimensions that country differences in self-ratings account for approximately 12% of the total variance, and for ratings of others this is as low as 4% (McCrae & Terraciano, 2005, 2008). It can be argued that the studies mentioned make use of western instruments and do not provide a good representation of conceptualization of personality elsewhere. Indeed, when a local personality

inventory was constructed in China by Cheung and colleagues (Cheung *et al.*, 2001), a dimension of social relatedness emerged that is absent from the Big Five and other western models. Similarly, an instrument developed in South Africa also showed a strong social orientation in the structure of personality (Nel *et al.*, 2012). However when these (non-western) instruments are administered to western samples, the social orientation dimension tends to be replicated (e.g., Valchev, van de Vijver, Nel, Rothmann, & Meiring, 2013), suggesting that not (only) differences in individual functioning, but also the representation of personality in the various models plays a role in the findings.

Although there is a paradox between empirical findings as mentioned and widely shared impressions, it should not be inferred from these examples that all psychological differences are small. Notably, consistent and large cross-cultural differences have been found in (aggregated) self-reports on situation contingent variables reflecting the actual conditions in which people find themselves. Affluence as opposed to poverty (GDP per capita) has dramatic effects on ratings of happiness in a country (average scores on a 10-point happiness scale differ from 7.5 in Denmark to 2.9 in Burundi (http://worldhappiness.report/wp-content/uploads/sites/2/2016/03/HR-V1_web.pdf) and on Subjective Well Being (SWB) as demonstrated by Diener and colleagues (e.g., Diener, Ng, Harter, & Arora, 2010). Research on SWB is also of interest since after subtraction of effects of affluence, there is remaining variance. For example, people in Latin America tend to be happier and more content than might be derived from their GDP per capita. Other cultural factors such as the general tendency to social comparison and its psychological consequences in a certain society can play a role (e.g. Brockmann & Yan, 2013).

In summary, these examples are meant to illustrate that as a research community cross-cultural psychologists tend to believe that cross-cultural differences in both manifest behavior and underlying

psychological traits and processes are massive, but that core parts of the research record do not appear to support this expectation, suggesting a paradox between expectations and findings. Other research does suggest substantial differences, in line with expectations. In the following sections we will explore both the paradox and its reach.

Assessing and interpreting cultural differences

Strong warnings that cross-cultural comparative research is methodologically vulnerable were formulated by Campbell (1964) decades ago. These warnings concerned both the design of cross-cultural studies and the equivalence of measurement methods. Cross-cultural research in which hypotheses are tested about group differences formally follows the design principles of the experimental paradigm in psychology, but by and large fails to meet two basic assumptions. A true experiment presumes random assignment of respondents to treatment conditions (exchangeability), and experimenter control over treatments and ambient events. Campbell and Stanley (1966; see also Shadish, Cook, & Campbell, 2002) referred to “quasi-experiments” and “non-equivalent group designs” when the assumptions are not entirely met, like in national research on educational programs where pupils are nested in classes or schools. In cross-cultural research the assumption of exchangeability is violated systematically; a person is inherently nested in the same population (i.e., assignment is fixed). In addition, in most research cultural treatments are vague and inferred, rather than actually measured. For example, in a review of 21 culture-comparative studies on self-efficacy Klassen (2004) found that of the 18 studies referring to the individualism-collectivism distinction, there were only six that included an actual assessment of this distinction, while the classification of societies as individualistic or collectivistic is known to be problematic (e.g., Oyserman, Coon, & Kemmeleier, 2002; Sinha & Tripathi, 1994).

In addition, cross-cultural research, like other

fields of science, is vulnerable to undue flexibility in the application of methodological principles that leads to large increases in false rejections of the null-hypothesis. Simmons, Nelson and Simonsohn (2011) argued that such flexibility can be found in data collection (e.g., making sample size dependent on reaching statistical significance), analysis (e.g., eliminating cases) and reporting (e.g., not listing all variables and attempted analyses). A focal point in the criticisms is the small size of samples, and the consequent low power of statistical analysis, which leads to overestimation of effect sizes and low reproducibility (e.g., Button et al., 2013). A point particularly relevant for culture-comparative research is that in null-hypothesis testing not only the dependent variable but any difference that is related to (confounded with) this variable may affect the findings (see below).

An important strategy to strengthen research is to carry out replications. Impressive replication efforts have been reported (Klein et al., 2014; Open Science Collaboration, 2015) that show a substantial decrease in the proportion of statistically significant findings reported in the original studies. A controversial point in replication research is whether exactly the same method and procedure have to be followed as in the original study (literal replication) or whether only essential features should be retained (constructive replication; Lykken, 1968). Literal replication creates a dilemma in cross-cultural psychology. To communicate accurately, items and instructions may need to be adapted (going beyond literal translation, for example because the content of an item does not make sense everywhere). The question is not answered easily whether such an adapted instrument is close enough to the original to serve for replication.

