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The Relative Comprehension of Communicative Gesture Types

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Abstract: Researchers have examined the role of gesture in signal presentation, but few have investigated how gestures differ in their communicative capacity. In this study, we investigated the relative comprehension of metamorphic, deictic, beat, and iconic gestures (McNeill, 1985). A sample of natural communicative gestures was acquired from social observation and then filmed in a laboratory setting in five to eight second clips. Sixty-five undergraduate student participants viewed each gesture without sound and determined within a three second period if a transcript matched or did not match the presented gesture. Each participant then completed tests of verbal fluency, mental rotation and symbol matching. Results indicated an above-chance identification of overall gesture type. Iconic gestures were correctly identified significantly more often than other gesture types. Results lead us to support McNeill's theory that gestures supplement spoken language, but we discuss interpretations of iconic gestures as independent communicators.

Keywords: Cognitive Psychology, Nonverbal Communication, Gesture, Language

JUST AS WITH theories of spoken language, the origin and structure of gesture in social communication is highly debated. In general, most research examines gesture as signal coding with social and innate cognitive components. We follow a social-cognitive approach to gestural coding that examines the relative salience of different manifestations of gesture in response to environmental cues. Our central goals in the current study are to 1) evaluate the extent to which gestures communicate in the absence of a verbal component, 2) identify which forms of gesture are most easily identifiable to an observer, 3) explore relationships between ability in gesture coding and individuals' scores on visuospatial and linguistic tasks, and 4) assess how a variety of demographic variables might correlate with gesture coding ability.

Theories and Definition of Gesture

The inspiration for this project comes from the research and theory of David McNeill. In 1985, McNeill presented his thoughts on the nature of gesture, its role in communication, and the implication of gesture in our understanding of language. For McNeill, gesture and speech share a common source, a computational stage of speech cognition. All language passes through this computational stage. In a review of so-called "body language," McNeill theorized that both gesture and spoken language originate in an information processing stage, meaning that gestures have no specialized, unique meaning separate from other forms of communication. In this way, all language is, at some point, a unified stream of action potentials that give way to different modes of responding. In most humans, speech is the primary

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mode of communication while gesture functions as a secondary, supplementary communication. From this, McNeill states that "gestures are verbal." They communicate via the same channels as spoken language, not by an independent "body language" (McNeill, 1985, pp. 350-351).

Some argue against a consolidated view of gesture and spoken language. In a review of the literature, Yelle (1995) proposed that gesture exists as a unique and universal human language. Using an example of a ballerina, Yelle argued that something as raw and abstract as "dance" cannot be defined by words from a finite language. Such techniques as Laban Movement Analysis (LMA), kinesics and psychodramatics also draw from the concept that movement elicits specific qualities on its own, which are not necessarily conscious to or related to speech (Levy & Duke, 2003; Jolly 2000). Levy and Duke correlated certain personality and emotional traits to specific qualities of movement by analyzing various body movements. This idea of implicit motion and emotion may suggest that body language and gesture communicate unintended information that diverges from spoken language entirely.

It would seem that the largest disparity between McNeill's theory and those of other disciplines is reducibility. While others define gesture in a broad scope, including those actions explicitly meant to display meaning on their own (such as dance), McNeill defines gesture more narrowly. While LMA analysts study the personality and emotional content implicitly present in explicit, purposeful movement, the computational stage described by McNeill is not driven by explicit cognition. McNeill's theory contends that gestures emerge concurrent with speech, revealing a fork of language in the computational stage to spoken and gestural outputs. Upon review of the detractors, one might say that this purposeful, non-spontaneous gesture in dance reveals a later development of the computational stage.

As McNeill, Cassell and McCollough (1994) elaborated, most gestures that appear in human communication are spontaneous, implicit and vague. These gestures lack obvious meaning when appearing on their own, and are rarely present without speech. As a prime example, Steeck (2002) documented a car mechanic's gestures over an extended period of work time. He noticed that most gestures had no apparent function, yet corresponded to stimuli present in the environment. It is in his theory that gestures hold a twofold significance. First, they facilitate the understanding and manipulation of novel stimuli. Secondly, they reveal the complete history of an individual's learned behavior as heuristic responses to the environment. In this manner, gestures reflect the individual as well as the surrounding culture.

