

SHORT REPORT/COMMUNICATION BRÈVES

Category Exemplars Normed in Canada

Justin Kantner and D. Stephen Lindsay
University of Victoria

Normative data on category exemplar generation are widely used by psychologists but vary across cultures such that well-known norm sets developed in the United States might not be appropriate for use in Canada. To date, no published set of category exemplars has been normed with a Canadian undergraduate population. We describe the creation of such a set using the popular Battig and Montague (1969) categories and provide a link to the full set of norms.

Keywords: category exemplars, norms, typicality

Normed lists of category exemplars—the most commonly generated members of basic categories (e.g., BIRD: eagle, robin, bluejay, cardinal, hawk)—have been of immense use to psychologists. Published norm sets (e.g., Battig & Montague, 1969; Nelson, McEvoy, & Schreiber, 1998; Rosch, 1975; Stadler, Roediger, & McDermott, 1999) reflect the structure of semantic relationships in memory and have been used to study numerous aspects of cognition, including false-memory generation, semantic priming, categorization, and cued recall. Perhaps the most popular set of verbal category norms, collected by Battig and Montague (1969), has been cited more than 2,500 times (according to Google Scholar), and an update by Van Overschelde, Rawson, and Dunlosky (2004) has already been cited more than 200 times.

The Battig and Montague and Van Overschelde et al. norms were collected in the United States. Because normative category associations vary across cultures, researchers have renormed the Battig and Montague categories in several countries, including Belgium (Storms, 2001), China (Yoon et al., 2004), Israel (Henik & Kaplan, 1988), and New Zealand (Marshall & Parr, 1996). To our knowledge, no published category exemplar norms of any kind have been drawn from a Canadian undergraduate population.¹ One would expect near-perfect overlap in the top exemplars generated by Canadian and U.S. undergraduates for some of the Battig and Montague categories (e.g., article of clothing, part of speech), but not for others (e.g., elective office, kind of money, unit of distance, country). Beyond these more obvious examples are several other categories for which U.S. norms might be inappropriate for Canadians (e.g., type of bird, sport, flower).

We sought a set of semantic associates appropriate for use with Canadian undergraduates. We collected responses to all 56 Battig and Montague (1969) categories (plus 1 additional category, “Ca-

nadian Provinces”) from psychology students at the University of Victoria. Here, we describe the methods used to gather and analyze the exemplars and provide a link to the complete set of norms.

Method

Participants

University of Victoria undergraduates provided category exemplars as part of a filler task during various memory experiments conducted between 2008 and 2010. With one exception (member of the clergy, $N = 104$), the number of participants completing each category ranged from 131 to 170.

Materials

Categories were the 56 used by Battig and Montague (1969) plus “Canadian provinces.” Exemplars were entered on packets containing instructions and four answer boxes beneath each of the 57 category names. Categories appeared in one of four randomly assigned orderings for each participant.

Procedure

Participants were asked to write the first four members of each category that came to mind when they read a given category name.² They were instructed not to “try to be fancy or come up with odd members” and told that we wanted to know the most

¹ Price and Connolly (2006) collected norms from 3- to 12-year-old children in the Vancouver, British Columbia area for 33 Battig and Montague categories.

² Battig and Montague (1969) and Van Overschelde et al. (2004) used a different procedure, giving participants 30 s to generate as many exemplars of each category as they could. The current “four response” procedure has been used to produce several other sets of norms (see McEvoy & Nelson, 1982). We used this procedure because we judged it easier to administer than the timed response window procedure. McEvoy and Nelson (1982) provided evidence that category-typicality norms are little if at all affected by such procedural variations.

Justin Kantner and D. Stephen Lindsay, University of Victoria.

Correspondence concerning this article should be addressed to Justin Kantner, Department of Psychological and Brain Sciences, University of California–Santa Barbara, Santa Barbara, CA 93106. E-mail: kantner@psych.ucsb.edu

common, frequent, typical members of each category, which would generally be the first category members that came to mind in response to the category label. The time allotted for the task depended on the length of the filler interval in a given experiment, but it was usually between 5 and 10 min; participants were encouraged to complete as many items as possible.