In line with this, the second major problem identified by Campbell (1964) was that findings of cross-cultural differences may result from failures of communication. Instruments such as tests and questionnaires used in survey research, and even tasks in experimental studies, are unlikely to have

precisely the same meaning and to elicit the same reactions in other contexts as where an instrument was developed originally. Numerous factors, collectively referred to as “cultural bias”, can affect the equivalence or comparability of scores. van de Vijver and colleagues have distinguished three kinds of bias (van de Vijver & Poortinga, 1997; van de Vijver & Leung, 2011). The first kind bias is called *construct bias*; it occurs when an item set is not equally representative of the target construct in the groups that are being compared. The second kind of bias is called *method bias*; it refers to factors that unequally influence the responses to all or most items in a scale. Examples include sampling bias (e.g., an unequal ratio across groups of men and women while variables show gender differences in score distributions), differences in response styles (e.g., acquiescence, social desirability) and differences in familiarity with testing. Although method bias is likely to lead to exaggeration of cross-cultural differences this need not be the case. Heine, Lehman, Peng, and Greenholtz (2002) have pointed out that self-ratings imply comparison of oneself with others from one’s own group rather than from other groups and that this can blur group differences; a (rare) empirical demonstration of such a “reference-group effect” can be found in van de Gaer, Grisay, Schulz, and Gebhardt (2012). The third kind is *item bias* with translation errors or subtle shifts in the meaning of translated items as a notorious reason for lack of equivalence in cross-cultural research with groups speaking various languages.

Nowadays various levels of equivalence of psychometric scales can be examined with a set of interrelated psychometric conditions (e.g., Vandenberg & Lance, 2000), using Multiple Group Confirmatory Factor Analysis (MGCFA; Chen, 2007; Cheung & Rensvold, 2002). The analysis of equivalence provides important evidence as to what kind of comparison is justified: configural equivalence suggests identity of factor structures across groups (i.e., the same dimensions are being assessed); metric equivalence suggests that changes in scores

over measurement occasions have the same meaning across groups; and scalar equivalence suggests that score differences across groups have the same meaning and can be interpreted at face value. In addition, there is a rich tradition in the analysis of item bias, or differential item functioning (DIF), rooted in the idea that differences between groups in the score distributions of each single item should match the differences in the score distributions of the item set. There are several statistical procedures to identify item bias (e.g., Sireci, 2011). Analysis does not only help to evaluate equivalence of an instrument; biased items can be reformulated for future research, and with an existing data set it may be possible to improve equivalence by excluding biased items.

A further methodological challenge is how to reconcile controversies between the qualitative and the quantitative traditions in research (Berry *et al.*, 2011). In cross-cultural psychology the quantitative approach is associated with a more universalist perspective and qualitative research traditions with a more relativist perspective. This latter orientation, which is closer to cultural anthropology, seeks to avoid all forms of ethnocentrism and cultural imposition that come with methods and theories developed in the researcher’s historical and local context, rather than in the context of the research participant. Qualitative researchers attempt to understand the lived experience (meaning) of people “in their own terms,” without imposing any *a priori* judgments or standards. A pervasive relativist movement is social constructionism that sees psychological reality as dependent on our own understanding; research does not reflect a world as-it-is, but constructs the world from a particular perspective (Gergen, 2009). Focus groups, open interviews, texts and narratives of cultural informers are the primary materials for qualitative analysis (e.g., Silverman, 2006). There is a trend to transcend the qualitative-quantitative controversy by advocating mixed methods (e.g., Creswell, 2009). For cross-cultural personality research such an approach has

been described by Cheung, van de Vijver, and Leong, (2011) drawing on work in personality assessment, mentioned above. Mixed methods attempt to combine local understandings and comparative research designs. The approach leads to a sequence of culture-specific phases (also called “emic” research) and culture-comparative phases (“etic” research). It may be noted that the qualitative-quantitative distinction has a long history, with expression in other pairs of terms, such as idiographic versus nomothetic, or phenomeno-logical versus experimental. Also attempts to transcend the dichotomy have a long history; the distinction between exploration and verification (nowadays falsification) as two necessary phases of all research (Reichenbach, 1938) is particularly appealing. From such a perspective controversies between qualitative and quantitative approaches mostly result from emphasizing one phase of research at the cost of the other phase.