Beattie (2004) used cartoons to identify an individual's use of gestures to describe complex environmental experiences. Participants viewed short segments of cartoons and were told to repeat what they saw with careful attention to detail. As classic cartoons use emphatic, physical slapstick, participants demonstrated an increased use of gesture to better communicate the story. In what is thought to be a similar phenomenon, the Tip-of-the-Tongue (TOTT) phenomenon also incorporates environmental cues to facilitate speech (Beattie & Shovelton, 2006). Verbs and nouns, the most commonly forgotten words in TOTT, are also the most commonly represented by gesture. This presents some connection between active speech, retrieval of memory and communication.

The present study operates on a definition of gesture consonant with McNeil's. Gestures are 1) spontaneous, 2) implicit in nature, 3) co-facilitated with spoken language, 4) affected by social and physical development, and 5) sensitive to environmental contexts.

Linguistic and Visuospatial Factors in Interpreting Gesture

Current research has placed gestures within auditory and visual centers of the brain. Goldin-Meadow (2005) found that gesture used without a tandem verbal component utilizes very similar brain function to typical linguistic thinking. When gesture is supplied with a verbal component, Goldin-Meadow reported a broader, imagistic linguistic component that supplements spoken language. These findings are supported by observations of TOTT phenomena and Beattie's experiments describing complex environments (Beattie, 2004).

The visual cognitive specialization of communication has been documented in the brain. Researchers have shown that deaf stroke victims with a previous knowledge of American Sign Language (ASL) show the same visuospatial abilities as hearing/speaking individuals when damage is to the left hemisphere (Poizner, Kaplan, Bellugi & Padden, 1984). When the right hemisphere is damaged, severe visuospatial deficits occur, though sign-language ability remains intact. Additional research has found a connection between gesture and the particular visuospatial task of mental rotation (Chu & Kita, 2008). Here, extensive tasks of visuospatial ability were found not only to elicit gesture, but inhibition of gesture caused a marked decrease in ability on the task.

Classifications of Gesture

Many researchers have attempted to create a universal system of gesture interpretation. Among these, the most well-known are those of Ekman and Friesen (1969b), McNeill (1985, 1992), and Kendon (1994). Our study focuses on the gesture categories of McNeill. The most typically defined gestures include iconic, metaphoric, deictic, mathematic, emblems and beats.

Many gestures seen in dramatic and dance applications are what some researchers refer to as emblems or pantomime, an example of which is the "OK" symbol of thumb and forefinger forming a loop with remaining three digits outstretched (McNeill, 1985; Levy & Duke, 2003 Poggi, 2008). Emblems are acquired in socially specific contexts. While emblems are interesting, they are not addressed in this study, as they are separate from spontaneous gesture.

Iconic gestures function in either a demonstrative, almost pantomimed form or a more symbolic, representational form. The first form (documented in this research as "iconic 1") references a physical object. When making iconic 1 gestures, gesturers use their hands as if they were acting on an object. One example is that of a person gripping an imaginary ball and "throwing" it during conversation. Iconic 1 gestures are not pantomime, as they are unplanned and spontaneous. The second iconic gesture ("iconic 2") is more symbolic. To use the previous example, an individual describing baseball may make a fist to indicate the ball. The difference is subtle. Rather than demonstrate the use of the ball, the hand symbolically becomes the ball. All iconic gestures are rooted in concrete experience and deal with physical, real objects.

Metaphoric gestures are similar to iconic gestures in that they represent an object in conversation. Whereas iconic gestures demonstrate physical objects, metamorphic gestures are purely abstract. In this sense, if a person is referencing the distinction of sports versus games, a person may cup his or her right hand to analogize "sport" in one hand while holding the concept of "game" in the left. A second prevalent example is associated with the use of mathematics as concepts in gestures. People often use their fingers and hands as placeholders while visualizing complex arithmetic (Gildea and Glucksberg, 1983; and McNeill, 1985). McNeill calls the former conduit gestures and the latter mathematical gestures. We combine the two subcategories for the purpose of the present experiment.

