3D-GRAPHIC ICONICITY'S DEPICTING VERBS AND PREPOSITIONS: EXPEDIENCY ON PHOTOGRAPH, NAME PREARRANGEMENT, AND APPROBATION IN ADULT PEDAGOGICS

BY

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Abstract

The expediency of 3D-graphic on photographs, name prearrangement, and approbation of graphic iconicity's for verbs and prepositions were appraised in an introductory adult pedagogy of 3 age groups. A mixed-group design was used, in each age group, quasi of the adults were randomly allotted to 1 of 2 orders of iconicity formats. The 52 adults were asked to guess the connotation of the iconicity's and approbated a target iconicity among thwarts given the spoken tag. 3D-graphics iconicity's were more transparent than static iconicity's while this was more apparent for verbs. But there was no difference between 3D-graphics and static prepositions. Verbs were approbated more accurately compared with prepositions, but there was no difference between iconicity formats. Older adults guessed name, and approbates iconicity's more expeditive than younger adults. 3D-graphic augments photographs and name prearrangement, specifically for verbs, which reduces the didactic burden that emanates with nontransparent (photographs) iconicity's. 3D-graphics does not enhance approbation accuracy. An evolving expediency was experiential for each measure. Limitations and inferences were underscored**.**

Keywords: 3D-graphics, enhancive communication, adults, graphic iconicity's

Introduction

3D-graphic iconicity's are a low-tech stipulation for most aided augmentative and alternative communication (AAC) systems unrelatedly of whether such systems are low-tech nonelectronic or microelectronic, with the franchise of systems that are utterly textualized based (Lloyd, Fuller, & Arvidson 1997; Beukelman & Mirenda, 2006). Persons who use graphic icons-based AAC systems rely on the graphic mode for expressive purposes by pointing to, bestowal, as well as for skimming to the pertinent iconicity (symbol), as well for approachable purposes when communication partner provide augment participation**.** Outstandingly, there are some graphic icons from some sets which are easier to speculation and learn when representing the word class nouns relative to other parts of speech such as verbs, adjective, and prepositions (Mizuko, 1987; Schlosser & Sigafoos, 2002). The mainstream of erudition involving 3D-graphic-iconicity's in AAC has concerned itself with graphic iconicity's representing nouns, and concomitantly little contemplation has been paid to other parts of speech, such as verbs and prepositions (Schlosser & Sigafoos, 2002).

3D-graphic Iconicity's Aptitudes

Actions (e.g., jump) are innately dynamic; they involve kinetics, and this may be predominantly challenging to represent through static (iconicity's) means. Because 3D-graphic visualize chronological change, they are deemed to be particularly well suited to convey information that is inherently dynamic (Betrancourt & Chassot, 2008; Otobo & Thukur, 2021). 3D-graphics has been defined as "any applicable task which generates a series of sequential frames, so that each frame appears as an interchange of previous one, and where the sequence of the frames is determined either by the illustrator, designer or user" (Betrancourt & Tversky, 2008). User-manipulated 3D-graphics may be relevance in AAC as well because they permit the user to control over various facets of the motion-graphics. For paradigm**,** the user may adopt on when and for how long to play an animatronics (motion-graphics), whether to

interrupt an animatronics, or whether to replay it. For the purpose of this study, nevertheless, the characterization of 3D-graphic, to interrupt an animatronic will be inadequate to those that are manipulated only by the illustrator or originator**.** That is, the go-betweens decided on the speed of the animatronic (motion-graphic), length of exposure to the motion-graphic, and that the motion-graphic would not be interrupted**.**

Deliberating the cognitive supporting of movement perception relative to AAC, Otobo & Palnam, (2021); Jagarroo & Wilkinson, (2008) distinguished that movement can be used to enhance iconicity meaning by enhancing the transparency (photograph) of an icon, and specifically concomitant to verbs, to cue word-class category: "For paradigm, the action of sitting might be prompted by the movement of the figure as it sits down on the chair, in disparity to a static iconicity that might refer to the chair itself". If 3D-graphic iconicity's becomes more translucent (Otobo & Palnam, 2021; Mirenda & Locke, 1989), then the iconicity-referent relation does not need to be imparted. Henceforth, it would be imperative to know whether animatronic facilitates (photographs) transparency. Yet, erudition to that end with graphic AAC iconicity's is currently not available. This not surprising given that motion-graphic iconicity's have been available since the early 1990s, when Sentient Systems Technology introduced DynaSyms with animatronic of their verb iconicity's (Zangari, Lloyd, & Vicker, 1994). Postmodernist advancement (technology) in computer technology have made it possible to display such motion-graphics with much smoother movements than previously possible (Shane & Weiss-Kapp, 2007). Accordingly, learnedness on the expediency of motion-graphics in AAC is belated.

