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Norms for pictures of proper names: Contrasting famous people and well-known places in younger and older adults.

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Abstract

Proper names comprise a class of labels that arbitrarily nominate specific entities, such as people and places. Compared to common nouns, retrieving proper names is more challenging. Thus, they constitute good alternative semantic categories for psycholinguistic and neurocognitive research and intervention. The ability to retrieve proper names is known to decrease with aging. Likewise, their retrieval may differ across their different categories (e.g., people and places) given their specific associated knowledge. Therefore, proper names' stimuli require careful selection due to their high dependence on prior experiences. Notably, normative datasets for pictures of proper names are scarce and hardly have considered the influence of aging and categories.

The current study established culturally adapted norms for proper names' pictures (N = 80) from an adult sample (N = 107), in psycholinguistic measures (naming and categorization scores) and evaluative dimensions (fame, familiarity, distinctiveness, arousal, and representational quality). These norms were contrasted across different categories (famous people and well-known places) and age groups (younger and older adults). Additionally, the correlations between all variables were examined.

Proper names' pictures were named and categorized above chance and overall rated as familiar, famous, distinctive, and of high representational quality. Age effects were observed across all variables, except familiarity. Category effects were occasionally observed. Finally, the correlations between the psycholinguistic measures and all rated dimensions suggest the relevance of controlling for these dimensions when assessing naming abilities. The current norms provide a relevant aging-adapted dataset that is publicly available for research and intervention purposes.

Keywords*: picture norms; proper names; aging; famous people; well-known places; psycholinguistic measures; evaluative dimensions.*

Norms for pictures of proper names: Contrasting famous people and well-known places in younger and older adults.

Proper names comprise a class of labels that arbitrarily nominate specific entities (such as people and places) without necessarily reflecting their properties (see Semenza, 2006). For example, the "Eiffel Tower" received this name not because of any particular characteristic (i.e., location, materials, shape) but in honor of Gustav Eiffel (the engineer who projected it). Proper names also make things particular or unique, assuming a relevant social function of differentiating an entity from others while communicating (Brédart, 2017). For instance, the reference to "Nelson Mandela" will be recognized as that unique man who dedicated his life to political activism against racism and later became the president of South Africa. The ability to particularize things by labeling them with a unique name constitutes a relevant adaptative step derived from language evolution and the development of a more efficient neural system (see Semenza, 2009). This individualization of entities through singular labels reflects a more complex world representation that is useful for adaptive purposes. A child may identify his mother to others; a traveler can identify a destination more effectively; a boy can refer to the name of the street he lives in case of being lost. However, proper names are also fragile mental representations susceptible to being easily forgotten (Cohen, 1990; Cohen & Burke, 1993). Classic case studies exploring anomia for proper names have also documented the special status of proper names. These studies converge in showing that proper names are more difficult to name, more easily forgotten, and processed in different (and perhaps more profound) neural structures, in comparison to common names - like apple or car (e.g., Cohen et al., 1994; Lucchelli & De Renzi, 1992; Martins & Farrajota, 2007; Semenza et al., 2003; Semenza & Zettin, 1989).

As a particular class of semantic representation, proper names' stimuli constitute an important resource in neurocognitive research and intervention, particularly in linguistic and neuropsychological examination (Adorni et al., 2014; Bélanger & Hall, 2006; Benke et al., 2013; Brédart et al., 2005; Evrard, 2002; James, 2004; Semenza et al., 2003; Semenza, 2006). For example, proper names' stimuli are helpful for inspecting grammatical and lexical structures

across languages (e.g., Müller, 2010) as well as for examining and stimulating linguistic acquisition (e.g., Bélanger & Hall, 2006). Pictures of proper names are also suitable for studying cognitive decline, particularly memory (see Martins & Farrajota, 2007; Semenza et al., 2003 for examples).

Despite their widespread application, one major challenge of using proper names in psychological research and intervention is the lack of consistency in selecting proper names. Researchers often use non-normalized stimuli (e.g., Kljajevic & Erramuzpe, 2018; Wang et al., 2015). Due to cultural constraints, they produce their own standards by conducting a pilot study or collecting ratings together with the picture-naming task (Benke et al., 2013; Martins & Farrajota, 2007; Rizzo et al., 2002; Ross & Olson, 2012). In some cases, these pilots even support further examination of clinical samples (e.g., Benke et al., 2013; Martins & Farrajota, 2007). Finally, the number of stimulus items and/or variables examined is often limited (e.g., Benke et al., 2013; Ross & Olson, 2012). Consequently, normative databases of proper names and particularly of proper names' pictures are still rare and include primarily celebrities' pictures (Bizzozero et al., 2005; Bizzozero et al., 2007; Bonin et al., 2008; Lima et al., 2021; Marful et al., 2018; Rizzo et al., 2002; Smith-Spark et al., 2006; Stoney et al., 2020; but see Benke et al., 2013, for standardized famous places).

One of the first studies that normalized proper names' pictures was conducted by Rizzo et al. (2002) and presented norms for naming measures, recognition, fame, and associated semantic knowledge in the Italian cultural context. This database comprises 50 pictures of famous people, systematically distributed by national (e.g., "Luciano Pavarotti") and international (e.g., "Madonna") domains of fame across several categories (arts, politics, sports, etc.). Subsequently, Bonin et al. (2008) normed a high number of pictures of famous people from several categories (e.g., actors, athletes, singers, etc.) from an extensive period of fame (between 1920 to 2003). In this study, besides naming performance and other linguistic measures, familiarity and distinctiveness were also reported as relevant dimensions. Familiarity refers to the frequency with which people interact with or think about a given entity in everyday life. Familiarity is likely influenced by prior experiences and the linguistic and cultural context

(Rendell et al., 2005; Smith-Spark et al., 2006; Snodgrass & Vanderwart, 1980). Distinctiveness is focused on the singularity of the items, reflecting the degree to which the item is easily recognized from its own features. This singularity is a central characteristic of proper names (see Semenza, 2006) that should also be relevant to their pictographic representations.

In the European Portuguese context, to our knowledge, there are only three standardizations of famous people's pictures (Lima et al., 2021; Martins et al., 2005; Rosa et al., 2012). For instance, Martins and colleagues (2005) used 74 items from old, recent, and contemporary famous faces and explored the influence of age differences in their naming. The authors did not find any relevant correlation between aging and naming performance, although a decrease in naming performance emerged in participants older than 70 years old. Rosa et al. (2012) presented a reduced version (39 items) of Martins et al.'s (2005) naming standards and obtained norms for older adults (50-65 years old and over 65 years old). Recently, Lima et al. (2021) presented norms for 160 black-and-white pictures of celebrities regarding their age of acquisition, familiarity, and distinctiveness, along with recognition and naming scores. This latter study showed that Portuguese young adults rated the presented celebrities' faces low in familiarity and high in distinctiveness, with distinctiveness being a relevant predictor for recognition and naming performance.

