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Van de Vliert, Evert

Published in:
Journal of Cross-Cultural Psychology

DOI:
[10.1177/0022022115615963](https://doi.org/10.1177/0022022115615963)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Van de Vliert, E. (2016). Human Cultures as Niche Constructions Within the Solar System. *Journal of Cross-Cultural Psychology*, 47(1), 21-27. <https://doi.org/10.1177/0022022115615963>

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Human Cultures as Niche Constructions Within the Solar System

Journal of Cross-Cultural Psychology
2016, Vol. 47(1) 21–27
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DOI: 10.1177/0022022115615963
jccp.sagepub.com

Evert Van de Vliert¹

Abstract

This commentary seeks to refine Kashima's timely and topical but too general call for embedding culture within the planetary ecosystem. My starting point is that cultures are to an underestimated extent ongoing niche constructions within the merry-go-round of the Sun's radiation, the Earth's rotation around its axis, and the resulting cold and hot seasons. Among the downstream consequences are clear connections between warm-blooded life and culture; between winter cold, summer heat, and culture; and, conversely, between culture and global warming. Cultural inventions of monetary resources have come to influence further culture creation on the foundation of seasonal solar heat. The odds are that climato-economic engineering of culture is just around the corner.

Keywords

solar system, ecosystem, climatic demands, niche construction, cultural retooling, climato-economic engineering

Culture is forced forward by a crawling train of causes. The ultimate cause of human culture is the distance between the Earth and the Sun, which varies slightly around an average of 149.6 million km over the course of the year. Living civilizations would either be frozen to death at considerably larger distances from the Sun, or would be burned to death at considerably smaller distances from the Sun. The next-to-ultimate cause of human culture is the Earth's rotation around its axis, which alternately exposes all flora, fauna, and human beings to heat radiation from the Sun. If the Earth would not spin, it would have a darkened hemisphere with eternal winter and a lightened hemisphere with eternal summer, leaving little leeway for "creating cultures between arctics and deserts" (Van de Vliert, 2013b, p. 227). Civilizations would most likely only have teeny-weeny chances for survival in the boundary areas between the two unlivable hemispheres. Indeed, and in short, creatures and cultures are integral particles of the solar system.

In his lead article, Kashima (2016) professes that, especially because of global warming, we need to consider culture and human functioning within the context of the planetary ecosystem.

¹University of Groningen, The Netherlands

Corresponding Author:

Evert Van de Vliert, Social and Organizational Psychology, University of Groningen, Grote Kruisstraat 2/1, 9712 TS Groningen, The Netherlands.
Email: E.Van.de.Vliert@rug.nl

Figure 1. Human cultures as ongoing niche constructions within the solar system.

Note. Cultural inventions of monetary resources feed back into the process of culture creation through mediation (right feedback loop) and modification (left feedback loop). Notably, winter cold, summer heat, and monetary resources interact in modifying further cultural niche construction away from threats toward challenges, away from collectivism toward individualism, away from autocracy toward democracy, and away from ecosystem destruction toward ecosystem protection.

The greatest merit of this contention is that it directs attention to, and paves the way for, improved understanding of cultural change and diversity on the cosmic scale of the solar system. This being said, the lead article fails to touch upon several centerpieces in the human corner of the solar system—warm-blooded species, winters, summers, and well-documented cultural changes during the Little Ice Age (e.g., Fagan, 2001) and during the Medieval Warm Period (e.g., Fagan, 2008). Against that backdrop, my commentary seeks to refine Kashima's call for an overarching understanding of culture by emphasizing the roles played by the warm-bloodedness of the human inhabitants of the Earth, the exposure of their habitats to winter cold and summer heat, and the exposure of the solar system to their cultural habits. These amendments on the basis of the framework in Figure 1 will hopefully advance research inspired by Kashima's intellectually stimulating conceptions of culture and person.