Three-dimensional preposition (e.g**.,** ***in***) linking a location relative to a locus point, or they may be directional as they involve a transition from one state in another (e.g., ***off***). In conferring the budding benefit of motion-graphics for AAC, Jagaroo and Wilkinson (2008) claimed that 3D-graphic can highlight the relationship between objects. This is very applicable to the processing of three-dimensional propositions, which are difficult to understand without "reading" the relation of the various graphic basics. Similar to verbs, prepositions may be difficult to convey through a static graphic. For paradigm, in order to understand the meaning of a jam-packed circle in between two bars (e.g., represents ***betwee****n*), an adult ("Three RRR pedagogy") would have to infer that it is the jam-packed circle relative to the two bars that is relevant and not the other way around. If on the other hand, at the beginning of a motion-graphic, the circle was outside the two bars and then progressively move between the stopping right in the middle, this tree-dimensional relation might be conveyed more efficaciously. Accordingly, it is conceivable that 3D-graphics might also help convey the meaning of graphic representations for prepositions by enhancing their photographs (transparency). At this assessment, it is unclear whether motion-graphics lend themselves to enhancing the transparency of verbs or prepositions. It would seem that for verbs, movement may need to appeal to higher order cognitive processes in order to detect three-dimensional relations.

Alternative way to appraise the hypothetically positive expediency of motion-graphics is to study whether animatronic iconicity's enhance name prearrangement. Designation (Name) prearrangement is a variable that initiates from cognitive psychology (Snodgrass & Vanderwart, 1980). It is closely related to transparency but is somewhat more demanding. With transparency (photographs) participants are often given credit when they say a word that is an approbated synonym of the target referent (e.g**.,** ***hop*** for ***jump***). In order to be measured correct for name prearrangement, however, participants have to speculation the exact word referent or a slight variation (e.g**.,** ***singing*** for ***sing***) envisioned for the icon. Hence, it would be thought-provoking to determine whether animatronic contributes not only to transparency but also to designation arrangement. A third means of appraising the expediency of 3D-graphic is to study whether motion-graphic iconicity's led to better approbation accuracy compared with static iconicity's. The approbation task encompasses the presentation of an array of iconicity's for which the adult ("Three RRR pedagogy") is asked to endorses the target icon when presented with the spoken referent. This task has a long tradition in AAC motion-graphic iconicity's (Miuzko, 1987; Mizuko & Reiechle,198; Musselwhite & Ruscello, 1984; graphic iconicity's (Otobo & Aruku, 2022). Disparate transparency (photographs) and designation prearrangement (names), in which adult ('Three RRR pedagogy") has to supposition an iconicity's meaning, the approbation task shows Schlosser & Lloyd, 1997) and only recent application with mnemonic whether the adult can see a relation between a spoken word and a graphic icon. Consequently, this task involves language

that the adult has associate with the correct graphic icon. Hence, approbation adds a different dimension to the study of motion-graphics. Also, the approbation task has sizable environmental validity because persons using AAC in real life may know what to communicate and have to recognize and locate the appropriate iconicity that capture their intent from an array of iconicity's on display.

Proposition for 3D-graphic

Learned evidence on facilitative expediency of motion-graphics across a variety of instructional fields (e.g., teaching biotic philosophies etc.). Tversky, Morrison, & Betrancourt (2002) posit their narratives review by saying that motion-graphics is not a panacea but may be effective provided that the motion-graphic are neither too complex nor too fast to be perceived accurately. More recently, erudite Hoffler & Leutner, (2007); Otobo & Palnam, (2021) steered a methodical review and meta-analysis on the expediencies of motion-graphics relative to static pictures in instructional situations. They noted that although many studies included in their review did not find a noteworthy advantage of motion-graphic over static pictures, motion-graphics did produce an overall mean weighted effect size of d=0.38 and a9% confidence interval (CI) of [0.25, 0.48]. When appraised only motion-graphics that play a representational role (akin they would in AAC), the effect size was even slightly higher (d=0.40, 95% CI [0. 26, 0.53] It is motivating to note that motion-graphics with lower level of realism did not required result in smaller effect size than static pictures. Hoffler & Leutner (2007); Otobo & Palnam (2021) regarded their findings as unswerving with the Tversky et al. (2002) prerogative that "motion-graphics should lean towards the schematic and away from the realistic" so that learners are able to focus on the quintessence's contents of the motion-graphic. Whether or not this verdict is generalizable to motion-graphic iconicity's used in AAC remains to be seen.

Proposition for 3D-graphic in ACC

In AAC, query into the expediencies of motion-graphic is in its infancy, as observed by erudite Jagaroo & Wilkinson (2008). Thus, it is not startling that there were no AAC studies acknowledged by Hoffer & Leutner (2007) and Tversky et al. (2002) in their corresponding reviews. There is, however, recent study in AAC available, although not with adult learners (three RRR pedagogy) but in which typically developing preschoolers were asked to identify actions from a four-choice arrangement using two kinds of motion-graphics formats and two kinds of static formats (Mineo et al.2008). motion-graphic formats included audiovisual as well as silhouette (line-drawings). Static formats included silhouette with dis-equilibrium cues aim and line-drawings with movement cues**.** ***Disequilibrium cues*** aim to convey a state of unsteadiness by displaying a position that could not continue to be sustained in the three-dimensional world. Movement cues aim to underscore what part of the icon is moving. Concomitant to our curiosity in the expediency of motion-graphic iconicity's, results indicated that motion-graphic silhouette (line drawings) were more effective than static line drawings with disequilibrium cues. Given the nature of the silhouettes used in Mineo et al. (2008), there is a need to appraise the expediency of motion-graphic on endorsement of more colorful graphic iconicity's that have been developed for AAC exploit. The fact that an animatronic expediency was found for rather white on black line drawings that were explicitly designed for their exploration study augurs well for examining the expediency of motion-graphic in other graphic iconicity sets used in AAC rehearsal.