In summary, in this section we have provided a brief overview of pitfalls in culture-comparative research. We have pointed out intrinsic problems with quasi-experimental designs geared towards null-hypothesis testing. Similarly we have pointed to vulnerabilities in survey research where cultural bias can distort measurement outcomes. We have referred to qualitative research that seeks to avoid the imposition of common instruments and standards and to “mixed methods” that seek to combine local understandings and comparative methodology. None of these pitfalls means that good cross-cultural research is impossible, but it does mean that a good study requires careful planning and investment of time and effort. Of all steps that can be taken to improve research the most important is to include in a research team representatives of all participating societies and to be wary about the transfer of existing methods that typically have been developed in a single (mostly western) society. We expect that the current wave of criticism on null-hypothesis testing will soon also reach the field of cross-cultural or cultural psychology and lead to methodologically stronger research practices.

The psychological organization of cultural differences

In the cross-cultural literature questions about the generalizability of scores are raised relatively rarely, although they are crucial to how we think about cultural differences in behavior and human psychological invariance. A major question is how far cross-cultural differences are expected to form coherent patterns across domains of behavior; can they be adequately represented in broad concepts (the “elephants” in our title), or is it better to think of a large array of more or less independent customs and practices (the “ants” in our title)? Methodologically the question is to which extent differences on a variety of variables can be demonstrated to hang together. In cultural anthropology there are frequent references to a “culture- as-a-system”, suggesting that all aspects of the behavior repertoire of a group hang together in a for that group characteristic fashion. In psychology coherence is implied in the notions of “mentality” (Fiske, Kitayama, Markus, & Nisbett, 1998) or of a culture as a “constellation” of ideas and practices (Chiu, Leung, & Hong, 2011). It should be noted that there is no more or less widely accepted set of parameters providing a representation or description of cultural systems (e.g., in the form of flow diagrams) (Baldwin, Faulkner, & Hecht, 2006). Hence, in serious psychological research one will not find interpretations of cross-cultural differences in terms of, for example, “the Chinese culture” or “the German culture”.

On the other hand, there are frequent explanations in terms of broad psycho-cultural dimensions that are taken to explain cross-cultural differences in a substantial portion of the overall behavior repertoire; individualism-collectivism (Hofstede, 2001; Triandis, 1989) or independence (autonomy) versus interdependence (Markus & Kitayama, 1991) is the most familiar. This contrast has been used as a dichotomy that can account not only for differences in social orientation, but also for differences in perception, cognition, emotions and social behavior (e.g., Nisbett, 2003; Na et al., 2010).

Although extremely popular, we like to note that this dichotomy is poorly demarcated (which aspects of the behavior repertoire are captured and which are not captured?) and that it is hard to find research looking for evidence of discriminant rather than convergent validity (Berry *et al.*, 2011). Such evidence is crucial as, in principle, any difference between two samples is compatible with a dichotomy.

Less broad and inclusive concepts, like personality traits, cognitive abilities and similar “hypothetical constructs” tend to be better defined and more open to critical analysis, including analysis of equivalence at both concept and instrument level (van de Vijver & Leung, 2011). Interpretation of cross-cultural data can refer to psychological properties of persons (emotions, traits, abilities); it can also refer to domains of behavior, such as domains of knowledge, and to cultural practices, rules or conventions (the “ants” mentioned in our title). When the elements of a domain can be listed (e.g., arithmetical operations, color words, etc.), it tends to be clear whether or not a domain reasonably can be assumed to be identical across certain populations (e.g., arithmetical operations) or non-identical (e.g., the alphabet in various languages). In our view, in research more precise and limited concepts and behavior domains are to be preferred over broad and fuzzy concepts. The former are more transparent and open to analysis of equivalence.

A pervasive trend in the analysis of cultural differences

An historical overview of psychological research across cultures reveals a pervasive theme: a new topic of research initially tends to come with claims of important, and often large, cross-cultural differences, which subsequently have to be redressed in the light of more precise/focused empirical analysis (Poortinga, 2003). In this section we illustrate this trend for a few research traditions.

