

Role of functional and categorical relations in adult's conceptual organisation

Differentiation between lexical and semantic levels

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1. Introduction

In a pilot study (Perraudin & Mounoud, 2003), we studied the importance of **functional and categorical (taxonomic) relations** among manufactured objects in young adults by means of a **primed naming task** with pictures of objects as stimuli. For the functional relations, primes were objects which can be used to perform an action on targets objects (e.g. a key "to start" the car). For the categorical ones, we used primes and targets objects from the same superordinate category (e.g. motorbike and car) sharing a same function (e.g. to transport). For the control condition, the primes and targets objects were unrelated (e.g. ball and car). Since our aim was to study the semantic systems rather than the lexical ones, we conducted two others studies in order to control the influence of the naming task used in the pilot study, which involves lexical-level processes, on the priming effects observed. For these two studies, we substituted an **Object Decision Task (ODT)** (study 1) and a **Categorical Decision Task (CDT)** (study 2) for the Naming Task (NT) used in the pilot study, by keeping the same items as in the pilot study. Moreover, in order to distinguish facilitation from inhibition effects, we introduced in these two studies a neutral condition in which the prime evokes little or no meaning.

2. Method

1. Population : 66 adults divided into 3 groups according to the task (NT: mean age=23 years; ODT: mean age=24 years; CDT: mean age=25 years)

2. Procedure









We used **priming paradigms** with pictures as stimuli. The task consisted in looking at the primes and in processing the targets as quickly as possible

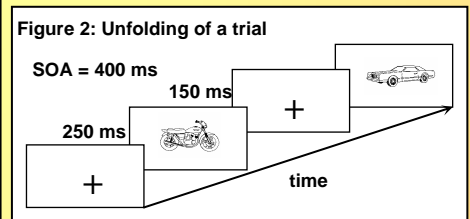
Pilot study → **Naming task (NT)** / **Conditions:** functional, categorical and unrelated (Relation factor)

Study 1 → **Object Decision task (ODT)**

Study 2 → **Categorical Decision task (CDT)**
(clothing/non-clothing)

Conditions: functional, categorical, unrelated, and neutral (Relation factor)

Figure 1: Conditions	Primes	Targets
Functional relation		
Categorical relation		
Unrelated		
Neutral		



Each pair of prime-target was presented 5 times (Repetition factor)

We measured Reaction Times (RTs) to process the targets

3. Hypotheses

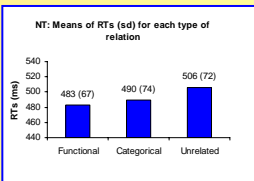
Since the global semantic distance and the global verbal associative strength (cf. Alario & Ferrand, 1998) are weak and equivalent for the functional and categorical conditions, priming effects (relative to the unrelated condition) should be essentially semantic in nature (de Mornay Davies, 1998). Consequently, no differences in priming effects are expected between our tasks.

Semantic relations when constituted (as is the case in young adults compared to children) are basically used to coordinate objects having common features even with manufactured objects. Hence we expect more priming effects for the categorical relations than for the functional ones.

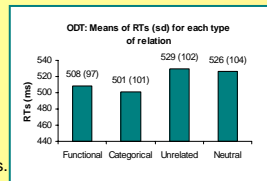
We assume that we investigate the semantic systems at an implicit or automatic level of processing. Therefore, we expect to observe no difference between the neutral and unrelated conditions for the ODT and the CDT.

4. Results

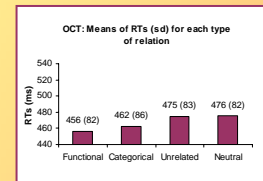
We carried out a repeated-measures ANOVA for each study with Repetition (Rep) and Relation (Rel) as fixed factors and Targets and Subjects (S) as random factors.



Rel: sign ($F^*(2.27, 10.62)=4, p<0.05$)
Rep: sign ($F^*(5.4, 29.55)=6, p<0.01$)
Rel*Rep & Rel*S: n.s.



Rel: sign ($F^*(3.33, 18.41)=5, p<0.05$)
Rep: sign ($F^*(4.47, 42.74)=5, p<0.01$)
Rel*Rep: n.s.
Rel*S: tend ($F^*(63, 189)=1, p=0.08$)



Rel: sign ($F^*(3.57, 17.19)=3, p<0.05$)
Rep: sign ($F^*(4.61, 65.3)=5, p<0.01$)
Rel*Rep & Rel*S: n.s.

In ODT and CDT, Unrelated = Neutral

For all studies: Functional < Unrelated

Categorical < Unrelated

Functional = Categorical

5. Discussion

Results of the three studies are very similar. Consequently the naming task did not introduce lexical effects; **priming effects seem to be essentially semantic in all studies**. Moreover, the similarity of RTs between the unrelated and neutral conditions in studies 1 and 2 indicate on the one hand that we are studying processing capacities more at an **implicit or automatic level** than at a strategic one and on the other hand that the priming effects observed are only due to facilitation when there was a relation between the primes and targets. However, contrary to our hypothesis, **functional and categorical relations generate similar priming effects**. This suggests hence that these two kinds of relations should be considered as two complementary aspects of the semantic organisation. Finally, post-hoc analysis revealed interactions between Target and Relation factors. This interaction could be explained by the variation, even controlled and reduced, of the semantic distance and perhaps of the verbal associative strength between the primes and the corresponding targets.

References

De Mornay Davies, P. (1998). Automatic semantic priming: The contribution of lexical- and semantic-level processes. *European Journal of Cognitive Psychology*, 10(4), 389-412.
Ferrand, L., & Alario, F.-X. (1998). Normes d'associations verbales pour 366 noms d'objets concrets [Norms for verbal associations for 366 names of concrete objects]. *L'Année Psychologique*, 98(4), 659-709.
Perraudin, S., & Mounoud, P. (August 2003). The contribution of priming paradigm in the understanding of the conceptual developmental shift from 5 to 9 years old. Poster communication, XIth European Conference on Developmental Psychology, Milano, Italy.