Quite a lot of graphic iconicity sets bid motion-graphic icon formats, including DynaSyms, the Library of International Pictures Symbols LIPS; Assistive Technology Engineering Lab, 2005, Picture Communication Symbols PCS (Mayer-Johnson, 2008). This sets were unambiguously designed to be alluring to children and uses colorful motion-graphic with more detail than the line drawings used in Mineo et al. (2008). An imperative subject related to the advantage of animatronics is the chronological age of children cum adults (disabilities or impairment) exposed to the iconicity's. Romski, Seveik, and Adamson (1997) conferred to age and disability as one intrinsic influence that may relate to language representational abilities of the cited persons. Study connecting children with or without disabilities has verified that picture understanding and used is an assimilated skill that develops over time and with experience (Ainsworth, 2006; Callaghan, 2ooo; Dixon, 1981; Troseth, 2003). None of this work, however, has premeditated this subject with graphic iconicity's that were animatronic. In what seems to be the only study on

this issue, Mineo et al. (2008) uncovered a developmental effect whereby children and adult's beginner's ("three RRR pedagogy') iconicity identifications become more precise across animatronic and static forms as they got older pedagogically or age wise. It would be interesting to determine whether this developmental effect is generalizable to other graphic iconicity's sets.

In sum, there is a necessity to studious learnedness on the expediencies of motion-graphics with graphic AAC iconicity's that are designed for concrete use by adult educates beginners ("three RRR pedagogy") in prerequisite of AAC, and to do so across word classes and across age categories in terms of measures that are critical to iconicity meaning .Hence, the purpose of this study was to reveal whether motion-graphics (Autism Language Program ALP graphics in comparison with static ALP graphics facilities the slides (transparency) , designation arrangement (names), and endorsement of verbs and prepositions in typically developing "three RRR pedagogy" across three classes of age groups. Specifically, the study aimed to answer the following research questions: (a) What is the effect of iconicity format (motion-graphics, static) on percent correct slides (transparency), designation prearrangement (names) and approbation? (b) What is the effect of word class (verbs, prepositions) on percent correct transparency, designation arrangement, and endorsement? (c) What is the effect of chorological age grouping (20-25) years, 30-35 years 40 years of age) on percent correct transparent, designation (names) prearrangement, and approbation?

Methodology

We press-ganged 16 twenty to twenty-five-year-old, 18 thirty to thirty-five years-old, and 18 fourth years-old. An adult was classified as 20-25 years old if he or she had that chronological age. An adult was classified as 30-35-year-olds if the age was between that range and an adult was measured 40 years old if is about fourth. Use of this age grouping definition allowable the creation of nearly equal groups in terms of *n* while guaranteeing that each age group was spread over the range of 4years that was deemed abstractly appropriate for that age. The mean age 20-25-year-olds- was 41.56 (*SD*=3.18). The mean age 30-35-year-olds 52.23 (*SD*=3.10), and the mean age of the 40-year-olds was 61.73 (*SD*=3.99). Of the participants, 23 were women, and 29 were men. For the breakdown of demographic information by age grouping, consult Table 1. The adult was recruited from three different adult education centers in a metropolitan area in the Northeast Nigeria.
To be in the running for inclusion, adults meet the following criteria: (a) chronological age of 20-25, 30-35, or 40years (grounded on the center's records) notwithstanding of gender, culture, or socioeconomic status; (b) vernaculars or English spoken at home (based on teacher response as necessary); (c) no uncorrected visual or hearing difficulties (based on the center's records); (d) age-appropriate receptive lexis (determined by *<1SD* below the mean on Receptive One-Word Picture Terminology Test (Brownell, 2000); and receptive or easy-to-read knowledge of verbs and prepositions used in the experiment (based on a screening task below). Grounded on a prior effect size (d=0.75) for slides (transparencies) and endorsement in the sample, a power check conducted with the SAS micro program (Mizuko, 1989; Michael, 2010) uncovered that in each of the three age groups would generate above .8 power to main expediency and interactions.

Table 1. Demographic data for participants across age groupings.

	20-25 years			30-35- Years			40 Years		
Linar age (in months)	41.56	3.8	36–46	52.23	3.1	47–57	61.73	3.99	58–68
ROWPVT (raw score)	50.93	9.8	32–69	61.11	11.1	42–78	67.72	8.75	52–85
Gender		N/N/A			N/A	N/A		N/A	N/A
Female	10			8			5		

Male	6	10	13

Note.ROWPVT = Receptive One-Word Picture Vocabulary Test; N/A

Experimenters' setting

The study was carried out in the pedagogical cycle in the respective adult education centers. The classrooms were accessible to the facilitators of the center at any time. Trained undergraduate and graduate students in linguistics served as experimenters or trustworthiness observers.