Perception

In the early history of scientific psychology

there has been a tradition of research on perception that included illiterate populations. Rivers (1901) concluded from the then available literature and from his own data collected in the Torres Strait Islands that “savage and half-civilized” people had a somewhat better visual acuity than the “normal European” (p. 42). He also observed a great attention to detail and saw this as an impediment to cognitive development: “the predominant attention of the savage to concrete things around him may act as an obstacle to higher mental development” (p. 45). This notion of a trade-off in the development between various psychological dispositions, known as the “compensation hypothesis” (e.g., Deregowski, 1989), was still around half a century later but now postulated *within* the perceptual domain as a relative predominance of sensory modalities. Pointing to sense of rhythm and the variety of languages spoken by unschooled urban Africans, and the long tradition of reading and writing among Europeans, authors like Biesheuvel (1943) and Ombrédane (1954) suggested that Africans were more oriented towards the auditory modality and Europeans towards vision. None of these broad generalizations has been upheld, but Rivers’ findings on differences in susceptibility to visual illusions were supported in later research. Segall, Campbell, and Herkowitz (1966) conducted an extensive and meticulous study including groups living in a variety of environments. They found greater susceptibility to the well-known the Müller-Lyer illusion [$>—<$ vs $<—>$] for groups living in environments with a higher degree of “carpenteredness” (i.e., environments where carpenters and other artisans have created orthogonal angles in rectangular buildings and street corners). Susceptibility to the horizontal-vertical illusion [\perp] was found to depend on the degree to which the natural environment is open (wide vistas) or closed in (forest or buildings). Apparently, repeated experience with certain perceptual cues affects our perception in a manner adaptive to a given ecological environment.

Emotions research

Cross-cultural research on emotions is an area where both universalist and relativist orientations have had a strong presence. The main argument for the former viewpoint are patterns of contraction of facial muscles characteristic for each of the major emotions, such as anger, sadness and joy. Especially Ekman and Friesen (1971) demonstrated above chance recognition of photographs of facial expressions of emotions across widely divergent groups, such as European Americans and the Fore in Papua New Guinea. The relativist position for a long time focused on the meaning of specific terms for which no corresponding words exist in other languages; such non-correspondence was the major argument to claim cultural specificity of the associated emotion. Most of the evidence came from ethnography; for example Lutz (1988) described two emotions present among the Ifaluk (in Oceania), but in her view not found in the USA. Also authors in psychology subscribed to such a viewpoint: Kitayama and Markus (1994, p.1) wrote: "Specifically, we wish to establish that emotion can be fruitfully conceptualized as being social in nature. Frijda, Markam, Sato, and Wiers (1995, p. 121) summarized the issue as follows: "One can assume that there exist words ('emotion words') that dictate the way things are seen; or one can assume that there exist things ('emotions') that are given names and thus have words assigned to them". With Frijda and colleagues we lean towards the second viewpoint. One might say that this is a kind of default position; if there were no strong communalities in the experience of emotions it would be incomprehensible how emotion laden stories and events would travel so well across countries and languages as they actually do. Prime examples are movies and also TV serials that, for example, were made for Mexican TV and subsequently have been successfully broadcast in Russia and Indonesia.

One way to study emotions separate from words is to write scenarios that capture a specific emotion or shade of emotion and examine reactions

for various components across languages (Breugelmans & Poortinga, 2006). For example, Frank, Harvey, and Verdun (2000) wrote scenarios for five forms of shame identified in China and prepared scales (e.g., feeling helpless, disgraced myself, wishing to hide) on which these scenarios had to be rated. Ratings of US-American students showed that the distinctions could be largely recovered, suggesting that they recognized the varieties of shame distinguished by Chinese. Such findings have not stopped fundamental debates (e.g., Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012), but the discourse has shifted and most current accounts of how emotions differ across cultures have become more modest.

Cross-cultural psycholinguistic research

While culture and language are closely related, language itself is intertwined with cognition. It is difficult to imagine how we can think if we had no language. Not surprisingly, many cross-cultural studies have looked at the influence of language on cognition. The most famous conceptualization is the Whorfian hypothesis, or Sapir-Whorf hypothesis. Whorf (1956) argued that a language is not merely an instrument for voicing ideas, but is intrinsic to the formation of ideas; speakers of different language families perceive and think about the world differently, in ways that follow from their language. Much of the early work on language effects was in the domain of color terms. It was known that languages differ in the number of "basic color words" (i.e., terms referring to color that are salient and general, in the sense of not being restricted to certain objects). The question was whether in a language the visible spectrum is divided into units on a physically arbitrary basis, or whether there are regularities in categorization, especially in focal colors. On the one hand, evidence of regularities emerged and theories were formulated around how color naming is rooted in color vision and its physiology (e.g., Hardin & Maffi, 1997). On the other hand, numerous insta-

nances were reported of languages with a basic color word not found elsewhere. The ensuing debate has not been settled entirely, but it appears to us that careful research as reported by Davies, Sowden, Jerrett, Jerrett, and Corbett (1998) and Roberson, Davies, and Davidoff (2000) has shown that color terms certainly are not distributed randomly along the visible spectrum: “the results uphold the view that the structure of linguistic categories distorts perception by stretching perceptual distances at category boundaries.” (Roberson *et al.*, 2000, p. 394). This conclusion is also supported by findings from China. Studies of the Yi, Bai and Naxi groups in Yunnan province, for example, showed consistency in the classification of Chinese basic color terms, but with noticeable differences in terms of the number and content of the categories (Zhang, He, & Zhang, 2007).