Sometimes described as “pointing gestures,” a deictic gesture denotes attention to distinguishable environmental elements, identifying “this chair” as separate from “that chair” (Schmidt, 1999). Deixis refers to the need for contextual information in order to understand communication. In English grammar, pronouns are considered to be deictic as they cannot be understood without a previous context of noun usage in discourse. In gesture, the term generally relates to any piece of communication in which spoken language is unclear without supplementary gesture.

Lastly, beats are rhythmic, fluid movements which aid in the pacing and emphasis of speech and have no propositional value on their own. Beats are generally the most common gestures by far, dominating the majority of gestures in a given communication (McNeil, 1985; Beattie, 2004). Comprising mostly repetitive vertical and horizontal movements, beats appear most readily in emphatic dialogue (Gregory & Gallagher, 2002). The gestures of political pundits, entertainers and everyday acquaintances have been observed to show syncopation of beats between two interested parties. Others theorize that beats serve a self-reinforcing behavior to propel verbal grammar (Loehr, 2007). McNeill describes beats as inherently non-communicative, though sociological research on speech rhythm suggests that the pacing of beats conveys cues for emotion and motivation (Tegea, 2007; Kendon, 1995). Beats could be labeled as the most used and least understood types of gestural communication.

We used these gesture categories to test gesture comprehension, and then compared results to individuals’ responses to cognitive measures.

Method

Participants

Sixty-five undergraduate students (age 18–23; mean = 19.46; sd = 1.31; 53 women; 66.2% psychology majors) participated in the study. Of those participants, 60% were Caucasian, 13.8% were Hispanic, 9.2% were African-American, 7.7% were Asian and 9.3% listed themselves as Mixed or Other. Participants were gathered through independent voluntary recruitment through Loyola classes and word of mouth, as well as through the Loyola University Psychology Research Pool. Those volunteers from participating psychology department courses received partial or extra course credit for their participation at the discretion of the professor. Participants were not reimbursed in any other form. All participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 1992).

Apparatus

A Sony Handicam DCR-HC38 model video camera was used to film volunteers. Footage was stored digitally on a Seagate© Free Agent Go 320GB external hard drive for portability and editing purposes. Footage was edited using Final Cut Pro © software on an Apple iMac computer running Mac OS X. Video clips were recorded in a .MOV format for use in Quicktime©. During the experiment, participants viewed clips on an Apple iMac with a 21” monitor using Quicktime©. Participants wore Sony MCR binaural sound-cancelling headphones.

Materials and Procedure

Individuals were observed for instances of gestures corresponding to the five types of gesture discussed by McNeill (1985). Observations were taken in public areas. Observed individuals were not recorded or identified in any way, in accordance with ethical guidelines. The dialogue and actions involved with these gestures was recorded manually using LMA notation for later reproduction. A single actor then recreated the gestures in a laboratory setting to correct for potential confounds. Those confounds accounted for included timing, range of motion, gender, age, attractiveness, position and proximity of the signaler as well as the circumstances of the gesture's occurrence (while sitting, walking, eating, etc.). Only the actor's hands and torso were visible. Individuals in pilot studies were at chance at identifying the actor's gender, and no participants reported knowledge of the actor's identity. In addition, the quality and timing of the gestures were constant across all examples.

Gestures were categorized by their content, as described in the introduction: iconic 1, iconic 2, metamorphic, deictic and beat. More than 60 gestures were recorded using the actor, but only the most representative of gestural categories were selected: six gestures from each type for a total of 30 gestures. Gestures were randomly assorted, but spaced so that no gesture types were presented sequentially. Three complete sets with different arrangements were used to compensate for potential order effects. The clips were arranged with a three-second break after each gesture, followed by a one-second tone and three more seconds of blank footage.

The principal investigator created a handout for each complete set. This handout contained transcripts of dialogue which occurred in the original observations. Half of these transcripts correctly matched the verbal component to the gestural component, whereas the other half mismatched the verbal and gestural components. Mismatches were of the same gesture type, but of different content. Thus, iconic 1 gestures were only mismatched with iconic 1 verbal transcripts not selected for this study.