Materials

Verbs and preposition. A total of 24 verbs, generated from a list of 50 verbs that were found to occur early in youngsters' reference book (Huttenlocher, Smiley, & Charney, 1983), were counted in the experiment. In option the 24 verbs, the following limits were applied: (a) the verb had to be represented in the ALP (Autism Language Program) Animated Graphics Sets; and (b) minimal pairs be made up of the same verbs that can be transitive (I.e., take direct object; displays action upon someone or something) or intransitive (I. e., takes no direct object; needs only a subject to make a sentence) were circumvented by selecting only one of the two kinds of verbs. Paradigms of these are *tune* and *bounce*, which can be either transitive or intransitive. Hereafter, we counted in the only one of these states. The 24 verbs that were chosen were as follows; ***blown, bounce, close, cover, cut, dance, drop, eat, fall, drawn, give, jump, kick, lie dawn, pull, push, lift, ride, run, sing, take, throne, turn around, walk***, and ***wave***. Two further prepositions were used during the drilling pilot-tests (***i.e., hug, climb***). In addition to verbs, the following eight three-dimensional prepositions were included in the experiment: Two additional prepositions were used during the habituation (pilot) period (i.e., above, under). These prepositions were selected because they are stereotypically in the repertoire of naturally developing primary pupils (Tumasello, 1987; Washington & Naremore, 1978; Azake, 1998).

Graphic iconicity's. Graphic iconicity's representing the above verbs and prepositions were selected from the ALP Animated Graphics set, were moderately redesigned for communication enhancement by an iconographer (graphics section) in University Maiduguri. This set, explicitly developed for persons with autism, consists of 104 graphic iconicity's for activities, 10 iconicity's for prepositions, and few signifiers. To create the iconicity set that homogeny the portrayal of verbs, prepositions, and signifiers, six design goals were followed. First, a generic attractiveness, "Super" was always the agent that acted out each concept, always in full body view. Supper was an adolescence-like character, joyful, outfitted simply, and with no rare topographies. Second, a generic object, "Drop" appeared whenever a concept portrayal also required an object. The Drop had an amorphous shape and an intermingling color and texture. Outstandingly, the Drop could change its shape and take on critical topographies needed to illustrate the concepts. Third, whenever the Drop changed into an object-like shape, it took on only the indispensable topographies needed to illustrate some concept but was not decidedly articulated that it looked like a realistic, tangible object. The goal was to portray the general nature of the concept, not a concrete paradigm (e.g., capture the act eating, not eating a specific cookies or snack). Fourth, activities and actions selected to illustrate the concepts were chosen based on the prospect that they would be highly accustomed to "three RRR pedagogy" adults. Fifth, no additional figurative conventions were applied to try to convey the concept (e.g., no arrows or wave lines to indicate direction or movement). Lastly, all motion-graphics open leisurely and effortlessly. In addition to the core components of "Super" and "Drop", sometimes an additional character or Drop was needed to illustrate a concept. For paradigm, a second character "Pal," was introduced for social concepts (e.g**.,** ***give, wave, take***). Similarly, a second Drop was introduced when multiple objects were needed to illustrate a concept (e.g., ***cut***). For a sample iconicity for verb and preposition, using a sequence of still frames to illustrate the motion-graphic check Figure 1 and 2, respectively.

Figure 1. A sequence of still frames of motion-graphic verb ***throw***

Figure 2. A sequence of still frame of motion-graphic prepositions ***on***

A motion-graphic and static visual were selected/developed for each verb referent and each preposition. Reliable with the procedures used by Mineo et al. (2008), the motion-graphics were selected first, and static visuals were resultant subsequently from the motion-graphics iconicity's. To do so, three members espousal two senior iconographers (graphic section) and a senior Nero-aesthetics (hemiphractids) research team of University of Maiduguri developed a consensus on the single frame of the motion-graphic iconicity that best conveyed the essence of the target movement. This becomes the static presentation. This procedure resulted in the two conditions being equated except for movement present in the animatronic condition (Tversky et al., 2002, posit that many animatronics academics providing additional information in one of the circumstances, making it difficult to attribute any modifications solely to the animatronics).

Hardware and software. A desktop computer display, Intel Core 2 Due processor, and 2-GHz processor speed was used to present the task. The undertaking was accomplished using Microsoft PowerPoint, along with the voice of one the male co-authors recorded in digitalized format. This allowed for consistent instruction, as well as dependable timing of the exposure to each iconicity and inter- trials (ITs), in so doing abating variation owing to human changeability and increasing procedural reliability. The order of verbs and prepositions was randomized once for each task and set aside unswerving across iconicity formats and participants. For endorsement task, the verbs iconicity's were presented in four sperate blocks of six verbs so that the "three RRR pedagogy" adults could take transitory breaks after each block.