Another similarly controversial topic that has been examined extensively is the relationship between language and spatial orientation. Languages differ in the way how they represent space. English speakers usually describe spatial relations from an egocentric, body-oriented perspective, while in some other languages an “absolute” orientation is used with geocentric spatial coordinates that stay the same independently of the position of the observer (Levinson, 2003). The fact that there are language-related differences in spatial orientation is not disputed, but what are the broader implications for cognitive functioning? In a review, Majid, Bowerman, Kita, Haun, and Levinson (2004, p. 113) suggested “profound linguistic effects on cognition”. Other authors have questioned such an interpretation (Li, Abarbanell, Gleitman, & Papafragou, 2011; Li & Gleitman, 2002). In China, a study by Liu, Zhang, and Wang (2005), adopting Levinson’s rotation paradigm, found differences between South and the North Chinese students to the effect that Southerners were inclined to use relative egocentric frame (left, right, front, back), while Northerners used more absolute reference frame (east, west, north, south) in a non-linguistic

spatial task. Likewise, Zhang, Xie, and He (2008) compared the spatial-terms classification by undergraduates of the Han and Naxi nationalities in Yunnan and revealed a difference in spatial cognition on the vertical and horizontal dimension. In both studies, the reported differences seem to be consistent with the habits of spatial expression in the respective languages. However, when participants in a study by Zhang and Liu (2007) received spatial cues contra their language habit, they appeared to be able to apply the instructed spatial frame in their orientation. This is in line with an extensive series of studies by Dasen and colleagues (Dasen & Mishra, 2010) showing that in groups with preferential use of an absolute frame encoding also could be relative, dependent on the nature of the task. Moreover, when asked for explanations, respondents could make use of absolute language to describe a relative encoding and vice versa. Essentially, the question is whether spatial coding systems (only) affect the preferred strategies in non-linguistic spatial tasks or whether the effect extends to the ability to use different strategies (“preference” vs. “competence”); this discussion is continuing (see Haun, Rapold, Janzen, & Levinson, 2011).

More straightforward are cross-linguistic studies targeting the implications of specific linguistic properties for cognitive processing, i.e. beyond the content of thinking. The Chinese language, due to its unique linguistic features compared to most Indo-European languages, serves as an excellent example (for an early overview of studies on language processing in Chinese see Chen & Tzeng, 1992). Of particular interest to our context is research dealing with effects of Chinese linguistic properties like word length (short pronunciation), writing direction, and regularity of the number system etc. on cognitive processes, such as memory and attention. Larger memory span of Chinese participants, especially for digits, compared to other language groups, has been documented by a number of studies (Stigler, Lee, & Stevenson, 1986; Lüer *et al.*, 1998) indicating a language specific effect on memory

(Yan, Lass, & Lürer, 2007). In a series of experiments done by Lürer et al. (1998), Chinese participants exhibited larger memory spans than German participants, not only for digits but also for experimental stimuli such as words denoting numbers, color squares, and words denoting colors. Moreover, the researchers could demonstrate a clear relationship between oral reproduction time per item and memory span. They could explain the Chinese subjects' higher performance through the short articulation times of the experimental materials, when these are verbalized in Chinese. These findings fit nicely with Baddeley's phonological loop hypothesis (Baddeley & Hitch, 1974; Baddeley, 1997). Consistent with this, when the experimental stimuli were replaced by random figures which cannot be spontaneously verbalized, Chinese subjects' higher performance over their German counterparts disappeared (Lürer et al., 1998). Similarly, a language effect has been demonstrated in item recognition process, while this effect can be controlled as well (Lass et al., 2006). The authors interpreted these findings by suggesting "cognitive invariance", in line with a universalist rather than a relativist position.

The high mathematics achievement of Chinese students as evidenced in many international assessments (e.g. the Programme for International Student Assessment, PISA) has received great attention. Besides the Chinese way of teaching and learning mathematics rooted in its cultural-social contexts (Ni, Chiu, & Cheng, 2010), the Chinese number system is of special research interest. The way of number word construction appears to influence early counting, arithmetic and place-value understanding (Dowker, Bala, & Lioyd, 2008; Siegler & Mu, 2008). There is great regularity in the Chinese numeral system between 11 and 20 and between 10 and 100, while inconsistencies between the Arabic notation and number word construction (e.g., number word inversion) lead to disadvantages in symbolic number processing (Lonnemann & Yan, 2015; Pixner, Moeller, Hermanova, Nuerk, & Kaufmann,