Prior to experimentation, the investigator received written consent from all participants. Prior to the experiment, the investigator gave handouts to participants for review. If any questions arose as to the meaning of words the investigator gave definitions. Participants were instructed to mark whether the transcript matched or mismatched a presented segment of gestured dialogue. Participants had three seconds to make a decision, after which a tone sounded and they were prompted to guess. Two sample clips were presented to ensure participants knew when to mark. After practicing, participants watched each of the 30 gesture clips one at a time, marking the corresponding transcripts as a "match" or "mismatch." The entire process took around five minutes.

After participants finished viewing the clips, they completed tests of linguistic, visuospatial and coding ability. Results from these tests were compared to accuracy of gesture identification across trial types. First, participants completed a two-minute verbal coding task. The task was designed by the authors, and its inclusion in this experiment was purely exploratory. This task asked participants to learn simple sequences of numbers by which to codify five letter words (e.g.–17359 = "KNIFE"). These number/word pairs were given in a word bank.

Participants were given two minutes to match as many numbers with their word components on a five page worksheet.

Next, participants completed a simple English fluency test, which has been shown as a reliable estimate of total vocabulary, executive functions, verbal working memory and processing speed (Woods et al., 2005). Participants were presented a grammatical category and a letter and then asked to think of as many words as possible that fall into those combined categories within two minutes. For example, if participants received the grammatical component "noun" and the letter "B," acceptable results included "bear," "Belgium" and "beignet" but not "better" or "benign." Grammatical type-letter combinations were the same across all participants. The test was repeated three times across three categories (using the letters "T", "R", and "S" for nouns, adjectives and verbs, respectively). The entire process took six minutes. Results were scored according to the number of words generated.

Lastly, participants completed an online mental rotation task, a reliable test for visual spatial cognition (Peters et al., 2006). Participants were given an image then asked to select a rotated version of the object from the selections given. The online test measured accuracy as well as speed on each individual task, and then averaged results.

Upon completion of the cognitive tests, participants filled out a detailed demographic questionnaire. The researcher debriefed participants and answered any remaining questions. The entire procedure took approximately 30 minutes.

Results

This study centered on four questions. The primary goal was to investigate whether gestures, in general, could be understood without a verbal component. A one-sample population variance unknown t-test compared the overall mean of gesture accuracy across all types (65.5%) versus the H_0 mean of complete chance (50%), $t_{64} = 7.522, p < .001$. Results indicate that participants performed significantly above chance for gesture identification as a whole. Consecutive *t*-tests on individual gestures compared to chance confirmed this result for all gesture types.

Second, we hoped to identify which forms of gesture were more easily comprehended without a verbal component. A one-way repeated measures ANOVA compared variances of correct responses by gesture type ($F_{64,4} = 15.901, p < .001, \eta\rho^2 = .20$, Power = .99). A Bonferroni post-hoc analysis indicated that iconic 1 gestures were significantly different from all other gesture types ($p < .001$). Iconic 2 gestures were significantly different from deictic gestures ($p < .001$). No other gesture types significantly differed from the group (Figure 1). These results indicate iconic 1 gestures as more interpretable than other gestures.

A dependent sample *t*-test additionally compared comprehension between match and mismatched conditions ($t_{64} = 3.157, p = .002$). Figure 2 illustrates the differences between match and mismatched conditions by gesture type and Figure 3 the differences between match and mismatch trials as a whole. Results indicate a positive response bias from participants (see discussion). The "match" category describes pairings in which gesture and transcript were presented as they were in observation, while the "mismatch" category described those pairings in which a false transcript has been imposed upon a different gesture. Through all gesture types, participants correctly selected 79.5% of properly matched gesture-transcript pairings, while only 51.9% of mismatched gesture-transcript pairings were correctly selected.

Further, we correlated individuals' gesture identification scores within and between gesture types. Relatively few significant relationships were found between responses to the six gestures within each category type. This indicates that while gesture types as a whole may differ in comprehension, another factor is driving comprehension on a gesture-to-gesture basis (see discussion).

Third, we sought to identify a relationship between ability in gesture comprehension and individual scores on cognitive tasks measuring visuospatial and linguistic ability. No large correlations were found between our measures and gesture identification. Mental rotation scores were inversely correlated with identifying "matched" beat gestures (r = -.270, p = .03) and "matched" iconic 1 gestures (r = -.272, p = .028). Iconic 2 gestures also correlated with verb fluency (r = .393, p < .001) and adjective fluency (r = .244, p = .05). Scores between tests were uncorrelated. Results indicate no relationship between gesture comprehension and scores on spatial rotation or spoken vocabulary (see discussion).