The approbation task, the "three RRR pedagogy" adults used the screen on the computer as replicated touch screen by pointing to the iconicity's. The first test block for both verbs and prepositions began with a pilot-trial involving two verbs and two prepositions that were not included in the experiment apposite. Each photograph (transparency) with an iconicity or iconicity's was preceded by blue screen along with the recorded digitized instruction, "Get set, watch the screen" or "Here comes the nest one." The iconicity display in the transparency task was accompanied by recorded question, "What's this?" In the transparency task, the iconicity's in either condition (motion-graphic, static-visual were displayed for 10 seconds before the red photograph give the impression (to show that pilot for this display was over). Throughout the ten seconds, the motion-graphic iconicity's entwined several times, with the number of circles varying needful on the duration of one cycle. Three-second ITIs were built in between iconicity slides. The iconicity display in the approbation task was accompanied by the recorded instruction, "point to

designation ("name of verbs/prepositions.") This instruction was repeated once, twice after the previous instruction. The iconicity's in either condition was displayed for twenty seconds before the screen turned red. During the twenty seconds, the motion-graphic iconicity's entwined several times, with the number of circles varying depending on the duration of one cycle. The rejoinder time was kept longer for approbation task concomitant with the number the transparency task in order to accommodate the increased task difficulty of having to scan an arrangement of four iconicity's. Three-second ITIs were built in between iconicity slides.

Procedure for Screening

Each ("three RRR pedagogy") adult were piloted with the lexical items selected for the experiment was tested through a dual procedure. First, the experimenter accomplished each action (or preposition) involving a prop (necessary), and the adult was asked to label the action ("what am I doing") or preposition ("Where is the-----[name of object/person?"]). No curative or helpful feedback was provided. The instructor only offered sporadic, generic annotation to endure participation ("keep the good work"). Second, the experimenter named each action and preposition and queried the 'adult' to validate the preposition or action. For what's more procedure, the arrangement of presentation was randomized after. In order to validate receptive and/or easy-to-read knowledge of the verbs and prepositions.

Adaptation with Tasks

Adaptation trials (piloting) were conducted prior to each experimental task with each word class and with iconicity format. This permitted the 'adults' to get consociate with the task before the experiment accurately. Adults ("three RRR pedagogy") were seated independently in front of the computer, with the instructor seating next to the adult. The adults were presented with two rehearsal items each, one at a time in each condition. For the transparency (photographs) task, the instructor said "----- [adult's name], let's play a dead reckoning game on the computer. You'll see a picture on the computer and the computer will ask you to guess it." Then, the instructor said, "First I am going to show you how to play the game" while proceeding to blue screen. The instructor notified the adult to "Listen to the computer-it will tell you when to make a guess." After the computerized query "what's this?" the adult was expected to make a guess. Correct responses by the adult were acknowledge ("yes, this is-----"), and incorrect responses were corrected ("No, this is-------"). The experimenter also memo that the adult had to make a guess before the red screen appeared. The instructor asked whether the participants were to hear the digitized voice and adjusted the volume as needed. After the second word, the experimenter asked "Do you understand how to play the game?" If the adult responded in the assenting, this was well-thought-out verified understanding. If the adult said "no," the adaptation trial was recurrent pending the adult indicated that the task was subjective. For the endorsement task, adaptation was done in the same vein, exclusive of the experimenter also modeled the correct pointing response if the adult pointed to the incorrect iconicity.

Experimental Tasks

Quasi of the participants in each categorized group acknowledged one order of iconicity format (e.g., static followed by motion-graphic iconicity), and the other half of participants received the inverted order (e.g., motion-graphic followed by static iconicity). As soon as the presentation order for iconicity format was gritty, and respective adaptation trial was completed, the verb transparency (slide) task was instigated for the first iconicity format. Subsequently, the same categorization was followed with the prepositions. Succeeding, the endorsement task was instigated for the first iconicity format (e.g., static), followed the same sequence of events. On a discrete day, the same categorization of events was carried out for the second iconicity format (motion-graphics). The procedures for both experimental tasks are clarified next.

Transparency (photograph) task. Origination with verbs, the adults were presented with one graphic iconicity at a time. Dependent on the sequence assigned, a precipitant may have first acknowledged all static iconicity's or all

motion-graphic iconicity's. The instructor recapped the adult that this task worked just like the adaptation task. Once the blue slide appeared on the next slide for four second, the instructor said "Listen to the computer; it will tell you when to make a guess." Then, the iconicity appeared on the next (fourteen second), and after a one-second delay, a recorded digitized voice asked the adult "what is this?" The adult was anticipated to make a guess before the red slide appeared on the PowerPoint. A three-second ITI was built into the slide presentation before the next blue slide and iconicity appeared. The instructor provided no corrective or confirmatory feedback, only sporadic, generic feedback to sustain enthusiasm and participation ("you are doing fine"). The adults received a five-minute break earlier they received the transparency task with propositions.