2011). In Lonnemann and Yan's study, addition problems were presented verbally to native speakers from China and from Germany in two different ways: number words non-inverted as used in Chinese and number words inverted as used in German (for example, 24 is pronounced as 'vierundzwanzig', literally translated to 'four-and-twenty', implying decade-unit-inversion). While Chinese participants had more difficulties when confronted with problems presented in the German way, German participants did not show more difficulties solving addition problems presented in the non-inverted structure even though it was unfamiliar to them. Inverted number words thus seem to complicate arithmetic processing in populations where arithmetic processing is an accomplished skill. Apart from the regularity of the Chinese number system, other factors, such as the shorter pronunciation of Chinese numbers, which leads to a greater digit span for native Chinese speakers as described above; and greater spatial abilities probably resulting from use of character-based written systems may also contribute to the higher mathematics achievement of Chinese groups in cultural comparisons.

In sum, the relationship of language and cognition is fascinating; the findings are intriguing and sometimes controversial, particularly when interpretations refer to broad and complex domains, such as spatial orientation. Cross-linguistic studies focusing on effects of specific linguistic properties, with well specified conditions and experimental controls, provide interesting, and presumably more lasting insights even though they focus on smaller pieces of evidence (i.e., the ants in our title). There is still much to learn about the subtle ways in which language influences perception and cognition, but the accumulated evidence is sufficient to qualify Whorf's original determinism hypothesis as a strong overgeneralization. Instead of the question of whether the Whorfian hypothesis is tenable, it might be more accurate to discuss how language is "affecting" thinking rather than "shaping" thinking, and how

language might modulate certain cognitive functions, as illustrated in our examples.

Cognition

The grossest overgeneralizations can be found in the history of cross-cultural research on cognition, where intelligence tests were long used to support existing beliefs about racial differences and the superiority of Caucasians (e.g., Porteus, 1937; Jensen, 1985). Other research traditions were less concerned with inferiority or superiority, but postulates of broad differences in modes of cognition can be found widely (for an overview of such “Great Divides” see Segall, Dasen, Berry, & Poortinga, 1990, Ch5). For example, Vygotsky (1978) saw the development of higher mental functions, which distinguish humans from other species, as a historical process. He argued that the sociocultural context mediates individual development and a mental function must be present at the societal level before the individual can acquire it. In line with these ideas, when illiterate farmers in Central Asia did not produce correct solutions for syllogisms, Luria (1971) concluded that they were lacking the capacity for abstract thinking, which was supposedly not present in their society. When respondents with a few years of formal schooling did come up with the logically correct answers, Luria further concluded that the capacity for abstract thinking had been acquired through cultural mediation in the school context. However, a much less far reaching psychological interpretation was suggested by Scribner (1979) who found in Liberia that unschooled people do follow the principles of logic to solve syllogisms, but tend to reason on the basis of their own prior experience rather than on the basis of premises presented by an experimenter. In other words, illiterates may not start from information mentioned to them in the experimental situation, but that does not say much about their *capacity* for abstract reasoning. Rather, a crucial factor is that in traditional societies children learn in-context, while with formal education in schools pupils learn from

what they are told by teachers, i.e., they are learning out-of-context. Especially M. Cole and colleagues (e.g., Cole, 1996; Scribner & Cole, 1981) demonstrated that cognition is contextual and that performance on cognitive tests is attuned to the school curriculum.

The trend to search for associations between well-defined antecedent conditions and precise behavioral outcomes in cognition was not reflected in Nisbett and colleagues’ line of research. They postulated a broad distinction in cognition between East Asia and the West in holistic or dialectical versus analytic thinking (Nisbett, Peng, Choi, & Norenzayan, 2001; Peng & Nisbett, 1999). For example, East Asians attend more to contextual cues and Westerners more to focal elements and salient objects; thus East Asians are better able to see relationships among events, and also among people than Westerners, while on the other hand, Westerners use attributes to assign people to categories, and apply rules of formal logic to understand their behavior (Nisbett & Miyamoto, 2005; Norenzayan, Edward, Kimc, & Nisbett, 2002). It should be noted that these East-West differences are in reasoning styles and do not refer to levels of cognitive capacities, but to preferences in situations that have a certain cognitive ambiguity; individuals from one cultural region employ certain cognitive strategies available everywhere with a relatively higher frequency than those from another region. Still, this is a broad distinction, since differences found on a large variety of variables all are seen as linked to more individualistic or independent versus more collectivistic or interdependent socialization, expanding a broad explanation prominent in the domain of social behavior to include cognitive functioning (Nisbett, 2003).