However, to date, normative studies of proper names have barely included relevant emotional and affective dimensions like arousal or valence (but see Marful et al., 2018; Stoney et al., 2020, for examples), particularly in the Portuguese context. Previous normative studies have shown that these affective dimensions along with semantic and perceptual variables influence the ability to name pictures of common names (e.g., Alario et al., 2004; Barbarotto et al., 2002; Bates et al., 2003; Garrido et al., 2017; Souza et al., 2021; see also Souza et al., 2020 for a review). The systematic examination of these dimensions in proper names' items thus seems critical to understand how such stimuli are processed.

Proper names are idiosyncratic designations relevant for social interaction (see Semenza, 2011) that are likely influenced by spatial, temporal, social, personal, and affective

characteristics. Therefore, controlling or examining how these variables may affect picture processing for proper names' items seems crucial.

Aging, for instance, has been widely indicated as a relevant predictor of proper names' retrieval abilities (see Evrard, 2002; James, 2004; Kavé et al., 2018). Proper name categories are known to be labile and suffer the influence of aging and neurophysiological constraints/deterioration (Brédart, 2017; Semenza, 2009; 2011). Moreover, aging alone is expected to generate a natural decline in cognitive competencies relevant to naming (e.g., Nilsson et al., 1997; Rönnlund et al., 2003). Age-related differences were also documented in ratings of evaluative dimensions in norms for famous people's names (see Smith-Spark et al., 2006) in line with those previously observed in object picture processing (see Ghasisin et al., 2015; Yoon et al., 2004 for an example). Moreover, naming famous people was significantly affected by age (Bizzozero et al., 2007). Likewise, a normative Italian dataset of famous buildings' names (a type of famous places) also showed age influence in several tasks related to naming performance (Mina et al., 2010). These findings suggest that the effect of age should be examined in norms for proper names. Despite their importance, the availability of age-related norms for several relevant variables in processing famous proper names is scarce (see Bizzozero et al., 2005; 2007), particularly in the European Portuguese context (but see Martins et al., 2005; Rosa et al., 2012 for examples of Portuguese naming tests).

Furthermore, the effect of the category (i.e., people or place) in proper names' picture processing also deserves more attention, namely regarding its possible influence in name agreement and the appraisal of evaluative dimensions (e.g., Brodeur et al., 2014). Prior standards of proper names' items (although not directly comparing these categories) obtained with healthy adults (age range: 19-65) showed comparable performance in naming famous people (71.1%) and places (71.8%), despite the slight differences observed in recognition and semantic knowledge retrieval capabilities (Benke et al., 2013). However, to our knowledge, the direct comparison between famous people and place pictures across aging has not been made in any normative study to date.

Besides age and categories, socio-demographic characteristics like educational background and the engagement in socio-cultural activities (e.g., watching tv, travel, etc.) also constitute relevant variables that influence face naming and face processing (see Bizzozero et al., 2007; Bonin et al., 2008; Garrido & Prada, 2017; Garrido et al., 2017; Kavé et al., 2018). For instance, educational background influenced the naming of famous people as a function of task difficulty, while gender/sex differences did not emerge (Bizzozero et al., 2007). As pictures of well-known proper names (e.g., celebrities or monuments), aside from unique, are also embedded in experience-based knowledge, some attention should be given to those experience-based variables.

In sum, the production of proper names' picture norms remains scarce in the European Portuguese environment. Notably, the few existing Portuguese norms for proper names' pictures only explored pictures of famous people and did not include places' items such as monuments or landmarks. Moreover, as discussed above, age and other personal-related variables seem particularly relevant for proper names' retrieval because these stimuli are relatively contextual-dependent and supported by singular arbitrary associations between the name and the entities named (see Semenza, 2006). These variables have not been systematically examined. In the current study, we produced norms for pictures of proper names (N=80) by age (younger and older adults) and category (people vs. places) in the dimensions of fame, familiarity, distinctiveness, arousal, representational quality, and psycholinguistic measures such as naming and category accuracy. We also present correlational analyses to further understand the relationship between the dimensions and their co-variation, as well as to clarify how the ratings of the dimensions influence naming measures.

2. Method

2.1. Participants

The initial sample included 110 healthy adults between 19 and 78 years old. Each subsample was recruited to meet the minimum number of evaluations (around 30) per picture

recommended in prior norms for visual stimuli (e.g., Brodeur et al., 2014; Garrido et al., 2017; Souza et al., 2021). Three participants were excluded because they did not answer the entire survey and missed the socio-demographic questions (one younger adult and two older adults). The final sample included 107 participants (age range of 19-77-year-old), 56 younger adults (age range:19-45), and 51 older adults (age range: 55-78) matched on educational level and socio-cultural profile[1] (*p's*> .200). The majority of the participants presented intermediate to high educational level (44.85% completed high school, and 47.66% held a university degree) and were students or active workers (70.9%). Aside from age, younger and older adults only significantly differed in their employability information ($p < .001$; see Table 1).

Table 1.

Socio-demographic profile of the sample by age group

	Younger Adults (n=56)	**Older Adults (n=51)**	***Statistics***
Age Mean (SD)	31.71 (9.28)	62.82 (6.14)	$t(105) = -20.246$, $p < .001$
Educational level	50% Intermediate 48.22% High	56.86 % Intermediate 47.06 % High	$\chi^2(4) = 5.889$, $p = .208$
Socio-cultural profile Mean (SD)	.66 (.096)	.64 (.108)	$t(105) = .774$, $p = .459$
Employability profile	87.5% active	50.98 % active	$\chi^2(1) = 16.982$, $p < .001$

The sample was recruited online through social networks (e.g., Facebook). Two 50€ commercial vouchers were drawn to all participants who agreed to participate. The present study was approved by the Ethics Board of the host institution (ref. 01/2018). All participants provided informed consent before participation.

2.2. Stimulus materials

[1]Participants' socio-cultural profile was assessed with seven items reporting socio-cultural habits, namely (1) watching TV; (2) watching films and series; (3) reading newspapers and magazines; (4) use of social media; (5) traveling; (6) visiting museums and monuments; (7) practice sports/outdoors activities. Participants were asked to evaluate on a 5-point rating scale (1 - *never* to 5 – *daily*) how frequently they engage in these activities. The engagement in socio-cultural activities is represented by a relative score (i.e., total reported score/maximum score).