Warm-Blooded Life and Culture

Although all living species on Earth are for their existence and flourishing dependent upon the waxing and waning exposure to the Sun, human beings are a special case. After the evolution of

warm-blooded animals, the human species has further evolved awareness of the impact of warm-blooded life under conditions of cooler nights, warmer days, colder winters, and hotter summers, and has then developed trillions of immaterial and material tools to more efficiently and effectively function within that system (see bottom-left feedback loop in Figure 1). Notably, billions of ideas, practices, instruments, and artifacts have been invented and innovated to deal with three fundamental problems of warm-blooded life—how to stay comfortably warm, how to acquire and retain food (especially water, carbohydrates, proteins, and fats), and how to prevent disease. Note that these ideas differ from Kashima's (2016) unclear and narrow understanding of culture "as a domain of shared meaning." What specifically is shared and in what way? Why precisely does Kashima exclude the entire human-made world—and thus niche construction—from the definition of culture?

Being collectively aware of warm-blooded life implies that humans have conscious and sub-conscious knowledge of (a) their basic needs for thermal comfort, nutrition, and health; (b) the environmental availability of comfortable temperatures, consumable flora and fauna, and low disease burdens; and (c) the resulting degree of human–environment fit (Van de Vliert, 2009, 2013a). Much evidence indicates that human–environment fit peaks at an ambient temperature of 22 °C (~72 °F). It is the approximate point where the metabolic rate required for the clothed individual to maintain a body temperature of 37 °C is both minimal and independent of the ambient temperature (Gailliot, 2014; Parsons, 2003; Van de Vliert, 2009, 2013a). Even more importantly, basic needs for nutrition and health are met more easily in habitats endowed with abundant flora and fauna amid supportive seasonal temperatures varying around a base range of 17 to 27 °C (Cline, 2007; Parker, 2000).

Conscious and subconscious awareness of deviation from perfect human–environment fit elicits adaptive niche construction to correct these imbalances within the solar system. In never-ending processes, greater fit deviation is thought to elicit quantitatively and qualitatively more culture creation. A telling example of how this might work is discussed in the next paragraphs because it elegantly reveals both a strength and a weakness of Kashima's (2016) conceptual perspective. Not only does this illustration illuminate the importance of embedding culture within the planetary environment of the solar system, it simultaneously demonstrates the illusory nature of what Kashima calls a historical shift "from adaptationism to niche constructionism" in studying culture.

The *airco theory of language* (Van de Vliert, 2009) states that, to maintain core temperature, heat transfer into our body and heat generation within our body must be balanced by heat outputs from our body (Parsons, 2003). In terms of thermoregulation, it is therefore functional to keep our mouths shut in cold environments and open our mouths in hot environments (to do as the dogs do). It is no less conceivable that cold-climate humans retain heat better and that hot-climate humans release heat better by using their breath channel as an air conditioner when they talk. This *airco* view of language highlights the openness of the breath channel when uttering words. Words consist of consonants and vowels. The articulation of consonants is characterized by constriction or closure at one or more points in the breath channel, with heat preservation as a result. But in the articulation of vowels, the oral part of the breath channel is exposed to the air, with heat release as a result. Hence, it would serve thermoregulation if words with many consonants (such as b, g, k, p, t) evolved in colder climates, whereas words with many vowels (such as a, o, u, ie, ee) evolved in hotter climates. Perhaps not surprisingly, that is exactly what anthropologists have found.

Fought, Munroe, Fought, and Good (2004) investigate approximately 45,000 word sounds in a sample of 60 indigenous societies chosen to represent major cultural areas on Earth. Each word sound was scored on a 14-point scale ranging from voiceless stop consonant (e.g., p, t, k) to low vowel (e.g., a, ɔ, æ). The resulting sonority score per society was then related to the degree of

climatic cold versus heat. In support of my thermoregulatory explanation, the languages manifested more consonant and less vowel usage in colder areas (tchkaš, vrazbrod, Gdańsk, Saskatchewan, Vladivostok, etc.), but more vowel and less consonant usage in hotter areas (maraki, tawani, Dahomey, Kuala Lumpur, Paramaribo, etc.). This evolution of linguistic thermoregulation arbitrarily tends toward adaptation if one concentrates on the function of the breath channel but toward niche construction if one concentrates on the impact of consonants and vowels in changing the environment and its selective pressures. Nevertheless, adaptation is an integral part of niche construction and no one ever can study cultural niche construction in isolation from cultural adaptation, let alone that cultural psychology can have moved “from adaptationism to niche constructionism.”