Approbation task. On a separate day, the endorsement task began, first with verbs, then prepositions. Yet again, depending on the assigned order of presentation, the adult may have first received all static iconicity's or all motion-graphic iconicity's. In this task, the adult was presented with four graphic iconicity's at a time, one target iconicity and three outmaneuvers from the testing pool of motion-graphic iconicity's or static iconicity's, respectively. The instructions were analogous to the transparency task except for the required procedural variations concomitant to the task involving pointing rather than guessing. For paradigm, for the first photograph (transparency) the instructor said, "Listen to the computer: it will tell you to which picture (iconicity) to point." and the recorded digitized voice instructed the (three RRR pedagogy) adult "Point to---- [name of verb/preposition]." The adult was expected to point to an iconicity before the red slide appeared on the PowerPoint (e.g., twenty second after the computer-delivered instructional swift)

Dependent Variables, Measures, and Entomb-viewer arrangement

Dependent variables comprised (a) transparency (photographs), (b) name prearrangement (designation) and (c) approbation. The variables transparency, name prearrangement was consequential from the transparency task**.** ***Transparency*** conferred to the dexterity of the participant to guess the meaning of the iconicity when presented with one iconicity at a time. For transparency, a response was considered correct if the 'adult's' tag matched to the exact tag reserved for the iconicity by the research team, a different form of the same tag (e.g**.,** ***climbing*** for ***clim****b*), or an acceptable synonym (e.g**.,** ***h*op** for ***jump***) after the computer-delivered swift (e.g., "what's this?"), and before the red slide appeared on PowerPoint (e.g., fourteen-second after computer-delivered swift). If the adult produced a phrase or lexical structure that contained the target verb/preposition in its acceptable forms branded above (e.g., "The boy is ***jumping*** over the wood"), the response was counted as correct as well. This verdict was deemed appropriate because our instructions did not specify that we were in quest of only one-word responses. A response was measured incorrect if the necessities for a correct response were not met. Based on the number of correctly guessed iconicity's, a fraction of transparent iconicity's was consequential by dividing the number of iconicity's multiplied by 100.
Designation prearrangement (name) creates a firmer measure than transparency. At this juncture, in order for a response to be counted correct, the adult had to tag the exact word referent (e.g., ***sing***), proposal an accepted variation of the same word (e.g., ***singing*** for ***sing***), or include the exact word referent or variation in phrase or lexical structure after the computer-delivered swift (e.g., "what's this?") and before the red slide appeared on PowerPoint. Alternative expression did not qualify as a name prearrangement even if they were measured acceptable for transparency. Based on the number of correctly named iconicity's, a fraction of name prearrangement was derived by dividing the number of correctly named iconicity's by the total number of iconicity's multiplied by 100.

The approbation variable was derived from the adult's pointing responses to the four-choice iconicity display. An iconicity was considered as endorsed correctly if the adult touched the quadrant with the iconicity conforming to an articulated designation provided by computer ("Point to----") before the red slide appeared on PowerPoint (e.g., twenty-second after the computer-delivered swift). The fraction of correctly endorsed iconicity's divided by the total number of iconicity's multiplied by 100 `Entomb-viewer arrangement statistics were collected for 12% of session. An independent viewer noted the responses to the transparency task and the endorsement task. These were equated to the responses recorded by the key experimenter. In the transparency task, an arrangement for the transparency response was recorded if both the viewers marked the verbal response the same way (e.g., correct, incorrect). For

name prearrangement, an arrangement was scored if both recorded the same word. For endorsement task, an arrangement was scored if both noted the same name of the iconicity to which the adult pointed. Percent prearrangement was calculated by taking the number of arrangements divided by the number of arrangements plus disarrays multiplied by 100. For photograph (transparency) and designation (name) prearrangement, this resulted in an arrangement of 99.33%. For approbation a 100% arrangement generated.

Results

A mixed group design was used, with age as a between-participant variable and iconicity format and word class as within-participant variables. One adult in a pair of same-age adults was randomly assigned to one sequence of graphic iconicity's (e.g., static followed by motion-graphic), and the other adult were assigned to the reverse sequence (e.g., motion-graphic followed by static). Although the order of presentation of static and motion-graphic iconicity's was compensated across participants in the three category age groups, a one-way analysis of variance (ANOVA) was steered to rule out order effects for all three dependent variables. Results revealed that no significant effect for order for the transparency measure, F (1,204) =0.67, p> .05, the name arrangement measure, F (1, 204) =9.78, p> .05, or the endorsement measure, F (1,198(=0.01, >.05. Table 2 illustrates the mean percent accurateness scores for photograph (transparency), designation (name) prearrangement, and approbation across three age groups (20-25, 30-35, and 40-years-old adults), two iconicity formats (motion-graphics, static), and two-word classes (verbs, prepositions). For details descriptive analyses of individual iconicity's performing or underperforming. See Schlosser et al. (2011).