The initial sample of stimuli consisted of 120 proper names' pictures retrieved from online sources that allow free use for non-commercial purposes, mainly pictures from web-newspapers, wiki library, and Flickr. All the images were previously selected by three native Portuguese speakers. Overall, the pictures were equally distributed by subcategories (e.g., arts, sports, geographical places, historical monuments), time periods[2] (old and current), and international and national reputation. Well-known places' pictures were selected considering famous Portuguese and international topographical locations and comprised four categories: geographical places (e.g., Rua Augusta, a famous touristic street in Lisbon), infrastructures/services buildings (e.g., 25 de Abril Bridge, that connects the two sides of the Tagus´ river), historical or archeological monuments (e.g., Pyramids of Giza), and architectonic structures (e.g., Eiffel Tower). People's pictures were obtained based on a previous list of celebrities (Martins & Farrajota, 2007) updated through an additional search. The selection of items of famous people considered four different areas, namely culture (e.g., Frida Kahlo), entertainment and TV (e.g., Jane Fonda), sports (e.g., Cristiano Ronaldo), and leaders (e.g., Nelson Mandela). Half of the items were male, and half were female. The pictures were selected considering an extended period (1940 to currently). The referred distribution of pictures across different subcategories and time periods was made to make them suitable for both young and older adults as well as to prevent ceiling effects that are likely to occur when using well-known items (see Martins et al., 2005). At this phase, two judges also provided the correct target and category names and evaluated the appropriateness of each picture to the Portuguese cultural environment. Inter-rater agreement was 86.67% (n=104). Disagreements were further discussed with a third judge until an agreement was reached. Whenever there was no consensus, items were excluded (n=12). In this judgment phase, items with agreed naming (n=108) but considered of lower cultural relevance were also excluded (n=28). The final sample of stimuli included 80 items equally distributed into two subsamples of famous people and well-known

[2] The variable time period was based on previous work (e.g., Martins et al., 2005) and refers to the period during which celebrities were likely more famous. In the present research, "old" items refer to those predominantly famous until 1999 and "current" items include those with recognized fame since 2000.

places (40 items each) (see Figure 1). Because the selected pictures might have differed in quality, pictures were resized at 500X500pxls with a blank canvas and controlled for 25% luminosity.

Figure 1.

Examples of stimuli by category

Note: The figure presents examples of national and international items from people and places' categories. For the "people" category, we present "José Saramago", a Portuguese writer awarded with the Nobel Prize of Literature as a national exemplar, and "Elizabeth II", the Queen of England, as an international exemplar. For the "places" category, we present the "25 de Abril Bridge" as a famous national place and the "Pyramids of Giza" as an internationally famous place.

2.3. Procedures and measures

Data was collected with Qualtrics Experience Management online software (Qualtrics, Provo-UT, USA), and data analysis was performed using SPSS version 26. Once they accessed the link, participants were informed about the voluntary and anonymous nature of their collaboration. For control purposes, after providing their informed consent and socio-demographic information, participants were asked to complete their socio-cultural profile by indicating to which extent (on a scale from 1 - *never* to 5 - *daily*) they engage in a set of

recreational and cultural activities. Subsequently, the instructions for ratings, naming, and categorization tasks appeared together with examples (for practice purposes), and then participants were forwarded to the test phase. Each participant saw the 80 pictures, one at a time, distributed in a randomized order by two between-participants counterbalanced category blocks (i.e., famous people and well-known places). For each picture, participants were asked to complete four rating tasks regarding familiarity, fame, distinctiveness, and arousal, randomly presented across pictures. Afterward, participants performed the naming and categorization tasks. In the naming task (written form), participants were asked to name the item as precisely as possible. In the categorization task, they were asked to choose the best category to classify the item within the four category options for famous people or well-known places. These options were presented in a fixed order and included an additional "I don't know" option always presented in the end. Finally, they completed a representational quality rating, assessing the potential of each picture in representing the concept/name. The detailed information for each measure is presented in Table 2.

Table 2.

Description of the evaluative dimensions and psycholinguistic measures

Measures	Description	References
Familiarity	Participants should consider how often they encountered the item represented in the picture in their daily life, indicating how familiar the stimulus was on a scale ranging from (1) *unfamiliar* to (10) *very familiar*. Frequently found stimuli are usually considered more familiar.	Bonin et al., 2008; Prada et al., 2016; Snodgrass & Vanderwart, 1980
Arousal	Evaluates the degree of activation elicited by the item. Participants should indicate to what extent they considered the item (1) *very passive/calm* or (10) *very active/intense*.	Prada et al., 2016; Prada et al., 2018
Fame	Participants should evaluate to which extent the item presented was famous/well-known, from (1) *not famous* to (10) *very famous*.	Rizzo et al., 2002

Distinctiveness	Participants were asked to indicate how distinctive was the face/place based on its visual aspects (i.e., facial features, architectural features, colors, etc.) on a scale ranging from (1) *low distinctive* to (10) *highly distinctive*.	Bonin et al., 2008; Marful et al., 2018
Image representational quality	Evaluates the representational quality of the picture. Specifically, whether the picture favors the recognition of the represented entity, from (1) *very low quality* to (10) *very good quality*.	Souza et al., 2021
Naming task	Participants were asked to write down the name they thought best identifies the item represented in the picture (write the first name that comes to your mind).	Marful et al., 2018; Snodgrass & Vanderwart, 1980; Souza et al., 2021
Categorization task	Participants were asked to indicate the best option to categorize the item (in a forced-choice task).	Brodeur et al., 2014; Souza et al., 2021

The main psycholinguistic measures included name accuracy (%) and categorization accuracy (%). Subsequently, the psycholinguistic measures of modal name (the most referred valid name) and name agreement (percentage of agreement regarding the modal name) were computed (see Souza et al., 2021). The respective value of name variability (H-stats[3]) was also estimated to capture the conceptual variability in correctly naming the item (see Snodgrass & Vanderwart, 1980, for details of the calculation procedure).

Whenever participants were not able to name a given picture, they were asked to indicate whether they were not able to do so because they "don't know" the item presented in the picture (DK) or they "know the item but were momentarily unable to name it" (TOT – "tip-of-the-tong"). In TOT responses, participants could provide semantically related information (e.g., "Portuguese football player" or "the best football player in the world"; for Cristiano Ronaldo's picture). Errors corresponded to cases in which incorrect names were provided. Incorrect responses comprised the occurrence of Errors (%) together with DK (%) and TOT (%) responses. Complementary, DK, TOT, and Error percentages were also inspected, as reflecting the causes for incorrect responses.