Winter Cold, Summer Heat, and Culture

Research into the cultural implications of degrees of livability between arctics and deserts comes in two general forms, which are discussed next because both forms seem highly relevant for Kashima's (2016) quest into “what it means to be human” within the context of the planetary ecosystem. If the research emphasizes theoretical parsimony, absolute deviations from 22 °C are taken as a single condition wherein the focus is on the undifferentiated impact of thermal demands on humans. If the research emphasizes theoretical accuracy, downward and upward deviations from 22 °C are taken as separate conditions wherein the focus is on the differential impacts of cold and heat on humans.

An important consideration for the inevitable trade-off between parsimony and accuracy in climate-culture research is the function of the available monetary resources—itsself classic remnants of adaptive niche construction (cf. note to Figure 1). Money can buy clothing, housing, warming and cooling devices, meals, medical cure and care, and numerous other items to meet the basic needs for thermal comfort, nutrition, and health. But, both theoretically and methodologically, all such purchases can be seen as approach or avoidance strategies of culture creation. The question is whether a scholar wants to conceptualize those purchases as being instrumental in approaching general optimal-livability conditions (to navigate absolute deviations from 22 °C) or as being instrumental in avoiding specific adverse-livability conditions (to navigate either downward or upward deviations from 22 °C)? Indices covering deviations from 22 °C in 232 independent countries and dependent territories (Van de Vliert, 2013c) are available for comparative research from both perspectives (downloadable from www.rug.nl/staff/e.van.de.vliert by clicking on *Projects*).

Monetary Resources as Mediators

Kashima (2016) insightfully conceptualizes economies as inventions on the basis of shared meanings, as largely ecology-based aspects of the human-made environment which, in turn, influence holistic cognition, cooperative interaction, cultural individualism, and so forth. By implication, then, there is a causal chain from seasonal temperatures through monetary resources to nonmonetary manifestations of culture. On closer scrutiny, the instrumental function of money seems to slightly favor scientific accuracy over parsimony because inhabitants of colder habitats tend to be richer than those of hotter habitats. An additional reason for distinguishing between cold and hot habitats is the confounding condition of higher prevalence of human-to-human transmitted parasitic diseases among inhabitants of warmer habitats, with the consequence that they are more prone to develop strong family ties and collectivism (Fincher & Thornhill, 2012). Importantly, monetary resources can both mediate and modify the remote impacts of climatic cold and heat on culture.

Monetary Resources as Modifiers

Kashima (2016) also discusses the frequently demonstrated interactive effects of winter cold, summer heat, and monetary resources on adaptive niche construction (e.g., Fischer & Van de Vliert, 2011; Karwowski & Lebuda, 2013; Kong, 2013; Robbins, 2015; Van de Vliert & Postmes, 2012), which are illuminated in the note to Figure 1 about monetary culture. However, Kashima fails to notice that monetary modifying effects often override monetary mediating effects. For example, a 116-country study of collectivist favoritism shown to relatives, better known as nepotism, produced the following modifying rather than mediating results (Van de Vliert, 2009).

The parsimony approach revealed that nepotism is maximal in poor countries with demanding temperatures and minimal in rich countries with such climates. The accuracy approach additionally uncovered that neither winter cold or summer heat nor monetary resources has a significant main effect on nepotism once the three-way interaction effect of winter cold, summer heat, and monetary resources is taken into account. The observed upward nepotism trend for poor countries with more threatening temperatures is the result of colder winters only. By contrast, the observed downward nepotism trend for richer countries with more challenging temperatures is affected by both colder winters and hotter summers. Specifically,

In richer countries, (a) too little climatic stress from temperate winters and temperate summers increases nepotism, (b) optimal climatic stress from either extremely cold winters and temperate summers, or temperate winters and extremely hot summers, decreases nepotism, and (c) too much climatic stress from extremely cold winters and extremely hot summers increases nepotism. (Van de Vliert, 2009, p. 186)

Despite many such hints about the importance of seasonal solar heat and local wealth for the creation of culture, the jury is still out about how important monetary resources are as modifiers of the links between deviations from 22 °C and culturally shared traits, states, and habits. An interim report concluded that there is a white domain, where climato-economic theorizing does apply (e.g., happiness, collectivism, and democracy); a gray domain, where it may or may not apply (e.g., personality traits and creativity); and a black domain, where it does not apply (e.g., human intelligence and gendered culture; Van de Vliert, 2013c).