Finally, several significant relationships were found between overall gesture accuracy and a variety of demographic variables. Overall gesture identification was correlated with religiosity (r = -.398, p < .001), attending religious service (r = -.320, p = .01), frequency of listening to music (r = .300, p = .015), athleticism (r = -.260, p = .05) and coming from talkative families (r = -.274, p = .05). While these relationships are interesting and provocative, we leave their explication and interpretation to future research.

Discussion

The findings of the present study go far in answering our initial questions. Overall, gesture comprehension was above chance (65.5% across all conditions). Only for the lowest subcategory for accuracy, mismatched beat gestures (29.2% accuracy), were scores not significantly below chance levels. One category, iconic 1, appeared much more comprehendible than the others, suggesting a component of this gesture is useful in non-spoken communication. A few interesting speculations may be inferred from the cognitive tests and demographic information but more testing is needed before more definitive conclusions can be drawn.

Overall Comprehension. On the whole, gestures were interpreted at a rate higher than chance. However, when examined as either "matching" or "mismatching" we see that gesture comprehension is effectively at chance for mismatched gestures. Comprehension for matching gestures, on the other hand, was exceedingly high (79.4%). This speaks to the design of the experiment and the role of gestures in nature. Only in the most restrictive of circumstances (say, in the theater) do we see gestures that do not correspond with dialogue. Taking McNeill's perspective, we can say that gestures are secondary communicators. In their supplementary role, gestures operate to clarify what is spoken. Our experiment effectively asked the inverse, having participants examine transcripts to clarify gestures. In this role we see a distinction between recognizing and knowing. "Matched" trials indicated that participants successfully *recognized* gestures as matching dialogue, but "mismatched" trials also indicate that participants do not *know* the meaning of the gesture without supplementary language. This confirms McNeill's theory of gesture. Gestures facilitate primary speech. There is no body language.

Type Comprehension. Differences were found in the comprehension of gesture, most significantly in iconic 1 gestures. This is in keeping with our research hypothesis. Continuing from McNeill's definition, iconic gestures manipulate the environment far more directly than any other nonverbal communication. These gestures are defined by the direct embodiment of an intentional object by the individual. They are the least abstract of the gestures used in this experiment, and often match specific parts of dialogue. The one-to-one nature of gestures to sentence topics may partially explain the relative comprehension of this type. As a nice contrast, iconic 2 gestures were selected more correctly as mismatching than matching, the only type to do so. This shows the similarities of iconic 1 to iconic 2 in terms of embodiment of ideas. It is easy to see how the iconic type gestures map on to purposeful pantomime. The iconic types seem the most likely to be understood across language barriers, lending to the theories of cross-cultural gesture.

More people correctly selected beats as matching than any other gesture type. This finding can be misleading. While many people did identify matching pairs as matching, there was also a visible trend to identify mismatched pairs as matching in a distinct positive selection bias. The disparity between identification of beat gestures in particular was large. This indicates that beats may be attributed to many verbal expressions without environmental interaction.

Another perspective concerns the construction of the experiment. By repeating observed gestures using a single actor in a laboratory setting, the context of people and environments are lost. These limitations, while necessary for a quantifiable study, may not reflect real-life events. Deictic gestures, for instance, may have greater comprehension when the observer can see and interact with the agents described by pointing and motioning. Likewise, a metamorphic gesture may contain greater meaning if the observer is informed of the subject of conversation. Only repetition of the experiment using entirely new gesture sets in a more naturalistic environment can corroborate these findings.

Lastly, correlations of responses to within-type gestures indicate a relative independence of gestures within the same category. Even though a significant difference was found between the types of gesture as a whole, the independence of each singular gesture hints that an underlying factor may be driving comprehension. Even though we controlled for environment, gender, range of motion, length of gesture and sentence complexity, this experiment can make no claims as to the nature of this underlying factor. Future analysis should examine these distinctions between gestures of a shared category, such as speed of motion, proximity to the body, use of fingers and subject-object structure of the gesture.