[3] The h-statistics (h-stats) is a measure that allows obtaining a standardized agreement value for naming based on the occurrence of the target name and the variability of acceptable concepts (see Brodeur et al., 2014; Snodgrass & Vanderwart, 1980). The calculation of the h-stats considers the proportion of agreement of an item name across participants (Pi; excluding errors and missing responses) and the different accepted names for the item (k), within the formula: $H = \Sigma P_i log_2 (1/P_i) k_i$ (Brodeur et al., 2014; Snodgrass & Vanderwart, 1980). The h-stats increases (closer to 1) with the number of alternative names and is inversely related to the modal name scores (Snodgrass & Vanderwart, 1980).

2.4. Data analysis

Norms are provided by item using descriptive statistics and correlations for all ratings and psycholinguistic measures. The descriptive summary of the data (i.e., means and standard deviation, confidence interval, skewness, and kurtosis) is provided for all dimensions and psycholinguistic measures for the entire sample, by category and age group. The influence of age-group (younger vs. older) and category (people vs. places) was explored using separate repeated-measures ANOVAs for each dependent variable (i.e., ratings and psycholinguistic measures), with age as between and category as within factors. The Greenhouse-Geisser adjustment was used in case of sphericity violation. Bonferroni correction was used to adjust multiple comparisons. When appropriate, t-tests were performed as follow-up analyses of significant interaction effects. Finally, the association between psycholinguistic measures and all normative dimensions was explored using partial Pearson correlational scores by age group with correction for category effects.

3. Results

3.1. Preliminary analysis

Regarding naming measures, participants' responses for each item were first inspected for typing errors, adjectives, order, and synonyms. Because of the experienced-based nature of the items, the naming analysis was performed using a lenient criterium and considered the target name and other valid related names attributed to the items (i.e., "CR 7" for "Cristiano Ronaldo's" picture). Likewise, names of relevant characters were considered as a variant name of the item (e.g., "Charlot" for "Charlie Chaplin"). Short versions of the correct name (e.g., "Amoreiras" referring to the "Amoreiras Shopping Center") and correct composite names presented in a different order ("Shopping Center Amoreiras") were considered valid alternatives. Afterward, responses were classified as correct or incorrect, and the naming measures were calculated.

The questionnaires were then examined for unnamed items. The naming task was inspected for "Don't Know" responses by participant and by item. The percentage of Errors and

TOT responses were also determined to provide a detailed description of naming performance and disentangle their influence in naming measures. Five participants were excluded from the naming scores analysis based on their naming performance (presenting more than 51% of DK or naming errors). Missing cases of naming were rare (less than 1%) and nonexistent after excluding those participants (all younger adults). None of the items reached 80% or higher of DK responses in naming. Incorrect responses comprised 34.24 % of the overall responses. Specifically, DK responses represented 20.91% of the responses, and TOT (8.92 %) and Errors (4.41 %) were less frequent.

The categorization task was also inspected for DK responses to identify unknown items that did not activate the associated semantic category. Four items were challenging to categorize (more than 50% of DK), although none of the items reached 80% of DK category responses.

Overall, no items were excluded from the sample since they were difficult to name but not uncategorizable items. Difficult items are welcome and should intentionally be retained to avoid ceiling effects in further testing/interventional contexts (Martins et al., 2005; Stiver et al., 2021).

Rating tasks were inspected for biased responses and missing cases. Systematic/biased responses (i.e., extreme values[4], continued use of the same value across items/dimensions, or scale midpoint tendency) were rare (i.e., below 2.6% of outliers for each dimension). No data were excluded based on such criteria. No missing cases were observed for the rating tasks.

3.2. Item Norms

Normative data is summarized for each rated dimension, together with naming and categorization measures for the entire sample, by age and by category (see Table 3). All the stimuli and detailed norms per item are presented as Supplemental Materials (https://osf.io/g8w3c/?view_only=cd1a8da3c85346ffb99f66d82c5302e5). These norms include computed means, standard deviation, 95 CI% as well as the defined level of dimension expression (low, moderate, or high) based on the midpoint of the scale (see Prada et al., 2016,

[4]Outliers' inspection based on the criteria of ±2.5 standard deviation from the mean rating per item and across participants (see Garrido et al., 2017).

for similar procedures). Additionally, the modal name and target category for each picture are provided.

Firstly, we contrasted the mean results of each dimension/measure with the midpoint of their respective scales to provide an overall description of the entire dataset. The results indicated that the pictures were overall rated above the scale midpoint (i.e., 5.5) in all dimensions (see Table 3). Specifically, the items were rated as familiar, $t(79) = 12.32$, $p < .001$, $dz = 1.38$, 95% CI [1.07; 1.68], distinctive, $t(79) = 13.77$, $p < .001$, $dz = 1.54$, 95% CI [1.21; 1.86], famous, $t(79) = 13.37$, $p < .001$, $dz = 1.49$, 95% CI [1.17; 1.81], arousing, $t(79)= 8.34$, $p < .001$, $dz = .93$, 95% CI [.66; 1.19], and as having good representational quality, $t(79) = 24.06$, $p < .001$, $dz = 2.69$, 95% CI [2.21; 3.16].

The performance in all the psycholinguistic measures (see Table 3) was above 50% across age groups and categories. Specifically, the percentage of name agreement, $t(79) = 3.85$, $p < . 001$, $dz = .43$, 95% CI [.20; .65], name accuracy, t(79) = 5.30, $p < .001$, $dz = .59$, 95% CI [.35; .82], and category accuracy, $t(79) = 6.07$. $p < .001$, $dz = .68$, 95% CI [.43; .92], were all above chance. No celling effects were observed for both naming and category accuracy, and none of the tasks proved unfeasible. Moreover, the results indicated low variability in naming proper names (H-stats: $M = .22$, $SD = .05$).

Table 3.