Culture and Global Warming

Psychologists have first been slow to respond to the current planetary problem of climate change, and have then only one-sidedly explored the impact of global warming on human functioning (Doherty & Clayton, 2011; Swim et al., 2011). Thus, Kashima (2016) is to really be commended for adopting the opposite perspective by viewing humans as psychological perpetrators rather than psychological victims of the disruption of the inner balance of the solar system. Most notably, Kashima in essence goes beyond ordinary awareness of the solar impact through winters and summers by professing that the use of numerous tools of culture has produced global warming, and that we may have to retool ourselves to rebalance the system. In the terminology of scholars outside psychology, the human ecological footprint has produced too many greenhouse gases and too much global warming, and we must immediately start to protect the life-sustaining flora and fauna of our ecosystems.

Culture and Ecological Footprint

Kashima (2016) correctly and aptly characterizes the current accumulation of greenhouse gases in the atmosphere as “a niche construction gone awry.” By spending too much money on luxurious

goods and services that satisfy cultural needs rather than basic needs (e.g., extravagant homes, cars, holidays, fashions, sports, and life projects), humans have enlarged their ecological footprints to an unsustainable extent. But consumption patterns offer a superficial explanation at best. Wondering whether seasonal solar heat also plays a part, Charles Vlek and I have discovered that poor and rich populations alike, but especially richer populations, have larger ecological footprints under more demanding thermal climates (Van de Vliert & Vlek, 2015). To an unmistakable degree, and in support of the bottom-right feedback loop in Figure 1, global warming appears to have proximal cultural precursors related to overconsumption, historical cultural origins of economic development, and remote climatic roots.

Culture and Ecosystem Protection

Ecosystem protection is a perfect example of cultural retooling (Kashima, 2016)—elsewhere advocated and investigated as climato-economic engineering of culture (Van de Vliert, 2013a). A striking illustration is the increasing use of increasingly cheaper solar energy to reduce the habitual use of fossil fuels and biofuels, which generate not only heat and energy but also large volumes of greenhouse gases. Switching over to solar energy for generating electricity and power is a clever yet seemingly contradictory strategy of niche reconstruction to support warm-blooded life by rebalancing winter cold and summer heat. Quite ingeniously, and indeed quite paradoxically, solar warming is used to combat greenhouse warming.

Interestingly, Kashima's (2016) cultural retooling is itself an integral part of the planetary ecosystem it seeks to change and may thus be subject to climato-economic influences. Accordingly, cultural efforts to protect ecosystems and to counter global warming are weakest in poor populations threatened by demanding thermal climates (e.g., Armenians and Mongolians), intermediate in poor and rich populations comforted by undemanding temperate climates (e.g., Mauritians and Nigerians), and strongest in rich populations challenged by demanding thermal climates (e.g., Canadians and Finns; Van de Vliert & Vlek, 2015). The same holds true for environmental marketing, including eco-labeling and other efforts to respond to "green" consumer demands. These and similar findings (Van de Vliert, 2013a) may be initial or early signs that cultural retooling through climato-economic engineering of culture is a burgeoning field of applied psychology.

A Hot Topic

In sum, there is a systemic interplay between seasonal solar heat, warm-blooded life, cultural niche construction, and global warming, usually in conjunction with poverty versus riches. Kashima's (2016) reconceptualization of culture starts to concentrate on that system and may thus set an exciting agenda for further exploration and utilization of the Earth–Sun dynamics of culture.