Comprehension across cognitive differences. Our three cognitive tests (mental rotation, verbal fluency and symbolic coding) were included as a broad sweep of spatial cognition, vocabulary, word-learning and executive function. While a few significant correlations appeared, a lack of comprehensive relationship between test performance and gesture interpretation speaks either to the generality of the tests or the independence of gesture from these measures. Of those small correlations, two are salient. First, a significant inverse relationship was found between mental rotation speed and iconic 1 and beat gestures. Those individuals who were faster and more accurate showed improved performance in selecting gestures as matching. Second, correctly selecting iconic 2 gestures as matching correlated with the fluency tests. A possible theory might link a high vocabulary with a high "gesture vocabulary." How or why iconic 2 gestures were closely related to fluency remains a subject for later consideration.

Comprehension across demographic variables. No clear picture can be taken from demographic variables. While we had a relatively multicultural sample, the representative samples from each sub-population were considerably low. Future research may be interested in the negative correlation of three groups (athletes, religious and musicians) to overall gesture comprehension. While the correlations are too minor to be conclusive, one could hypothesize this to be an extension of Streek's work (2002). There exists the possibility that the gestures we collected favored individuals from specific environments. It is entirely possible that gestures unwittingly taken from a specific group (restaurant waiters, for instance) would be more comprehensible to other waiters and less comprehensible to out-groups. Future research may look at this in-group/out-group distinction for specific populations.

Conclusions. The results support McNeill's description of gesture as supplementing the primary communication of spoken language. However, they also suggest that one gesture type, iconic 1, may have certain properties that facilitate gesture comprehension. The qualities of iconic 1 gestures–physical action parallel to or independent of the action described by words–aligns with the understanding of body language provided by Laban Movement Analysis. Thus, while gesture as a whole is supplementary to spoken language, an embodied meaning can be extracted even out of context.

We agree with McNeill that gestures are "verbal," while still acting in a spontaneous, dependent fashion to spoken language. The notion of a separate "body language" may stem from the cross-cultural persistence and comprehension of iconic 1 gestures–gestures that may be adapted to communicate by themselves.

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Table 1: ***One-sample Population Variance Unknown t-test Comparing Accuracy by Gesture Type to Chance***

Gesture Type	**Mean correct**	**t score (df=64)**	**p value**
Metamorphic	64.4%	6.974	p < .001***
Deictic	58.3%	3.985	p < .001***
Beat	60.3%	4.981	p < .001***
Iconic 1	77.7%	13.450	p < .001***
Iconic 2	66.9%	8.220	p < .001***
OVERALL	65.5%	7.522	p < .001***

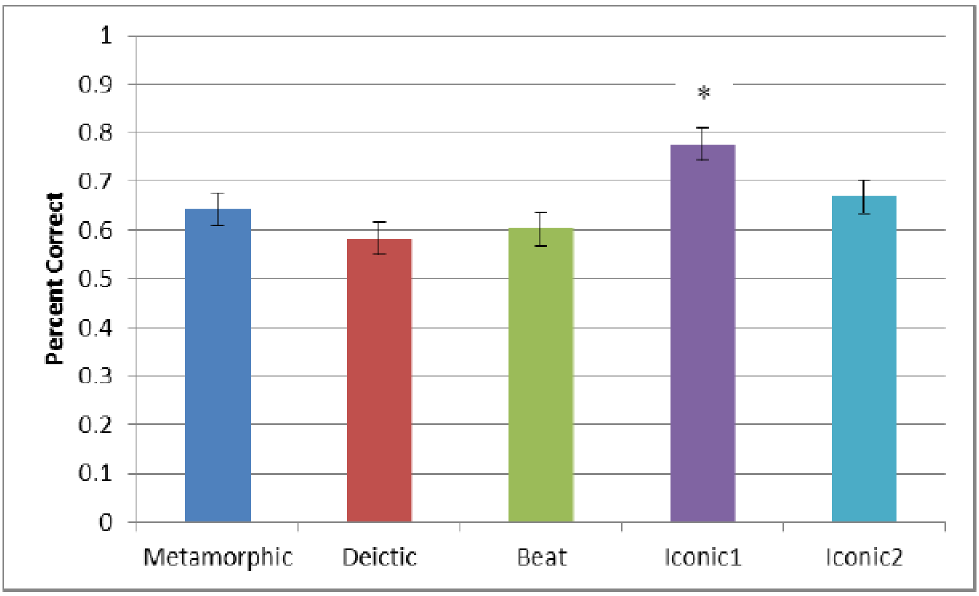

Figure 1: *Proportion Accuracy by Gesture Type* (*n=65*), Note: Error Bars Designate Standard Error of the Mean