Results and Discussion

Exemplars for each category were ranked according to their strength of association with the category label via a scoring system that was based on output order: An exemplar received 4, 3, 2, or 1 points each time it was written down first, second, third, or fourth by a participant, and the exemplar with the highest total number of points was the #1 exemplar for the category. Any responses for a given category were scored even if the participant had not generated all four exemplars. Misspellings were corrected and abbreviations spelled out according to the judgment of the first author and research assistants. Plurals were counted as instances of the singular form (e.g., “apples” was recorded as “apple”). Instances differing only by the use of spaces (e.g., “wash cloth” vs. “washcloth”) or hyphens (e.g., “yo yo” vs. “yo-yo”) were combined and counted as instances of whichever form was correct, or, if neither form was incorrect, whichever was given more often. Exemplars expressed as verbs were converted to noun form (e.g., “steal” was counted as “stealing”). Responses that implied the inclusion of the category label (e.g., “clown” in the “fish” category) were completed (“clownfish”).

The full stimulus set can be downloaded at <http://web.uvic.ca/~dslind/sites/default/files/Norms.xls>. Categories appear in alphabetical order from the top to the bottom of the file. Information for each category is organized in seven columns as follows:

Column 1: The name of the category.

Column 2: The number of responses collected for the category.

Column 3: The rank of the exemplar.

Column 4: The name of the exemplar.

Column 5: The total score for the exemplar as a percentage of the maximum possible score for that category (exemplar score/ $(N_{\text{category}} * 4)$).

Column 6: The percentage of participants listing the exemplar first.

Column 7: The percentage of participants listing the exemplar in any position.

As noted above, we expected similarities in addition to substantial differences across Canada- and U.S.-normed category exemplar lists. Because similarities with existing norms help establish the validity of our norming procedure, we sought evidence of cross-norm stability in a measure that should be positively correlated across Canadian and U.S. norm sets. For each of the top-ranked exemplars in the present norms, we correlated the percentage of participants listing that exemplar first (“% first” [Column 6] in the present norms) with the percentage of participants listing those same items first in the updated Battig and Montague norms collected by Van Overschelde et al. (2004). #1 Canadian exemplars absent from the U.S. norms were not included in the analysis. “% first” values for these exemplars were highly correlated across norm sets, $r(52) = .74$, $p < .001$; with the exclusion of the “country” category, the correlation was .88. The strength of this

Table 1

Comparison of the Current Norms With Those Collected by Van Overschelde et al. (2004) in the United States

Category name	Mean deviation ^a	Number absent in U.S. ^b
Canadian province	N/A	N/A
City	9.00	7
Male first name	8.82	0
Female first name	8.44	1
U.S. state	5.60	0
Kind of money	4.63	2
Fish	4.22	1
Disease	4.00	0
Tree	4.00	2
Type of ship	3.82	1
Type of vehicle	3.78	1
Bird	3.60	0
Weather phenomenon	3.40	0
Vegetable	3.33	0
Article of clothing	3.00	0
Nonalcoholic beverage	2.80	0
Type of footwear	2.75	2
Country	2.60	0
Relative	2.60	0
Carpenter's tool	2.50	0
Part of body	2.40	0
Natural Earth formation	2.30	0
Substance for flavouring food	2.30	0
Type of fuel	2.11	1
Toy	2.00	0
Unit of distance	2.00	0
Dance	1.90	0
Profession	1.89	1
Metal	1.80	0
Kitchen utensil	1.78	1
Part of speech	1.75	2
Insect	1.70	0
Kind of cloth	1.70	0
Musical instrument	1.70	0
Chemical element	1.70	0
Four-footed animal	1.60	0
Military title	1.60	0
Sport	1.60	0
Alcoholic beverage	1.56	1
Elective office	1.50	8
Unit of time	1.50	0
Fruit	1.40	0
Part of building	1.40	0
Science	1.38	3
Human dwelling	1.20	0
Item of furniture	1.20	0
Type of music	1.20	0
Snake	1.13	3
Weapon	1.11	2
Crime	1.00	3
Member of the clergy	0.91	0
Reading material	0.89	1
Precious stone	0.83	0
Colour	0.60	0
Building for religious services	0.50	2
Flower	0.50	0
College or university	0.00	9

Note. The category “Canadian province” was not included in the U.S. norms. The category “college or university” has a mean deviation score of zero because 9 of the top 10 exemplars were not present in the U.S. norms and the 10th (Harvard) occupied the 5th position in both norm sets. In the table (as in the norms), we have adopted Canadian spellings where they differ from American English.