Normative data for the entire sample, by age groups and by category

Dimension:		*NA%*	*H (NA)*	*NAcc%*	*CAcc %*	*FAM*	*FAME*	*DIST*	*AROU*	*RQ*
OVERALL (80 inputs)										
Entire Sample	*Min*	1.96	0.00	1.96	1.96	2.34	3.03	3.40	3.81	5.94
	Max	98.04	1.62	100.00	100.00	9.96	9.94	9.79	8.51	9.38
	M	**61.29**	**0.22**	**65.86**	**66.20**	**7.84**	**7.83**	**7.70**	**6.48**	**7.89**
	SD	2.93	0.05	2.99	2.67	0.19	0.17	0.16	0.12	0.10
	Skew	-0.50	2.02	-0.69	-0.62	-0.99	-0.71	-0.68	-0.39	-0.28
	Skew SD	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Kurtosis	-0.71	3.18	-0.52	-0.30	0.59	-0.03	-0.07	-0.58	-0.79

	Kurt SD	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
By Age Group (80 inputs)										
Younger adults	*Min*	0.00	0.00	0.00	2.00	2.36	3.11	3.36	3.77	5.55
	Max	98.04	1.35	100.00	100.00	9.95	9.93	9.71	8.43	9.25
	M	**58.26**	**0.20**	**62.25**	**64.17**	**7.76**	**7.67**	**7.56**	**6.17**	**7.60**
	SD	3.08	0.04	3.18	2.77	0.21	0.18	0.17	0.13	0.11
	Skew	-0.29	1.88	-0.44	-0.51	-0.84	-0.49	-0.50	-0.03	-0.23
	Skew SD	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Kurtosis	-0.98	2.41	-0.94	-0.55	0.12	-0.48	-0.50	-0.95	-0.92
	Kurt SD	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Older adults	*Min*	3.92	0.00	3.92	1.96	2.31	2.94	3.45	3.86	5.71
	Max	100.00	1.75	100.00	100.00	9.98	9.98	9.86	8.61	9.45
	M	**64.73**	**0.22**	**69.46**	**68.16**	**7.94**	**7.99**	**7.85**	**6.83**	**7.95**
	SD	3.03	0.05	3.07	2.72	0.19	0.18	0.16	0.12	0.10
	Skew	-0.67	2.10	-0.90	-0.67	-1.11	-0.92	-0.84	-0.74	-0.53
	Skew SD	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Kurtosis	-0.60	3.85	-0.29	-0.30	0.64	0.22	0.05	-0.01	-0.43
	Kurt SD	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
By Category (40 inputs)										
People	*Min*	1.96	0.00	0.00	1.96	2.31	2.94	3.36	3.77	5.55
	Max	97.06	0.99	100.00	100.00	9.98	9.98	9.76	8.45	9.45
	M	**59.98**	**0.06**	**61.47**	**71.25**	**7.46**	**7.64**	**7.41**	**6.31**	**7.55**
	SD	4.40	0.02	3.40	3.03	0.23	0.20	0.17	0.13	0.11
	Skew	-0.54	3.95	-0.51	-0.94	-0.73	-0.68	-0.56	-0.24	-0.10
	Skew SD	0.37	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Kurtosis	-0.65	16.53	-0.99	-0.04	-0.32	-0.31	-0.38	-0.68	-0.73
	Kurt SD	0.73	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Places	*Min*	9.80	0.00	9.80	13.73	4.18	4.53	4.39	4.18	5.66
	Max	98.04	1.75	100.00	94.12	9.84	9.94	9.86	8.61	9.25
	M	**62.60**	**0.36**	**70.25**	**61.08**	**8.24**	**8.03**	**7.99**	**6.69**	**8.00**
	SD	3.91	0.05	2.79	2.32	0.16	0.16	0.15	0.13	0.10
	Skew	-0.41	1.17	-0.70	-0.40	-0.90	-0.54	-0.69	-0.54	-0.69
	Skew SD	0.37	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Kurtosis	-0.89	0.26	-0.67	-0.72	-0.04	-0.79	-0.51	-0.76	-0.39
	Kurt SD	0.73	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53

Note: NA%: percentage of modal name agreement; H (NA): H-statistic of name agreement; NAcc%: percentage of name accuracy; CAcc%: percentage of categorization accuracy; FAM: familiarity; FAME: fame; DIST: distinctiveness; AROU: arousal; RQ: representational quality.

1

2 3.3. Norms by Age and Category

3 Age group and category effects were examined using separate repeated-measures
4 ANOVAS for each evaluative dimension and psycholinguistic measure.

5 *3.3.1. Evaluative dimensions*

6 Age differences were observed in all evaluative dimensions, except in familiarity,
7 $F(1,78) = 2.817$, $p = .326$. Specifically, aging was relevant for ratings of arousal, $F(1,78)=$
8 80.356, $p < .001$, $\eta^2_p = .507$, distinctiveness, $F(1,78) = 11.001$, $p = .001$, $\eta^2_p = .124$, fame,
9 $F(1,78) = 11.025$, $p = .001$, $\eta^2_p = .124$, and representational quality, $F(1,78) = 37.800$, $p < .001$,
10 $\eta^2_p = .124$. Bonferroni pairwise comparison showed that older participants evaluated proper
11 names pictures as more arousing, distinctive, famous and with higher representational quality
12 than younger participants (all p's $\leq .001$).

13 The main effect of category influenced the ratings of representational quality, $F(1,78) =$
14 4.815, $p = .031$, $\eta^2_p = .058$, and familiarity $F(1,78) = 4.433$, $p = .038$, $\eta^2_p = .054$. Specifically,
15 places were rated higher on familiarity and representational quality than people (p's $< .05$). The
16 ratings of fame, $F(1,78) = 1.251$, $p = .267$, distinctiveness, $F(1,78) = 3.422$, $p = .068$, and
17 arousal, $F(1,78) = 2.733$, $p = .102$, were not significantly different between the two categories.

18 All evaluative dimensions examined showed a marginal to significant age*category
19 effect (representational quality, $F(1,78) = 3.802$, $p = .055$, $\eta^2_p = .046$; familiarity, $F(1,78) =$
20 21.478, $p < .001$, $\eta^2_p = .216$; fame, $F(1,78) = 6.401$, $p = .013$, $\eta^2_p = .076$, distinctiveness, $F(1,78)$
21 $= 12.790$, $p = .001$, $\eta^2_p = .141$; and arousal, $F(1,78) = 31.205$, $p < .001$, $\eta^2_p = .286$). Subsequent
22 analysis using t-tests, and their detailed statistics are presented in Table 4. These analyses
23 indicated that people's pictures were rated as more familiar, famous, distinctive, arousing and
24 considered of better quality in representing their entities by older adults compared to younger
25 ones (all p's $\leq .001$). Ratings of places' pictures were influenced by age for familiarity, arousal,
26 and image representational quality (p's $\leq .001$). Places were considered more familiar by
27 younger adults, while arousal and representational quality ratings were higher in older ones.

28

Table 4.

T-tests between age groups for each category across all evaluative dimensions.

