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## AD HOC CATEGORIES

An ad hoc category is a novel category constructed spontaneously to achieve a goal relevant in the current situation (e.g., constructing *tourist activities to perform in Beijing* while planning a vacation). These categories are novel because they typically have not been entertained previously. They are constructed spontaneously because they do not reside as knowledge structures in long-term memory waiting to be retrieved. They help achieve a relevant goal by organizing the current situation in a way that supports effective goal pursuit.

Ad hoc categories contrast with thousands of well established categories associated with familiar words (e.g., *cat, eat, happy*). Extensive knowledge about these latter categories resides in memory, and may often become active even when irrelevant to current goals. When ad hoc categories are used frequently, however, they, too, become highly familiar and well-established in memory. The first time that someone packs a suitcase, the category, *things to pack in a suitcase*, is ad hoc. Following many trips, however, it becomes entrenched in memory.

Ad hoc categories constitute a subset of role categories, where roles provide arguments for verbs, relations, and schemata. Some role categories are so familiar that they become lexicalized (e.g., *seller, buyer, merchandise, and payment* name the agent, recipient, theme, and instrument roles of *buy*). When the conceptualization of a role is novel, however, an ad hoc category results (e.g., *potential sellers of gypsy jazz guitars*). Pursuing goals requires the constant specification and instantiation of roles necessary for achieving them. When a well-established category for a role doesn't exist, an ad hoc category is constructed to represent it.

Both conceptual and linguistic mechanisms appear central to forming ad hoc categories. Conceptually, people combine existing concepts for objects, events, settings, mental states, properties,

etc. to form novel conceptual structures. Linguistically, people combine words in novel ways to index these concepts. Sometimes, novel concepts result from perceiving something novel and then describing it (e.g., seeing a traditional opera set in a modern context and describing this newly encountered genre as “modernized operas”). On other occasions, people combine words for conceptual elements before ever encountering an actual category instance (e.g., describing “mezzo sopranos who have power, tone, and flexibility” before experiencing one). The conceptual and linguistic mechanisms that formulate ad hoc categories are highly productive, given that components of these categories can be replaced systematically with alternative values from semantic fields (e.g., *tourist activities to perform in X*, where *X* could be *Rome, Florence, Venice*, etc.). Syntactic structures are also central to integrating the conceptual/linguistic components in these categories (e.g., the syntax and accompanying closed class words in *tourist activities to perform in Rome*).

Barsalou (1983) introduced the construct of ad hoc categories in experiments showing that ad hoc categories are not well established in memory and do not become apparent without context. Once constructed, however, they function as coherent categories, exhibiting internal structures as indexed by typicality gradients. Barsalou (1985) showed that these gradients are organized around ideal values that support goal achievement, and also around frequency of instantiation. Barsalou (1987) showed that these internal structures are generally as stable and robust as those in familiar taxonomic categories.

Barsalou (1991) offered a theoretical framework for ad hoc categories (also see Barsalou, 2003). Within this framework, ad hoc categories provide an interface between roles in knowledge structures (e.g., schemata) and the environment. When a role must be instantiated to pursue a goal, but knowledge of possible instantiations does not exist, people construct an ad hoc category of possible instantiations (e.g., when going camping for the first time, constructing and instantiating *activities to perform on a camping trip*). The particular instantiations selected reflect their fit with (a) ideals that optimize goal achievement, and (b) constraints from the instantiations of other roles in the knowledge structure (e.g., *activities to perform on a camping trip* should, ideally, be enjoyable and safe, and should depend on constraints such as the vacation location and time of year). Once

established, the instantiations of an ad hoc category are encoded into memory, and become increasingly well established through frequent use (e.g., establishing *touring back roads* and *socializing around the campground* as instances of *activities to perform on a camping trip*). Barsalou (1999) describes how this framework can be realized within a perceptual symbol system. Specifically, categories (including ad hoc categories) are sets of simulated instances that can instantiate the same space-time region of a larger mental simulation (where a simulation is the reenactment of modality-specific states, as in mental imagery).

Ad hoc categories have been studied in a variety of empirical contexts. Glucksberg and Keysar (1990) proposed that ad hoc categories underlie metaphor (e.g., the metaphor “jobs are jails” conceptualizes the category of *confining jobs*). Cech, Shoben, and Love (1990) found that ad hoc categories are constructed spontaneously during the magnitude comparison task (e.g., forming the ad hoc category of *small furniture*, such that its largest instances anchor the upper end of the size dimension). Vallee-Torangeau, Anthony, and Austin (1998) found that people situate taxonomic categories in background settings to form ad hoc categories (e.g., situating *fruit* to produce *fruit in the produce section of a grocery store*). Chrysikou (2006) found that people rapidly organize objects into ad hoc categories that support problem solving (e.g., *objects that serve as platforms*).

Research has also addressed ad hoc categories that become well-established in memory, what Barsalou (1985, 1991) termed “goal-derived categories.” (also called “script categories,” “slot filler categories”, “thematic categories”). Luciarello and Nelson (1985) found that children acquire goal-derived categories associated with scripts before they acquire taxonomic categories (e.g., *places to eat*). Ross and Murphy (1999) examined how taxonomic and goal-derived concepts simultaneously organize *foods* (e.g., *apples* as belonging simultaneously to *fruit* and *snack foods*). Medin et al. (2006) found that goal-derived categories play central roles in cultural expertise (e.g., tree experts form categories relevant to their work, such as *junk trees*).

Although ad hoc and goal-derived categories are ubiquitous in everyday cognition, they have been the subject of relatively little research. Much further study is needed to understand their structure and role in cognition. Important issues include: How do productive conceptual and

linguistic mechanisms produce ad hoc categories? How do these categories support goal pursuit during situated action? How do these categories become established in memory through frequent use? How does the acquisition of these categories contribute to expertise in a domain?

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### **Author Notes**

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