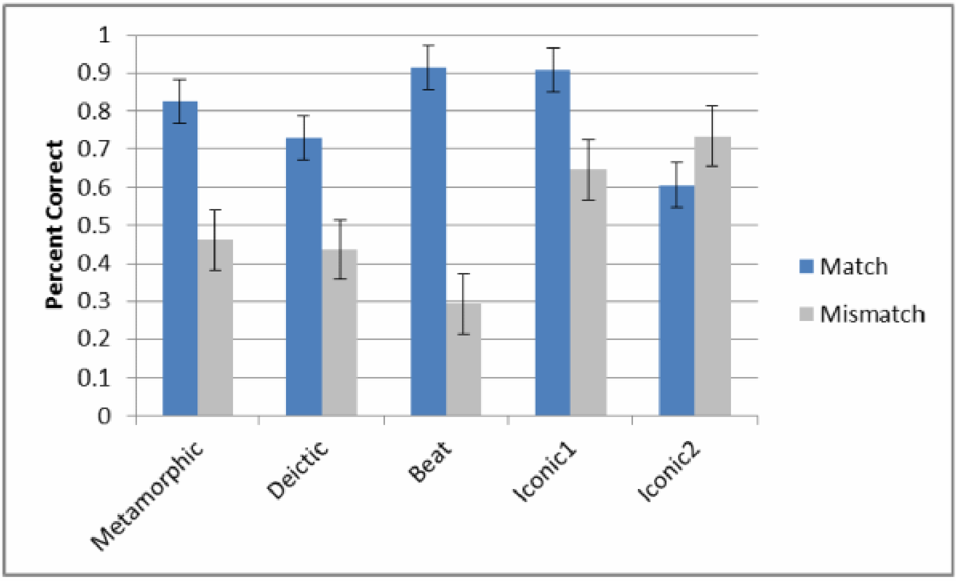

Figure 2: *Proportion Accuracy by Type and Match/Mismatch Presentation* (*n=65*), Note: Error Bars Designate Standard Error of the Mean

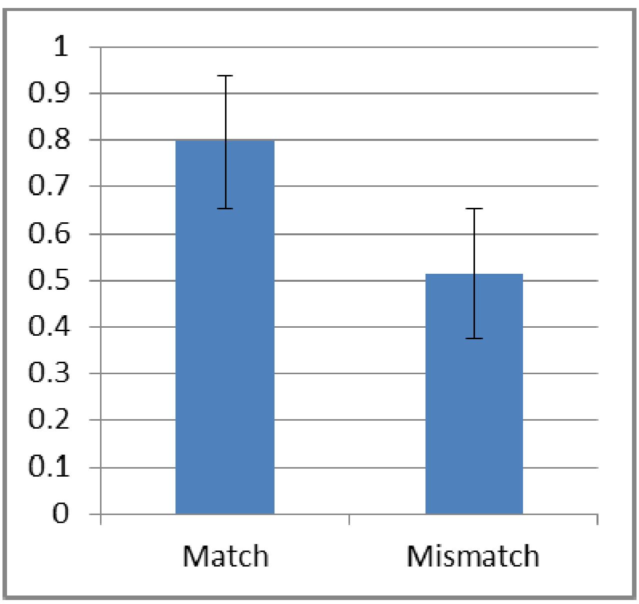

Figure 3: *Percent Accuracy by Trial Category* (*n=65*), Note: Error Bars Designate Standard Error of the Mean, Means are Significantly Different at the .002 Level

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Conference

Members of the Social Sciences Community meet the International Conference on Interdisciplinary Social Sciences, held annually in different locations around the world. The Conference was held at University of the Aegean, on the Island of Rhodes, Greece in 2006; at the University of Granada, Granada, Spain in 2007; at Monash University Centre, Prato, Tuscany, Italy in 2008; at the University of Athens, Athens, Greece in 2009; at University of Cambridge, Cambridge, UK in 2010; and at the University of New Orleans, New Orleans, USA in 2011. In 2012, the Conference will be at Universidad Abat Oliba CEU, Barcelona, Spain.