Table 2. Mean transparency across age groups, iconicity formats and word class

			Transparency	Name agreement	Identification
Age group	Format	Word class	M (SD)	M (SD)	M (SD)
30–35-year-olds	Motion-graphic	Prepositions	60.16 (24.67)	53.13 (23.94)	80.83 (19.40)
		Verbs	73.44 (14.18)	69.27 (14.34)	91.67 (13.86)
	Static	Prepositions	60.83 (24.49)	55.83 (22.59)	88.39 (14.26)
		Verbs	58.16 (16.92)	54.71 (18.20)	93.89 (6.07)
40-year-olds	Motion-graphic	Prepositions	77.94 (23.60)	60.29 (23.90)	89.17 (15.57)
		Verbs	83.09 (8.39)	79.17 (8.72)	96.11 (4.58)
	Static	Prepositions	65.44 (20.02)	53.68 (20.14)	84.56 (18.50)
		Verbs	60.54 (14.21)	56.86 (14.87)	93.87 (6.61)
50-year-olds	Motion-graphic	Prepositions	88.16 (11.39)	69.16 (17.89)	95.39 (7.47)
		Verbs	88.82 (8.10)	82.86 (7.96)	98.03 (2.90)
	Static	Prepositions	84.03 (10.33)	70.14 (14.94)	95.83 (6.06)
		Verbs	67.59 (17.71)	65.51 (17.31)	97.45 (2.91)
Total	Motion-graphic	Prepositions	76.20 (23.12)	61.32 (22.47)	89.03 (15.44)
		Verbs	82.21 (12.05)	77.47 (11.81)	95.17

				(5.54)
	Total	79.21 (18.59)	69.40 (19.62)	92.26 (12.84)
Static	Prepositions	70.75 (21.07)	60.25 (20.31)	89.41 (14.84)
	Verbs	62.50 (16.50)	59.33 (17.14)	95.29
				(7.24)
	Total	66.63 (19.28)	59.79 (18.70)	92.38 (11.12)
Total	Prepositions	73.53 (22.20)	60.80 (21.34)	89.41 (14.84)
	Verbs	72.55 (17.42)	68.58 (17.20)	95.29
				(7.24)

Transparency

A request of key inquisitiveness in this erudition was whether any statistically significant effect would be pragmatic for the variables of iconicity format, word class, and age group. The statistics were thus analyzed using a 2x2x3 ANOVA in which group served as the between factor variables and iconicity format and word class served as the within-participant variables. This breakdown revealed no significant main efficacy for word class, F (1, 204) = 0.10, p>.05, and there were no significant two-way or three-way communication. There was a significant main expediency for age, F (1, 204) = 21.27, p>.01 (see Figure 3), indicating the existence of clear developmental trend in the 30-35 years-old (M= 71. 75, SD = 19.44) yielded transparency percentages than 20-25 years-old (M= 63.37, SD= 20.95), 40 years-old (M = 82. 32, SD= 14.83) attained higher scores than both the cohorts' groups. Post hoc investigates using HSD (Tukey's honestly significant differences) test revealed that each of these differences was significant at p< .05. Accompanying, there was a main expediency for iconicity format, F (1, 204) =27.37, p< .01 (see Figure 4). In addition, there was a significant interaction between iconicity format and word class, F (1, 204) = 8.95, p< .01(see Figure 5). Motion-graphic verbs were guessed more enthusiastically (M= 81.78) than static verbs (M = 62.24). However, the mean difference between motion-graphics prepositions (M =76.41) and static prepositions (M= 70.10) was smaller than the mean difference between motion-graphics and static verbs, leading to a significant interaction. A pair-wise using t-test adjustment (p< .05) revealed that both motion-graphics verbs, t (49) =7.65, p< .001, and motion-graphics prepositions t (49) =2.06, p< ,04, were guessed more eagerly than static iconicity's.