^a Mean deviation of the top 10 exemplars from the list position of the same items in the U.S. norms. ^b Number of top 10 category exemplars not present in the U.S. norms.

relationship indicates that the present category exemplars are comparable with those normed in the United States.

Comparison of the present norms with those of Van Overschelde et al. (2004) reveals substantive differences in many categories, suggesting that the present norms are uniquely Canadian. Although U.S. and Canadian undergraduates agreed on the strongest exemplars of many categories (e.g., color [top five exemplars identical], alcoholic beverage [top four identical], science [top four], occupation [top four]), both exemplars and rankings diverged for many others. The exemplars represented in categories such as sport, country, musical instrument, type of music, and unit of distance largely overlap across the Canadian and U.S. norms, but their orderings differ in nontrivial ways; in categories such as elective office, kind of money, city, U.S. state, and college or university,³ the exemplars themselves differ substantially. Examples of distinctions in Canadian and U.S. terms for common items (e.g., “pop” vs. “soda”; “runners” vs. “tennis shoes”) appear in some categories, and #1 exemplars differ for many.

To quantify the degree of overlap between the Canadian and U.S. norms, we calculated the difference between the Canadian and U.S. ranks for each exemplar that appeared in both sets of norms. For example, in the category “nonalcoholic beverage,” the exemplar “Coke” was ranked fifth in the current norms and second in the Van Overschelde et al. (2004) norms, yielding a difference score of 3. The mean Canada-U.S. deviation⁴ for the top 10 exemplars of each category appears in Table 1. Items among the top 10 Canadian exemplars that did not appear in the U.S. norms were not included in the calculation of mean deviation, but we display the number of such items for each category in Table 1 as a second means of comparing the Canadian and U.S. norms. For example, items in the “type of vehicle” category differed from their U.S. counterparts in rank by an average of 3.78 list positions, and there was one vehicle amongst the Canadian top 10 not listed in the U.S. rankings.

As expected, mean deviation scores ranged from relatively small (e.g., building for religious services, $M = 0.50$) to relatively large (e.g., kind of money, $M = 4.63$). Ranks differed by an average of at least two positions per exemplar in 25 categories, and numerous instances of items unique to the Canadian norms were observed. We conclude that these norms are better suited to experiments involving a Canadian undergraduate population and hope that Canadian researchers find them helpful.

³ As in the U.S. norms, some of the highly ranked exemplars in the city, U.S. state, and college or university categories are transparently specific to the location of data collection; for example, the #1 exemplar in the college and university category was the University of Victoria, which would certainly not be the case elsewhere in Canada. For these categories, “weaker” exemplars may better represent a region-invariant category structure.

⁴ Although we rank exemplars according to the output order-weighted scoring system described above (see *Results and Discussion*), Battig and Montague (1969) and Van Overschelde et al. (2004) based rankings on the percentage of participants listing the exemplar in any position. Although differences in rankings between these two systems were small in our data, we adopted the Battig and Montague standard for the purpose of comparing ranks across norm sets. Of course, readers can adopt either ranking system

simply by sorting the exemplars of each category either according to output-based score (Column E [% Max] in the norm spreadsheet) or frequency of appearance (Column G [% Listed]).

Résumé

L'utilisation de données normatives sur la production d'exemples représentatifs de catégories est largement répandue parmi les psychologues, mais celles-ci varient selon les cultures de façon que, des ensembles de normes bien connus établis aux États-Unis pourraient ne pas convenir à une utilisation au Canada. À ce jour, aucun ensemble d'exemples de catégories n'a été standardisé au moyen d'une population d'étudiants canadiens au premier cycle. L'article décrit la création d'un tel ensemble au moyen des populaires catégories établies par Battig et Montague (1969) et comprend un lien à l'ensemble complet de normes.

Mots-clés : exemples représentatifs de catégorie, normes, typicalité.

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