Our community members and first time attendees come from all corners of the globe. The Conference is a site of critical reflection, both by leaders in the field and emerging scholars. It examines the nature of disciplinary practices, and the interdisciplinary practices that arise in the context of 'real world' applications. The Conference also interrogates what constitutes 'science' in a social context, and the connections between the social and other sciences. Those unable to attend the Conference can opt for virtual participation in which community members can submit a video and/or slide presentation with voiceover, or simply submit a paper for peer review and possible publication in the Journal.

Online presentations can be viewed on YouTube.

Publishing

The Social Sciences Community enables members to publish through three mediums. First, by participating in the Social Sciences Conference, community members can enter a world of journal publication unlike the traditional academic publishing forums—a result of the responsive, non-hierarchical and constructive nature of the peer review process. *The International Journal of Interdisciplinary Social Sciences* provides a framework for double-blind peer review, enabling authors to publish into an academic journal of the highest standard.

The second publication medium is through a book series The Social Sciences, publishing cutting edge books in print and electronic formats. Publication proposals and manuscript submissions are welcome.

Our third major publishing medium is our news blog, constantly publishing short news updates from the Social Sciences community, as well as major developments in the social sciences. You can also join this conversation at Facebook and Twitter or subscribe to our email Newsletter.

Common Ground Publishing Journals

AGING Aging and Society: An Interdisciplinary Journal Website: http://AgingAndSociety.com/journal/	**ARTS** The International Journal of the Arts in Society. Website: www.Arts-Journal.com
BOOK The International Journal of the Book Website: www.Book-Journal.com	**CLIMATE CHANGE** The International Journal of Climate Change: Impacts and Responses Website: www.Climate-Journal.com
CONSTRUCTED ENVIRONMENT The International Journal of the Constructed Environment Website: www.ConstructedEnvironment.com/journal	**DESIGN** Design Principles and Practices: An International Journal Website: www.Design-Journal.com
DIVERSITY The International Journal of Diversity in Organizations, Communities and Nations Website: www.Diversity-Journal.com	**FOOD** Food Studies: An Interdisciplinary Journal Website: http://Food-Studies.com/journal/
GLOBAL STUDIES The Global Studies Journal Website: www.GlobalStudiesJournal.com	**HEALTH** The International Journal of Health, Wellness and Society Website: www.HealthandSociety.com/journal
HUMANITIES The International Journal of the Humanities Website: www.Humanities-Journal.com	**IMAGE** The International Journal of the Image Website: www.OntheImage.com/journal
LEARNING The International Journal of Learning. Website: www.Learning-Journal.com	**MANAGEMENT** The International Journal of Knowledge, Culture and Change Management. Website: www.Management-Journal.com
MUSEUM The International Journal of the Inclusive Museum Website: www.Museum-Journal.com	**RELIGION AND SPIRITUALITY** The International Journal of Religion and Spirituality in Society Website: www.Religion-Journal.com
SCIENCE IN SOCIETY The International Journal of Science in Society Website: www.ScienceinSocietyJournal.com	**SOCIAL SCIENCES** The International Journal of Interdisciplinary Social Sciences Website: www.SocialSciences-Journal.com
SPACES AND FLOWS Spaces and Flows: An International Journal of Urban and ExtraUrban Studies Website: www.SpacesJournal.com	**SPORT AND SOCIETY** The International Journal of Sport and Society Website: www.sportandsociety.com/journal
SUSTAINABILITY The International Journal of Environmental, Cultural, Economic and Social Sustainability Website: www.Sustainability-Journal.com	**TECHNOLOGY** The International Journal of Technology, Knowledge and Society Website: www.Technology-Journal.com
UBIQUITOUS LEARNING Ubiquitous Learning: An International Journal Website: www.ubi-learn.com/journal/	**UNIVERSITIES** Journal of the World Universities Forum Website: www.Universities-Journal.com