From Black-and-White to Color: Effects of Lexical Access on Semantic Domains

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Background: Picture naming is the most commonly used task to assess different cognitive processes, including lexical access and semantic processing [1]. Traditionally, black-and-white line drawings have been widely used to assess visual and lexical processing [2]. More recent research, however, has pointed to stimulus format as an influential factor in picture recognition [3–8]. Moreover, it has found that the use of either drawings or photos differentially influences the recognition of living things (LTs) and non-living things (NLTs). However, other studies have not been able to find differences across formats [7–10].

Purpose: This study aimed to assess whether the visual format of pictorial stimuli affects performance in an oral naming task, particularly across semantic domains: LTs and NLTs.

Methods: 56 Spanish-speaking adults were randomly divided into two material groups: (i) colored drawings and (ii) photos. The two groups were matched in gender, age ($t(27)=.447$; $p=.658$) and years of education ($t(27)=.167$; $p=.869$). Stimuli consisted of 140 photographs or drawings. The same 140 concepts were shown using colored drawings [11] and photographs [12]. Half the stimuli depicted LTs and the other half represented NLTs. Both tasks were designed and administered using DMDX program [13]. The answers were analyzed using Check Vocal program [14]. Accuracy and reaction times were analyzed using generalized and linear mixed-effects models, respectively, with random intercepts for participants and items.

Results: No significant differences in accuracy were found either between formats ($\chi^2(1)= 3.07$, $p= .080$) or semantic domains ($\chi^2(1)= 0.55$, $p= .458$). However, participants named photographs significantly faster than drawings ($F(1,7328)= 15.829$, $p< .001$). Although NLTs were named faster than LTs, the difference did not reach statistical significance ($F(1,137)= 1.855$, $p= .066$). While both formats yielded comparable accuracy, photographs facilitated faster lexical access, likely due to their higher visual iconicity.

Discussion and Conclusions: These findings have some practical implications. In educational and clinical practices, pictorial stimuli are frequently used to assess lexical access or semantic processing, so the visual format can affect recognition and processing speed [8]. Therefore, photographs may produce advantages when efficiency is essential, such as in reaction time assessments or interventions that target processing speed [15]. While drawings are prototypes and simple representations of concepts, photographs are considered a more ecological format because they are a realistic representations which capture more surface attributes [8].

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