Support for this broad East-West distinction is still expanding (e.g., Jenkins, Yang, Goh, Hong, & Park, 2010; Lao, Vizoli, & Caldara, 2013; Petrova, Wentura, & Fu, 2013). At the same time, challenges have been emerging (e.g. Evans, Rotello, Li, & Rayner, 2009; Rayner, Li, Williams, Cave, & Well,

2007) along with criticism towards the monolithic categorization or the general line of argument and interpretation (see reviews of Nisbett's book e.g. Engel, 2007; Ortner, 2003; Yan, 2004).

Cultural neuroscience

For more definite answers to questions concerning broad and inclusive dimensions several cross-cultural psychologists are now looking at cultural neuroscience. Two subfields can be distinguished in both of which East Asian, including Chinese, researchers play a leading role. The first is research with psychophysiological variables, notably fMRI (e.g., Han & Northoff, 2008; Ma et al., 2014) that reflects changes in blood flow in local brain areas and measures of evoked responses in the EEG (ERP). The second subfield is research on differences in the distributions of genetic polymorphisms (alleles) across populations. Developments in cultural neuroscience are seen widely as exciting and we agree. Psychophysiological measures provide, more than self-report measures and other psychological tests, a common standard of comparison, less subject to cultural bias. Differences in the frequency distributions of polymorphisms at population level, especially in neurotransmitters and hormones, can provide plausible accounts of broad cross-cultural differences; the expression of genes is likely to extend over a wide range of situations. A telling illustration of the topicality of this research are three reviews in the prestigious *Annual Review of Psychology* (Kitayama & Uskul, 2011; Han et al., 2013; Kim & Sasaki, 2014). However, despite our enthusiasm we are of the opinion that much of the published research is characterized by weak research designs and interpretations of data that show little attempt to rule out alternatives, as has been the case with "new" research areas of the past.

For reasons of space we have to limit ourselves to a few main points (for further issues see e.g., Martínez Mateo, Cabanis, Cruz de Echeverría Loebell, & Krach, 2012; Losin, Dapretto, & Iacoboni, 2010). A serious weakness in fMRI studies is that

they tend to compare small samples of East Asian and European American students. Such studies are particularly vulnerable to finding false positive outcomes (Simmons et al., 2011; Button et al., 2013). Vul, Harris, Winkielman, and Pashler (2009) have warned that the presence of some statistically significant findings is almost inescapable given non-independent analysis of voxels (small brain loci) and the large data sets in fMRI recordings. We find it worrisome that in none of the three review chapters just mentioned the criticisms by Vul et al. have been addressed. Another weakness is a need for replication that has not been met; brain-behavior correlations show up poorly in replications (e.g., Boebel et al., 2015), again an issue addressed more by outsiders than insiders in cultural neuroscience.

Research on psychological concomitants of population differences in frequencies of various polymorphisms is perhaps even more exciting. Initially, the search was for associations between cross-cultural (East-West) differences in frequency distributions of neurotransmitter receptor genes (serotonin, dopamine) and some index of behavior, usually individualism-collectivism (Chiao & Ambady, 2007). In recent years the focus has been shifting from main effects to interactions between various variants of some polymorphism and a behavioral variable. Kitayama et al. (2014) studied a polymorphism in the dopamine receptor gene DRD4, where the variation is in the number of repeats (from 2 – 11) of a 48 string of base pairs. They found an interaction between indices of social orientation (i.e., individualism-collectivism) and repeater frequency in samples of European and Asian-born Americans. In a series of studies Kim and colleagues (see Kim & Sasaki, 2014 for references) examined variations in the relationship of various social psychological variables across a polymorphism with three alleles in an oxytocin receptor gene locus (OXTR rs53576) among Koreans and US Americans. For one of these alleles (associated with greater social sensitivity and social engagement) they found significant interactions in the sense that the same allele comes with

low scores on social psychological variables in European Americans and high scores in Koreans.

Probably the findings of these studies at the frontiers of cross-cultural psychology should be taken as rather tentative. Most problematic is that the complex pathways from genetic structure to actual population differences in manifest behavior are poorly understood. We cannot even be sure that a targeted polymorphism is independent of other polymorphisms in the same chromosomal region (e.g., Murdoch, Speed, Pakstis, Heffelfinger, & Kidd, 2013). As far as methodological aspects is concerned, there is an urgent need for replication and extension with populations beyond the North America-East Asia dichotomy. Interactions as reported by Kitayama et al. (2014) and by Kim and colleagues (see Kim & Sasaki, 2014) have been observed only for subsamples (a kind of ad hoc selection that can be questioned, e.g., Lee, 2009). All in all, despite sizable initial samples, the studies mentioned were underpowered, which implies a high rate of false positive findings.

In summary, the field of cultural neuroscience is rapidly expanding, with creative researchers moving in various directions (see e.g., S, Cole, 2014; Kitayama et al., 2015). Using Reichenbach's (1938) distinction, mentioned before, the emphasis is on exploration. We see a strong need for verification and consolidation of findings, to prevent similar over-interpretation as we have described in this section for other topics in the history of research on behavior and cultural context.

