"ILLUSIONS OF NORMALITY": A METHODOLOGICAL CRITIQUE OF CATEGORY-SPECIFIC NAMING

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Abstract

Category-specific disorders are perhaps the archetypal example of domain-specificity – being typically defined by the presence of dissociations between living and nonliving *naming* ability in people following neurological damage. The methods adopted to quantify naming across categories are therefore pivotal since they provide *the criterion* for defining whether patients have a category effect and necessarily influence the subsequent direction and the interpretation of testing. This paper highlights a series of methodological concerns relating to how we measure and define category (or any) dissociations. These include the common failure to include control data or the use of control data that is inappropriate e.g. at ceiling, unmatched. A review of past cases shows that the overwhelming majority suffers from these problems and therefore challenges conclusions about the purported empirical demonstrations of dissociations and double dissociations in the category specific literature. This is not a refutation of category deficits, but skepticism about the current existence of any convincing empirical demonstrations of category specific double dissociations. As a potential solution, certain minimal criteria are proposed that might aid with the attempt to document category effects that are more methodologically convincing.

Key words: dissociation, double dissociation, modularity, category-specific, review

Much of cognitive neuropsychology is underpinned by the empirical documentation of dissociations and double dissociations that are used to fractionate cognition into *domain-specific* processes. Category-specific disorders (CSDs) are perhaps one of the archetypal examples of domain-specificity – being typically defined by the presence of dissociations between living and nonliving *naming* ability. The methods adopted to quantify naming across categories are therefore pivotal since they provide *the criterion* for defining whether patients have a CSD and necessarily influence both the direction and the interpretation of further testing.

A search of bibliographic databases and recent reviews reveals that by far the most common strategy for documenting CSDs has been to use a *within-patient* comparison of living and nonliving naming (Table I). Two-thirds (22/33) of case studies have used a within-subject comparison (with χ^2 analysis) to establish category naming effects; with only approximately 1 in 5 studies including any controls for comparison purposes. It will be argued that the pervasive use of a within-subject approach is likely to mislead about both the *presence* and the *direction* of CSDs. Moreover, the *empirical* status of the dissociations and double dissociations in this literature therefore require closer examination, especially with regard to methodological requirements for defining a category-specific naming deficit (be it living or nonliving).

The Assumption of Normality

Why would the majority of category-specific studies fail to include control data? This may partly reflect the assumption that patient performance would be an *exaggeration* of the *normal* profile. Most commonly, this assumption suggests that normal subjects would find living things more difficult to name than nonliving things because the former are, for example less familiar, have lower name frequencies, or have greater visual complexity (Stewart et al., 1992; Funnell and Sheridan, 1992). Nevertheless, as with patient studies, it is necessary to examine the performance of controls on sets of living and nonliving stimuli that are not confounded by these and other potential artefactual variables. In contrast to expectation, recent studies using matched sets of stimuli have reported better and faster naming of living than nonliving things in neurologically intact subjects (Laws, 1999, 2000, 2001a, 2001b; Laws and Gale, 2002; Laws and Neve, 1999). We cannot, therefore, simply assume what is *normal* – this must be explicitly examined anew in each case[1].

Moreover, such 'artefactual explanations' can *only* ever account for half of the phenomenon e.g.

[1] Patients and controls should also be gender-matched. Recent studies have consistently reported better naming of nonliving things by males and better naming of living things by females in Alzheimer patients (Laiacona et al. 1998), aphasics (Laiacona et al., 2003), as well as normal controls (Laws, 1999, 2000, 2004) and this even extends to semantic fluency (Laws et al., 2005).

TABLE I
Details of category specific case studies

Study	Patient name	Stimuli type	Identified variables	Matched for identified variables?	Living	Nonliving	How was effect defined?
Arguin et al., 1996	ELM	S + V	VC, Fam	*Post-hoc* testing	26/66	70/79	No statistical analysis
Barbarotto et al., 1996	LF EA FA FI	S + V	Fr, Fam, NA, IA, VC, Proto	Regression scores adjusted	16/30 1/30 7/30 4/30	26/30 13/30 18/30 17/30	L-NL difference in regression
Bunn et al., 1998	JBR	S + V S + V Colour photos	 Fam, VC, Fr Fam, VC	✘ ✓ ✓	25/97 3/24 14%	93/160 12/24 59%	Within patient χ^2
Cappa et al., 1998	GP	S + V	–	✘	76/94 (86/94) post 7 months	31/64 (46/64) post 7 months	Within patient χ^2
Caramazza and Shelton, 1998	EW	S + V	Fam, Fr, VC	✓	7/17	16/17	z score comparison to controls
De Renzi and Lucchelli, 1994	Felicia	Colour pictures	–	✘	32/80	27/30	Below worst control and discrepancy greater than maximum in controls
Farah et al., 1989	MB LH	S + V	Fr, Fam, VC	Regression scores adjusted	Not reported	Not reported	Within patient χ^2
Farah et al., 1996	MB LH	S + V	VC, Fam, Fr, IA, name specificity	Included in regression analysis	159/475 247/475	633/825 694/825	L-NL difference in regression
Forde et al., 1997	SRB	S + V Photographs Real items	Fr, Fam, VC, SS – –	Included in regression analysis ✘ ✘	60/75 23/32 12/21	69/70 32/32 20/20	Reaction time data used for regression Within patient χ^2
Funnell and Davies, 1996	JBR	S + V	Fam, VC	✓	16/54	29/54	Within patient χ^2
Gainotti and Silveri, 1996	LA	Colour pictures S + V	checked a subset for Fam (but not reported) Fam and Fr.	 ✓	46/93 (40/58 without MI and food) 10/30	46/93 (40/58 without MI and food) 23/30	Within patient χ^2
Hart and Gordon, 1992	KR	S + V	Fr, Fam, VC	✓	7/15	29/30	Within patient χ^2
Hart et al., 1985	MD	Line drawings Colour drawings Photographs Real items	–	✘	12/22 9/13 23/36 23/36	11/11 18/18 222/229 11/11	No statistical analysis
Hillis and Caramazza, 1991	JJ PS	Line drawings Line drawings	Mean word length and syllables, Fr.	✓	42/46 21/58	12/98 77/86	Within patient χ^2
Kolinsky et al., 2002	ER	S + V Matched subset (Snodgrass) BW photos Colour photos	– all usual variables (17 in all) – –	✘ ✓ ✘ ✘	Animals (33%) f + v (30%) 36% 50% animals 39% f + v; body parts (100%) 26% animals 43% f + v	artefacts (71%) 83% 82% artefacts –	Within patient χ^2 Within patient χ^2 Compare to controls Compare to controls
Laiacona et al., 1993	FM RG	S + V	Fr, Fam, NA, IA, VC, Proto	Regression scores adjusted	6/30 4/30	21/30 22/30	L-NL difference in regression
Laiacona et al., 1997	LF EA	S + V	Fr, Fam, NA, IA, VC, Proto, difficulty index	Regression scores adjusted	16/30 1/30	26/30 13/30	L-NL difference in regression
Laiacona and Capitani, 2001	PL	S + V	VC, IA, Proto, Fam, Fr.	Logistic regression	37% (6.7% after year)	13% (0% after year)	Within patient χ^2 (after adjusting for variables)

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