	PEOPLE						***PLACES***					
	Younger		Older		comparison statistics		Younger		Older		comparison statistics	
	M	*SD*	*M*	*SD*	*t(39)*	*Cohens' d 95% CI [Min-Max]*	*M*	*SD*	*M*	*SD*	*t(39)*	*Cohens' d 95% CI [Min-Max]*
FAM	7.11	2.01	7.80	1.99	-3.622***	-.701[.30; 1.10]	8.40	1.39	8.07	1.43	3.014**	.58[.17; .98]
FAME	7.36	1.75	7.92	1.75	-3.474***	-.67[.27; 1.07]	7.99	1.48	8.06	1.43	-.732	-.14[.00; .50]
DIST	7.11	1.53	7.71	1.55	-4.083***	-.79[.38;1.20]	8.00	1.36	7.98	1.38	.242	.05[-.33; .43]
AROU	5.77	.99	6.84	1.06	-8.737***	-1.69[1.14; 2.21]	6.57	1.22	6.82	1.07	-3.050**	-.59[.21; .98]
RQ	7.33	1.01	7.78	.92	-4.853***	-.93[.50; 1.36]	7.88	.90	8.12	.91	-3.807***	-.74[.33; 1.14]

Note. The statistics (t-test) are significant at *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

FAM: familiarity; FAME: fame; DIST: distinctiveness; AROU: arousal; RQ: representational quality.

3.3.2. Psycholinguistic measures

The results for psycholinguistic measures indicated a main effect of age group (younger vs. older adults) for modal name agreement, $F(1, 78) = 12.479$, $p = .001$, $\eta^2_p = .138$; name accuracy, $F(1, 78) = 16.678$, $p < .001$, $\eta^2_p = .176$; and category accuracy, $F(1, 78) = 9.712$, $p = .003$, $\eta^2_p = .111$, but not for H-statistic of naming, $F(1, 78) = .818$, $p = .369$. Bonferroni pairwise comparison indicated that older adults named and categorized this sample of proper names' pictures more accurately than younger adults (all p´s < .005), and presented higher agreement regarding the modal name ($p = .001$).

The main effect of category (people vs. places) on the psycholinguistic measures, of name agreement, $F(1,78) = .269$, $p = .605$, and name accuracy $F(1,78) = 2.180$, $p = .144$, was not significant. However, differences according to category types were significant in H-statistic, $F(1,78) = 13.929$, $p < .001$, $\eta^2_p = .152$, and marginal in category accuracy $F(1,78) = 3.756$, $p = .056$, $\eta^2_p = 046$. Places presented lower variability in naming than people although people were better categorized (p´s < .05). The interaction effect between age and category was not significant for the psycholinguistic measures (all p´s > .140).

3.4. Correlational analysis

The correlational results were obtained by Partial Pearson's correlations for the entire sample scores and controlled for the category factor influence. Considering the nature of most of the measures (i.e., semantic-sensitive) and to avoid interpretations of spurious correlations derived from the influence of other common co-variates (i.e., semantic knowledge), we only provide comments on strong correlations ($r \geq .70$; Hinkle et al., 2003). The detailed correlational results are presented in Table 5.

Table 5.

Partial Correlations (Pearson correlational scores) between variables independently of age groups and controlled for category effects.

	NA%	H(NA)	NAcc%	CAcc%	FAM	FAME	DIST	AROU	RQ
NA%									
H(NA)	-0.279								
NAcc%	0.925	0.066							
CAcc%	0.586***	0.047	0.631***						
FAM	**0.857****	0.054	**0.927****	**0.725****					
FAME	**0.844****	0.042	**0.912****	0.673***	**0.962****				
DIST	**0.844****	0.040	**0.919****	0.644***	**0.953****	**0.984****			
AROU	**0.744****	0.014	**0.809****	0.567***	**0.855****	**0.885****	**0.884****		
RQ	**0.803****	0.035	**0.880****	0.601***	**0.884****	**0.911****	**0.937****	**0.791****	

Note: The correlations are significant at *$p < .05$; **$p < .01$; ***$p < .001$. The signal (-) is reported for negative correlations. Results in **bold** refer to strong correlations at $r \geq .70$. NA%: percentage of modal name agreement; H (NA): H-statistic of name agreement; NAcc%: percentage of name accuracy; CAcc%: percentage of categorization accuracy; FAM: familiarity; FAME: fame; DIST: distinctiveness; AROU: arousal; RQ: representational quality.

Overall, name agreement and name accuracy were positively and strongly correlated with all rated dimensions (all *p's* < .001). Name agreement and the H-stats measures were negatively correlated (Bonin et al., 2008; Marful et al., 2018), but contrary to the expectations, the observed correlation was not significant. Category accuracy correlated significantly with familiarity in a strong and positive manner. Finally, the rated dimensions presented strong and positive correlations among themselves (all *p's* < .001).

4. Discussion

The current study presents systematic norms for 80 pictures of proper names culturally adapted for European Portuguese for the evaluative dimensions of arousal, fame, distinctiveness, familiarity, and representational quality. The psycholinguistic measures of name agreement, name accuracy, name variability, and category accuracy were also considered. Importantly, these norms also report the effects of age and category on the normed variables examined.

Item norms

Overall, the obtained results for the evaluative dimensions showed that pictures of well-known proper names' entities were rated as highly familiar, distinctive, and arousing. These results converge with previous norms for famous people's names (from pictures or written names) in which items were also considered familiar, highly distinctive, and arousing (photos - Bonin et al., 2008; Marful et al., 2018; generated names - Smith-Spark et al., 2006). The current findings are also consistent with previous norms obtained in the European Portuguese context in which pictures of famous faces were rated as highly distinctive, although the previously reported mean ratings of familiarity were below the scale midpoint (Lima et al., 2021). The difference between familiarity ratings observed in the current study and those reported by Lima et al. (2021) is likely due to our prior selection of items based on their relevance to the context. This procedure was also used by Bonin et al. (2008) and Smith-Spark et al. (2006), who also identified the significance of the personalities to the context (i.e., they used a prior naming generation task) before conducting the normative study. Likewise, they also reported high familiarity scores. Moreover, Lima et al. (2021) only presented famous people's pictures in black-and-white versions and in a higher number than in our study. Notably, our study indicates that familiarity ratings were lower for famous people than for famous places. Arousal ratings have not previously been obtained for pictures of famous people and places simultaneously. The current results indicate that these categories are equally arousing, confirming that arousal is a relevant dimension in stimuli that carry some uniqueness in their identity (see Garrido & Prada,

2017; Garrido et al., 2017; Marful et al., 2018; Prada et al., 2018). The current sample of pictures also presented good representational quality regarding the famous entities they intend to represent. Finally, because the pictures were from well-known entities, they were, as expected, rated highly in fame (see Rizzo et a., 2002).

