

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Cognitive Science and the Arts

Permalink

<https://escholarship.org/uc/item/1m08m62x>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 36(36)

ISSN

1069-7977

Authors

Tversky, Barbara

Healey, Patrick

Kirsh, David

Publication Date

2014

Peer reviewed

Cognitive Science and the Arts

Barbara Tversky (btversky@stanford.edu)

Department of Psychology
Stanford University, Stanford, CA 94305-2130 USA

Patrick Healey (p.healey@qmul.ac.uk)

School of Electronic Engineering and Computer Science
Queen Mary, University of London, London, UK

David Kirsh (kirsh@ucsd.edu)

Department of Cognitive Science
University of California, San Diego, La Jolla, CA 92093-0119 USA

Keywords: cognitive science, arts, embodiment, external representations, creativity, imagination, psychology of music, dance, narrative, comics, art, film

Background

Cognitive science and the arts are natural partners. The arts are produced by the mind, the brain, and the body and comprehended, interpreted, and appreciated by the mind, the brain, and the body. The arts make special contributions to cognitive science by providing a rich, natural, multi-sensory, multi-cultural arena for study and analysis. Recent research bears this out. Projects connecting the arts and cognition have been scattered throughout the cognitive sciences. Artists of all genres create things, creating and revising as they proceed. Some have been investigating the interactions of artists, musicians, and designers with their external creations, notably, sketches and gestures, in both creating and communicating, how they get insight and learn from externalizing thought (e. g., Goel, 2007; Healey and Thibaut, 2007; Healey, Swoboda, and Umata, 2007; Kirsh, 2012; Tversky and Suwa, 2009). Studies of the ways the eye, brain, and hand interact in drawing have enabled convincing simulations of drawing that create sketches recognizably in the style of individual artists (e. g., Tresset and Lemayrie, 2013). Brain research has revealed the brain processes underlying the appreciation of artistic creations (e. g., Berger and Turrow, 2011; Brattico and Pearce, 2013; Menon and Levitin, 2005) as well as the convergent and divergent thinking that is needed for creating original works of art (e.g., Jung, et al., 2010). New findings of the ways people perceive and comprehend the ordinary events of life have been used to interpret the ways people create and understand narratives, those in words, film, and depictions (e.g., Tversky, 2011; Zacks & Magliano, 2011). The exploration of children's narratives about their imaginary friends reveal new understandings of the many roles of imagination in our lives (e. g., Taylor, 2009). A richer understanding of aesthetic judgments has been emerging from research on perception (e.g., Palmer), on the brain (e. g., Chatterjee, 2013), on the body (e. g., Krumhansl, 1997; Stevens, et al, 2007), and on the senses (Tsay, 2013). The body is intimately involved in many arts, notably dance; the various roles of using the body as a representational system and their participation in the creation and understanding of dance have yielded new understandings of the ways the

body can serve thought, especially non-propositional, non-verbal thought (e.g., Kirsh, 2012). Performances, such as music, dance, and theater, entail interactions with many players and with audiences. Many of the insights that have come from years of study of language in use are now providing insights into the ways players in performances interact with each other and with their audiences (e. g., Haviland, 2011; Kirsh, 2013; Schober, 2006; Stevens, et al., 2007).

These projects amply illustrate the remarkable depth and breadth of the contributions of a cognitive science approach to the arts. Impressive as this overview is, it is only a partial overview of the many ways that cognitive science and the arts interact. Most of these groups work in isolation with few opportunities to interact with each other and learn from each other. These diverse and rich contributions are typically not known to other groups or to broader audiences. We propose this workshop in order to bring these groups together and to bring these exciting projects to the attention of the broader cognitive science community.

Goals and Plan of the Workshop. Each of the organizers has been active in research integrating the cognitive sciences and the arts and each of us has been involved in organizing and participating in multi-disciplinary conferences and workshops integrating the cognitive sciences and the arts. Yet, this burgeoning area has had little presence in the meetings of the Society. The goals of the workshop are: a) to convene a diverse set of researchers working on various cognitive science perspectives on the arts; b) to bring the issues and research to a broader audience in Cognitive Science; c) to stimulate these productive areas of research, especially in young researchers. To these ends, the workshop will have presentations from many projects that have integrated the arts with cognitive science. There will be two kinds of presentations: Five or six 30 minute overviews by established researchers and approximately 20 five minute blitz presentations by current researchers on specific projects. Blitz presentations have been highly successful in previous workshops, and are standard and excellent at large computer science meetings. The blitz presentations will allow broad participation and will be broadly solicited (many people have already indicated interest). Blitz presentations allow researchers to introduce themselves, to

find connections with others, and to stimulate discussion. Time will also be allotted for group discussion.

Planning Committee. The planning committee consists of researchers who have complementary projects in the arts and who have frequently interacted with each other. Each will give an overview talk.