Reflection and outlook

In the present overview we have addressed two central questions. The first is whether cross-cultural psychology, throughout its history, has not been occupied too much with how and how much humans belonging to various groups differ from each other in psychological functioning. The second, related, question is how psychological differences found between human groups can best be conceptualized, in terms of a few broad dimensions (i.e., elephants)

or in terms of numerous specific conventions (i.e., ants).

As described, fascination with cultural differences has driven the discipline, and led to new insights in human behavior. While behavioral variations still remain the main focus of research the context is changing. In times of globalization, the increasing intercultural contacts and interactions are blurring the boundaries of national cultures; modernization and social development go hand in hand with social and cultural change in almost every society. There should be perhaps a paradigm shift, moving the focus away from static cultural differences to dynamic psychological and behavioral consequences of culture change, cultural exchange, cultural infusion and hybridization. Certainly, acculturation has long been a central topic of cross-cultural psychology (Berry, 1980; Sam & Berry, 2016), variations in how people acculturate and in how well they adapt are often defined by the terms integration, assimilation, separation, and marginalization. However, the dynamic of the intercultural interaction has been shifted from more or less passive adoption by migrants (of a dominant host culture) to infusion, mixing and hybridization of diverse cultures. Such processes are covered only partly by the classic domain of acculturation research from a migration perspective. Research, such as studies on "superdiversity" (van de Vijver, Blommaert, Gkoumasi, & Stogianni, 2015) will expand the focus. Other related psychological behavior and cognitive processes may also be interesting, just to mention a few, cultural frame switching, bicultural and multicultural mindset, the dynamic of diversity and creativity in culturally ambiguous context (Hong, Morris, Chiu, & Benet-Martínez, 2000; Cheng, Leung, & Wu, 2011). It may be time to speak about "polycultural psychology" (Morris, Chiu, & Liu, 2015) or "cross-cultural psychology of globalization", we use "cross" here in the sense of transcending cultural differences and thus the orientation that shaped (cross-)cultural psychology in the past.

It is difficult to predict the future; this also

holds for the future of cross-cultural psychology. However, one can have a vision on what direction the field should take and which objectives ought to be pursued. We see a triple relevance for cross-cultural psychology. First, in a globalizing and shrinking world intercultural contacts and mobility are likely to increase ever more. Therefore, knowledge about how “others” behave and think and how they change in the dynamic process of cultural blending (as stressed above) is an important pursuit. Selection for an international workforce, psychotherapy with clients from migrant groups, addressing prejudice and stereotypes, and intercultural communication in an international social or work environment are just a few examples of why applied cross-cultural psychology should be considered an important pursuit (e.g., Berry et al., 2011). Second, the field is also relevant for understanding what is common and what is unique to specific groups and contexts in human behavior repertoires and psychological functioning, and this has been the focus of our overview. Studying psychology in one context only provides a limited view, like a horse wearing blinkers. Good cross-cultural psychology seeks to maximize variation (Whiting, 1954) by sampling a range of groups from hunter-gatherers via traditional agriculturalists to urban dwellers in various countries. Third, cross-cultural study provides a special approach and an excellent research strategy for theory testing, allowing the “un-confounding” of phenomena that within a society can be inherently linked, such as, for example, school education and literacy. Needless to add that our vision of the future of cross-cultural psychology goes in the direction of more rigorous research.

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行为的文化差异：几头大象还是一群蚂蚁？

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摘要 本文综述了关于行为与文化之间关系的研究。综述分为如下几个部分：第一部分介绍了跨文化/文化心理学自20世纪中叶创立以来，在人类行为的共同性、差异性以及心理功能在多大程度上存在文化特异性的问题上的持续争论。第二部分探讨文化差异的魅力，论证为什么迄今的研究往往偏向于寻找行为的差异而不是跨文化的不变性。第三部分简要概述跨文化比较研究中的文化偏误、缺乏等价性等问题及其对数据解释的影响。第四部分重点阐述本文题目中的主题，即跨文化差异的心理组织。这部分内容对目前文化心理学研究中存在的倾向，即从宽泛的维度或笼统的心理功能角度来组织和解释行为差异提出了挑战。第五部分则通过跨文化心理学的历史回顾，以几个重要的传统研究领域为代表来具体说明这种过度泛化的倾向及近期的研究发展，其中也包括了中国研究人员贡献越来越大的文化神经科学领域。最后对跨文化心理学的前景与展望进行了讨论。

关键词 (跨)文化心理学；跨文化不变性；文化差异；心理组织；过度泛化

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