Acknowledgments

The author thanks Ron Fischer and Fons van de Vijver for their helpful contributions to this commentary.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Cline, W. R. (2007). *Global warming and agriculture: Impact estimates by country*. Washington, DC: Center for Global Development, Peterson Institute for International Economics.
- Doherty, T. J., & Clayton, S. (2011). The psychological impacts of global climate change. *American Psychologist*, 66, 265-276. doi:10.1037/a0023141
- Fagan, B. (2001). *The little ice age: How climate made history, 1300–1850*. New York, NY: Basic Books.
- Fagan, B. (2008). *The great warming: Climate change and the rise and fall of civilizations*. New York, NY: Bloomsbury Press.
- Fincher, C. L., & Thornhill, R. (2012). Parasite-stress promotes in-group assortative sociality: The cases of strong family ties and heightened religiosity. *Behavioral and Brain Sciences*, 35, 61-79. doi:10.1017/S0140525X11000021
- Fischer, R., & Van de Vliert, E. (2011). Does climate undermine subjective well-being? A 58-nation study. *Personality and Social Psychology Bulletin*, 37, 1031-1041. doi:10.1177/0146167211407075
- Fought, J. G., Munroe, R. L., Fought, C. R., & Good, E. M. (2004). Sonority and climate in a world sample of languages: Findings and prospects. *Cross-Cultural Research*, 38, 27-51. doi:10.1177/1069397103259439
- Gailliot, M. T. (2014). An assessment of the relationship between self-control and ambient temperature: A reasonable conclusion is that both heat and cold reduce self-control. *International Review of Social Sciences and Humanities*, 8, 149-193.
- Karwowski, M., & Lebuda, I. (2013). Extending climato-economic theory: When, how, and why it explains differences in nations' creativity. *Behavioral and Brain Sciences*, 36, 493-494. doi:10.1017/S0140525X13000150
- Kashima, Y. (2016). Culture and psychology in the 21st century: Conceptions of culture and person for psychology revisited. *Journal of Cross-Cultural Psychology*, 47, 4-20.
- Kong, D. T. (2013). Examining climatoeconomic contextualization of generalized social trust mediated by uncertainty avoidance. *Journal of Cross-Cultural Psychology*, 44, 574-588. doi:10.1177/0022022112466700
- Parker, P. M. (2000). *Physioeconomics: The basis for long-run economic growth*. Cambridge, MA: MIT Press.
- Parsons, K. C. (2003). *Human thermal environments: The effects of hot, moderate and cold environments on human health, comfort and performance* (2nd ed.). London, England: Taylor & Francis.
- Robbins, B. G. (2015). Climate, affluence, and trust: Revisiting climatoeconomic models of generalized trust with cross-national longitudinal data, 1981-2009. *Journal of Cross-Cultural Psychology*, 46, 277-289. doi:10.1177/0022022114562496
- Swim, J. K., Stern, P. C., Doherty, T. J., Clayton, S., Reser, J. P., Weber, E. U., . . . Howard, G. S. (2011). Psychology's contributions to understanding and addressing global climate change. *American Psychologist*, 66, 241-250. doi:10.1037/a0023220
- Van de Vliert, E. (2009). *Climate, affluence, and culture*. New York, NY: Cambridge University Press.
- Van de Vliert, E. (2013a). Climato-economic habitats support patterns of human needs, stresses, and freedoms. *Behavioral and Brain Sciences*, 36, 465-480. doi:10.1017/S0140525X12002828
- Van de Vliert, E. (2013b). Creating cultures between arctics and deserts. *Advances in Culture & Psychology*, 3, 227-282. doi:10.1093/acprof:oso/9780199930449.003.0005
- Van de Vliert, E. (2013c). White, gray, and black domains of cultural adaptations to climato-economic conditions. *Behavioral and Brain Sciences*, 36, 503-521. doi:10.1017/S0140525X13000277
- Van de Vliert, E., & Postmes, T. (2012). Climato-economic livability predicts societal collectivism and political autocracy better than parasitic stress does. *Behavioral and Brain Sciences*, 35, 94-95. doi:10.1017/S0140525X11001075
- Van de Vliert, E., & Vlek, C. (2015). Relations between economic wealth, ecological footprint, and environmental protection depend on climatic demands. *International Journal of Environmental Studies*, 72. doi:10.1080/00207233.2015.1067471