The examination of psycholinguistic measures indicated that naming the pictures of proper names was a challenging but feasible task (around 65% of accuracy). Participants showed greater naming accuracy and good agreement regarding the modal name compared to previous normative studies using face stimuli only (Marful et al., 2018; Smith-Spark et al., 2006), likely motivated by differences in the analysis procedure and item diversity. Additionally, participants presented low variability in attributing a name (H-stats), a finding that is congruent with previously published celebrities' norms (Bonin et al., 2008). Prior European Portuguese norms of common objects (receiving a common noun) reported higher scores of name accuracy (92%) and name agreement (above 75%), and also more variability in naming (H-stats of 0.78) comparatively to our findings (Souza et al., 2021). Such comparison confirms that it is more challenging to name proper names than common names' items (see Brédart, 2017 for a review). Moreover, their identity nature seems to restrict the number of acceptable labels as reflected by their lower naming variability when compared to common objects. The performance in identifying the correct category was higher than 60%. However, the ability to categorize these items was also lower than what was observed for common objects (94% of accuracy) in previous norms obtained in the Portuguese context (Souza et al., 2021). This comparison further suggests that proper names refer to identity labels less susceptible of being associated with a class of items and confirms proper names as a specific lexical category (Brédart, 2017; Semenza, 2006; 2011).

Aging effect in evaluative dimensions

The effect of age on the rated dimensions indicated that familiarity was relatively immune to aging. This is a surprising finding since familiarity is likely to improve with aging, considering the significant influence of life experiences on this dimension (e.g., Yoon et al., 2004). However, age differences were observed in all the other evaluative dimensions.

Specifically, older participants rated the pictures as more arousing, famous, distinctive, and with higher representational quality than younger ones. Overall, these findings might be related to the fact that older participants were better at recognizing the pictures (as shown in higher name accuracy, category accuracy, and TOT states and in less DK and Errors). Prior studies already provided age-related norms for relevant dimensions, such as fame, familiarity, and distinctiveness (Rizzo et al., 2002; Smith-Spark et al., 2006). However, while these norms were obtained from samples with large age ranges, the authors did not report aging effects statistics. Our findings suggest that ratings in dimensions such as distinctiveness, fame, and arousal vary with aging and might be sensible to life experiences. Therefore, age seems relevant for processing proper names' items and should be examined in the production of proper names' norms.

Category effects in evaluative dimensions

The current norms showed category effects only for familiarity and representational quality, with places rated higher in these dimensions than people's pictures. Famous people and famous places are known to engage different specific brain structures (Gorno-Tempini & Price, 2001; Ross & Olson, 2012). These differences are probably motivated by the unicity and richness of their associated semantic knowledge (see Ross & Olson, 2012). Therefore, category effects observed in familiarity and representational quality are expected because these dimensions are highly influenced by a semantic component.

The interaction between category and age might provide further insights into these results. For instance, familiarity ratings presented an opposite age influence across categories. Older adults rated people's pictures as more familiar, while younger adults rated places as more familiar. The different exposure to knowledge about proper names along life might be important in explaining such differences. Previous studies showed that our prior experiences and interests, as well as how familiar the items are, influence our knowledge about proper names (Martins et al., 2005; Rosa et al., Semenza et al., 1998). Specifically, the familiarity dimension captures the likelihood of occurrence in daily-life experiences (see Snodgrass & Vanderwart, 1980). For instance, the difficulty younger participants presented comparatively to older adults in

recognizing peoples' items is likely related to their familiarity ratings. Because peoples' items included both recent and old characters, it is reasonable to assume that younger participants are less likely to have encountered such old items during their life. Places were better recognized by younger adults. In contrast with people items, places are less dependent on time period, thus being less susceptible to generational factors. Therefore, the increased recognition of people items seems to contribute to the appraisal of familiarity and also impact all the remaining dimensions (since they are correlated), particularly for older adults.

Together, these results suggest that the category effect plays a moderate role in assessing relevant dimensions that are influenced by age and likely by life experiences. Therefore, the influence of categories of proper names should be accounted for in future norms, at least when familiarity and representational image quality are examined.

Aging effect in psycholinguistic measures

The results observed for the psycholinguistic measures of proper names' pictures varied between age groups, as shown by significant differences for name agreement, name accuracy, and category accuracy measures. Although a decline in naming retrieval of proper names' items is expected with healthy aging (e.g., Evrard, 2002; Kavé & Yafé, 2014; Semenza, 2006), the current study showed that younger adults presented a worse performance than older ones. This interesting finding might have several explanations. First, aging effects in naming remain a controversial finding in the literature (e.g., Mina et al., 2010; Kavé & Yafé, 2014; Kavé et al., 2018; Rendell et al., 2005) that seems to be influenced by the methodology used (e.g., stimuli, instructions, response type, presentation time) as well as by the sample characteristics (see Gouler et al., 1994). For instance, a prior normative study conducted in the Italian context using famous proper name items (i.e., famous buildings) did not report significant aging effects in naming (Mina et al., 2010). Second, in the current study, the expected aging effect may have been masked by the specific characteristics of our older participants, who voluntarily applied to participate in an online study. This self-selection bias is likely to reflect an older sample with preserved capabilities (i.e., attentional resources, motor skills, executive functions, and learning facilities) as well as with an educational background and cultural profile comparable to the

younger sample. The referred profile of our aging sample might have contributed to attenuating the natural (neuro)cognitive decline expected with aging, given their likely enhanced level of cognitive reserve, that is, the product of life experiences such as education, occupation, and leisure in maintaining a healthy neurocognitive functioning (see Stern, 2012 for details). Although naming people has not been associated with cognitive reserve likely due to their arbitrary content (Mondine & Semenza, 2016; Montemurro et al., 2018), there are other proper names' categories somewhat semantically sustained, like Logo names, that seem to be better retrieved when participants have a high cognitive reserve (Montemurro et al., 2019). This might be, for example, the case of the names in our category of "monuments places". Therefore, since naming proper names stimuli might be sensitive to cognitive reserve, this variable should be addressed in future studies.

