

## **Syntax and semantics are linked during sensorimotor processing of noun-adjective pairings: evidence from a grasp-compatibility task.**

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Evidence suggests that specific motor plans linked to potential hand-object interactions are activated when semantically processing graspable object nouns. Furthermore, it has also been demonstrated that adjectives expressing object features can modulate these motor plans. Since semantics and syntax are learned together during the lifespan, it is conceivable that syntax can have a role in sensorimotor activation during language processing. This study investigated the role of syntax by comparing two languages with different syntactic structures (Experiment 1 –Italian, Experiment 2 –English). In both experiments, an adjective-noun pair was shown on the screen, with the adjective presented always in pre-nominal position. Adjectives denoted either a disadvantageous quality of the object graspability (e.g., sharp) or the object colour (e.g., reddish). Participants had to categorize the object nouns as natural or artifact, performing a precision or a power reach-to-grasp movement. On different trials, the grasp response was compatible or incompatible with the size of the object denoted by the noun. In Experiment 1 the adjective-noun order violated the syntactic rule and no difference emerged between compatible and incompatible trials. In Experiment 2, the adjective-noun order met the syntactic rule. Results showed slower responses on compatible than incompatible trials when disadvantageous adjectives preceded the nouns, while a standard compatibility effect emerged when colour adjectives preceded natural object nouns. Similar results were previously found when the Italian combinations followed the correct syntactic order. Taken together, these modulations show that syntax contributes to sensorimotor activation. Results are discussed with respect to embodied cognition theories.

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**Autore principale:** GAROFALO, Gioacchino (Università di Bologna - Dipartimento di Filosofia)

**Coautore:** Prof. RIGGIO, Lucia (Università di Parma - Dipartimento di Medicina e Chirurgia); Prof. BIANCHINI, Francesco (Università di Bologna - Dipartimento di Filosofia); GHERRI, Elena (Università di Bologna)

**Presentatore:** GAROFALO, Gioacchino (Università di Bologna - Dipartimento di Filosofia)

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