- Pat Healey, "Audience Interactions"
- David Kirsh, "Embodiment in Dance"
- Barbara Tversky, "Visual Narratives"

Many others who have been studying the arts from a cognitive science perspective have indicated their interest in attending and presenting. Others expressed their enthusiasm but said they cannot attend the meeting this year. A partial list of those who are interested and likely to participate:

Chia Chung-Tsay (Management Science & Innovation, UCL, London): musical performance.

Jonathan Berger (composer, researcher, computer scientist at Stanford University): composing and perceiving music.

Will Crow (artist, art educator, Metropolitan Museum and Columbia Teachers College in Cognitive Studies): drawing for learning.

Allison Faye (art historian, art educator, Columbia Teachers College in Cognitive Studies): perception of art.

Frederic Fol Lemayrie (computer graphics, Goldsmiths, University of London): simulating drawing style.

Vinod Goel (neuroscientist, York University): brain and design creativity

John Haviland (anthropologist, UCSD): music.

Andrea Kantrowitz (artist and art educator, Columbia Teachers College in Cognitive Studies): drawing as exploration.

Joseph Magliano (cognitive psychologist, Northern Illinois University): film.

Rebecca McGinnis (artist, art educator, Metropolitan Museum and Columbia Teachers College in Cognitive Studies): drawing for learning.

Steve Palmer (cognitive psychologist, UC-Berkeley): color, music to vision.

Marcus Pearce (computer scientist, Queens Mary): brain and music.

Michael Schober (cognitive psychologist, New School): collaboration in jazz improvisation.

Marjorie Taylor (developmental psychologist, University of Oregon): narratives, imaginary friends.

Jeffrey Zacks (cognitive psychologist, Washington University); film.

References

Berger, J. and Turow, G. (2011). *Music, science and the rhythmic brain*. NY: Routledge.

Brattico, E. & Pearce, M. T. (2013). The neuroaesthetics of music. *Psychology of Aesthetics, Creativity and the Arts*, 7, 48-61.

Chatterjee, A. (2013). *The aesthetic brain*. Oxford: Oxford University Press.

Goel, V. (1995). *Sketches of thought*. Cambridge: MIT.

Jung, R. E., Segall, J. M., Bockholt, H. J., Flore, R. A., Smith, S. M., Chavez, R. S., and Haier, R. J. (2010). Neuroanatomy of creativity. *Human Brain Mapping*, 31, 298-409.

Haviland, J. B. (2011). Musical spaces. In *Multimodality and human activity: Research on human behavior, action, and communication*. C. Goodwin, J. Streeck, & C. LeBaron, Editors. Pp. 289-304. Cambridge: Cambridge University Press.

Healey P.G.T. and Thiebaut, J. (2007) Sketching musical compositions. *Proceedings of the 29th Annual Conference of the Cognitive Science Society*. 1079-1084. Austin TX: Cognitive Science Society.

Healey P.G.T., Swoboda N, Umata I. (2007). Graphical language games: Interactional constraints on representational form. *Cognitive Science*, 31, 285-309.

Kirsh, D. (2013). Embodied cognition and the magical future of interaction design. *ACM Transactions on Computer-Human Interaction*. 20,1-30.

Kirsh, D. (2012). Running it through the body. In N. Miyake, D. Peebles, & R. P. Cooper (Eds.), *Proceedings of the 34th Annual Conference of the Cognitive Science Society*. Austin TX: Cognitive Science Society.

Krumhansl, C. L. (1997). An exploratory study of musical emotions and psychophysiology. *Canadian Journal of Experimental Psychology*, 51, 336-352.

Menon, V. and Levitin, D. (2005). The rewards of music listening: Response and physiological connectivity of the mesolimbic system. *Neuroimage*, 28, 175-184.

Palmer, S. E., Schloss, K. B., Xu, Z., & Prado-Leon, L. (2013). Music-color associations are mediated by emotion. *Proceedings of the National Academy of Sciences*. 110 (22), 8836-8841.

Schober, M. F. (2006). Virtual environments for creative work in collaborative music-making. *Virtual Reality*, 10, 85-94.

Stevens, C., Glass, R., Schubert, E., Chen, J., & Winskel, H. (2007). Methods for measuring audience reactions. In *Proceedings of the International Conference on Music Communication Science*. 155.

Taylor, M. (1999). *Imaginary companions and the children who create them*. New York: Oxford University Press.

Tresset, P. and Leymarie, F. F. (2013). Portrait drawing by Paul the Robot. *Computers and Graphics*, 37, 348-363.

Tsay, C. (2013). Sight over sound in the judgment of music performance. *Proceedings of the National Academy of Sciences*, 110, 14580-14585.

Tversky, B. (2011). Visualizations of thought. *Topics in Cognitive Science*, 3, 499-535.

Tversky, B. and Suwa, M. (2009). Thinking with sketches. In A.B. Markman and K. L. Wood (Editors), *Tools for innovation*. Oxford: Oxford University Press. Pp. 75-84.

Zacks, J. M. and Magliano, J. (2011). Film, narrative, and cognitive neuroscience. In D. P. Melcher and F. Bacci (Editors), *Art and the senses*. Oxford: Oxford University Press.