Moreover, the lower scores in naming and categorization observed in the younger group could have been tight with pictures of people, which included old and recent characters. Some of these characters presented a challenge to younger participants who are less likely to have been previously exposed to semantic knowledge about them. However, the advantage of older participants was not restricted to famous people items, suggesting that overall, cumulative knowledge across life might be favoring their performance. The ability to retrieve picture names seems to be influenced by crystallized abilities (i.e., dependent on acquired world knowledge, life experiences, and educational background) and fluid cognition (e.g., executive functions, motor abilities, attentional resources; see Catell, 1963; Carpenter et al., 1990; Elias & Saucer, 2006; Lezak et al., 2004 for further explanation). Crystalized competencies are expected to be preserved or even enhanced throughout the lifespan and might improve naming, while fluid abilities appear to decrease with aging impairing naming retrieval and other cognitive competencies (e.g., Hunt, 2010, p.367; Verhaeghen, 2003). Therefore, the advantage for older people in naming measures observed in the present study suggests the preservation of both crystallized but also fluid abilities. While the assumption of preserved crystallized abilities and a decline in fluid cognition with healthy aging seems to be the rule, future studies might directly examine these abilities, particularly in samples of older people. Alternatively, studies might also

include more heterogeneous samples in their educational background and cognitive competencies to examine further the impact of such variables in naming performance and picture appraisal. Finally, significant changes in naming performance are progressive and might only become more evident in healthy aging when participants reach older ages (likely above 70 years old; Martins et al., 2005) and memory decline is expected (see Nilsson et al., 1997; Rönnlund et al., 2003). In the earlier stages of aging (which comprises most of our older group), it is more difficult to observe such differences because they seem to be only visible in more sensitive measures, as latency times (see Verhaeghen & Poncelet, 2012). Moreover, it is even argued whether the expected age-related decline is restricted to specific types of accuracy measures (see James, 2006). Further studies including different measures are still required for inspecting aging effects in naming pictures of proper names.

Category effects in psycholinguistic measures

The category factor influenced the variability of naming (H-stats) and categorization accuracy that were both higher for people's pictures. Previous work has already shown that people items are faster to categorize and that it is easier to identify prior knowledge associated with people than with places (Fairhall et al., 2014). This availability of associations between famous people items and previous semantic information may also explain the increased variability in the number of valid attributed names for this category. Naming variability (H-stats) is influenced by both semantic attributes of conceptual diversity and frequency (see Brodeur et al., 2014; Snodgrass & Vanderwart, 1980). In contrast, the processing of places' items seems to be more contextual-dependent and requires less semantic activation than the processing of famous people's items (see Engst et al., 2006; Gorno-Tempini & Price, 2001). Our findings also indicate that naming accuracy and modal name were not affected by the category of proper names, with well-known places being named as easily as famous people. Previous studies present conflicting findings regarding naming across categories of proper names (e.g., Benke et al., 2013; Engst et al., 2006) that seem to be tied to the specific stimuli used in each category. It could be expected that naming people would be easier than naming

places (see Engst et al., 2006). However, these results suggest that our sample of people and places items is balanced in the naming challenges they pose to the participants.

Overall, albeit sharing identity-based features, our stimuli still present some relevant differences across categories that likely derive from their respective associated semantic knowledge. The results of the interaction between category and age did not indicate any statistically significant differences in naming abilities or categorization. Category effects in psycholinguistic measures presented a similar trend for younger and older participants, probably due to the similarities in socio-cultural profiles and educational background across age groups. This pattern seems to suggest the dependence of these measures on prior accumulated knowledge (see also Kavé & Yafé, 2014; Rizzo et al., 2002).

Correlational analysis

The correlational results showed that name agreement and name accuracy were positive and strongly correlated with all rated dimensions (see Bonin et al., 2008; Lima et al., 2021; Marful et al., 2018 for similar results, except for arousal). As more distinctive and familiar a picture of a proper name is, the more accurately it will be named (Bonin et al., 2008). Distinctiveness is a relevant dimension in naming proper names, influencing name accuracy and familiarity in previous normative datasets of famous people (Bonin et al., 2008; Lima et al., 2021; Marful et al., 2018). Previous studies exploring the relationship between arousal and fame and naming measures are practically absent, particularly in the Portuguese context. The positive correlations observed between fame and naming and arousal and naming suggest the need to use culturally adapted items to avoid insensitive measures that might be particularly critical for clinical purposes. Notably, all rated dimensions were correlated. Of greater interest for famous items, the dimension of fame was positively and strongly correlated with arousal, familiarity, and distinctiveness. Although circumscribed to the cultural experiences and time period, the fame dimension is relevant for confirming the actual status of the widespread knowledge regarding each item (Rizzo et al., 2002; Smith-Spark et al., 2006). Contrary to previous findings reporting negative and weak correlations between arousal and distinctiveness in a sample of Spanish speakers (Marful et al., 2018), the present study indicated a positive and strong

relationship between those dimensions. Such conflicting findings may reflect differences in the variety of categories and subcategories of proper names since Marful et al. (2018) explored a higher range of subcategories of personalities and did not examine places' items.

4.1. Conclusion

Proper names are distinguishable categories based on their identity content that are also influenced by their associated semantic knowledge (Brédart, 2017; Kavé & Yafé, 2014; Marful et al., 2013), and constitute a relevant class of stimuli for psycholinguistic and neurocognitive research and intervention. The present study presents norms for proper names in five relevant dimensions and naming measures by age group and category. Overall, the results showed that age influenced almost all variables, emphasizing its importance in proper names' normalization. Moreover, while the performance in naming was similar across people and places, differences across categories were found in categorization, naming variability, and two evaluative dimensions.

One of the advantages of the current work rests on the inclusion of places items and the systematic examination of category differences in proper names. The use of places pictures may enhance the temporal suitability of this dataset and expand the types of pictures available for researchers and practitioners. Moreover, our results might help reconcile disparate findings in the literature examining the differences in person and topographical identity items. One important drawback of such a stimuli database is its limited generalization potential since the stimuli should be culturally and temporally relevant (Lima et al., 2021; Marful et al., 2018). However, including items from both categories distributed in international and national contexts and different time periods may allow some cultural comparisons. Overall, the current norms constitute a useful manipulable database of well-characterized pictures of proper names from various subcategories and degrees of difficulty normed in several relevant variables that allows a controlled and systematic selection of stimuli in future research and intervention endeavors with different age groups.

Declarations

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Conflict of interest The funders had no role in study design, data collection, analysis, or manuscript preparation.

Ethics approval The present study was approved by the Ethics Board of the host institution (ref. 01/2018).

Consent to participate and for publication Participants gave their informed consent for participation and publication of the results before participating in the study.

Open practice statements The present study was not pre-registered in an open-source database. The stimuli and main data are available online at the Open Science Framework, link <https://osf.io/g8w3c/?view_only=cd1a8da3c85346ffb99f66d82c5302e5 >.

Authors' contributions All authors contributed equally to designing the study, the procedures, and drafting the manuscript.

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