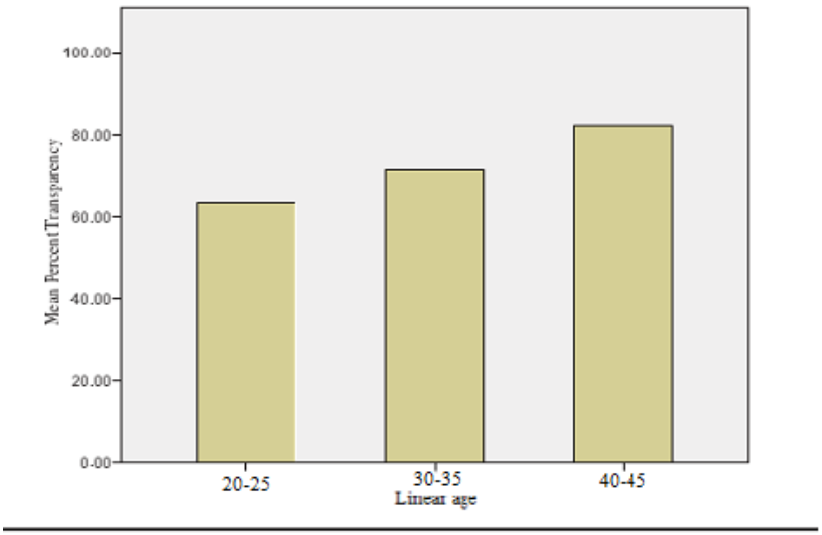

Figure 3. Overall mean percent transparency scores across the three age groups

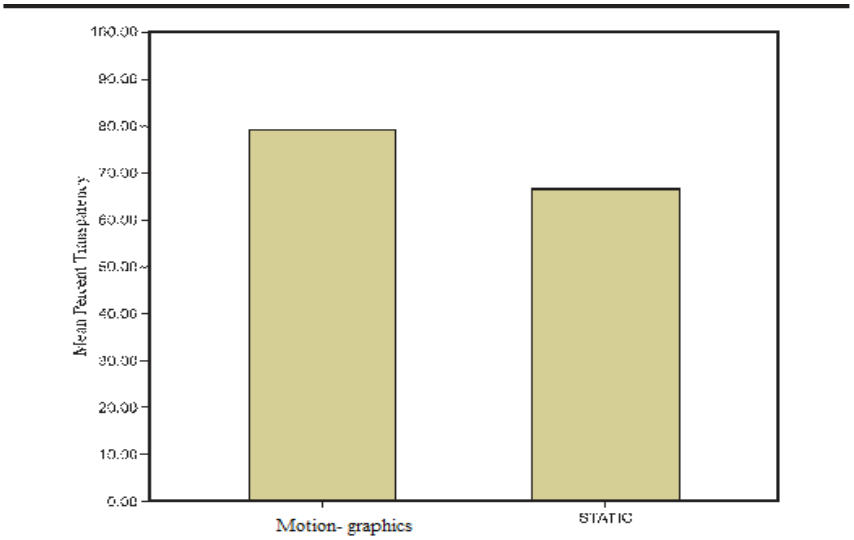

Figure 4. Overall mean percent transparency scores for motion-graphic and static iconicity's

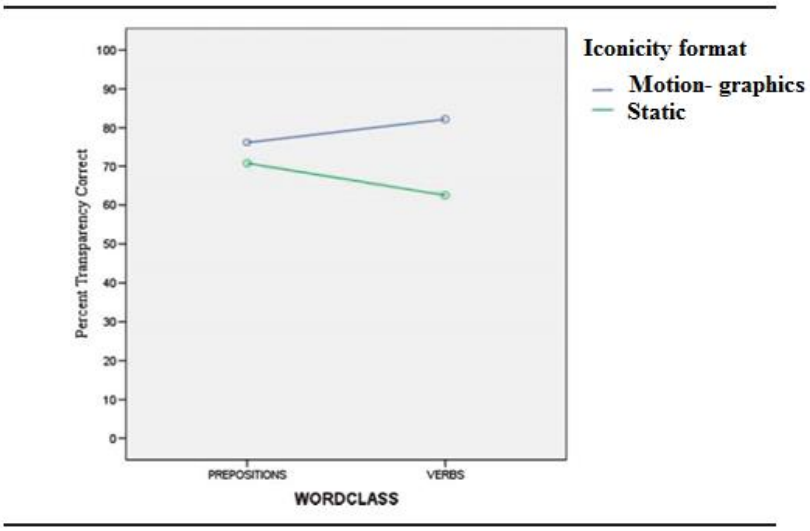

Figure 5. Mean percent transparency correct as a function of iconicity format and word class.

Name Prearrangements

Statistics for designation (name) prearrangements were also studied using a 2x2x3 ANOVA. Results indicated a significant main expediency for word class, F (1,204) =9.66, p< .01 (see Figure6); iconicity format, F (1, 204) =14.80, p< .01 (see Figure7); and age, F (2, 204) = 10. 89, p< (see Figure 8), Post hoc analyses using HSD test revealed that percent name arrangement for 20-25 years-old (M = 58.23) was significantly (p< .05) lower than that 40-year-olds (M = 71.81) and that name arrangement for 30-35 years-old (M = 62.50) was significantly lower than that of 40-year-olds. Nevertheless, there was no significant difference between 20-25 years-old and 30-35 years-old. There were no significant interactions for age. Accompanying, there was a significant interaction between iconicity format and word class, F (1, 204) = 11.92, p< .01 (see Figure 9). This interaction undoubtedly designates that

motion-graphics appears to aid naming verbs but not prepositions. Comprehensive, percent mean arrangement scores were higher for motion-graphics verbs (*M* = 77.10) than for static verbs *(M* = 59. 02). In contrast, percent mean arrangement scores for motion-graphics prepositions (*M* = 60. 86) did not significantly fluctuate from static prepositions (*M* = 59. 88). A pair-wise t test inveterate the significant difference between motion-graphics and static verbs, *t* (49 = 6.80, p< .00, and the absenteeism of a significant difference between motion-graphics and static prepositions, *t* (49) = 0.62, p>. 05.

Approbation

Statistic breakdown using a 2x2x3 ANOVA revealed significant main effects for word class, *F* (1,198) =14.87, p< .01(see Figure 11), nonetheless not for iconicity format, *F* (1,198) = 0.086, p>.05. Inclusive percent endorsement scores for 40-year-olds (*M* = 96.67) were higher than those for 30-35 years-old *(M* = 90.92) and 20-25 years-old (*M* = 88.69). Besides, across age groups and iconicity formats, a higher percentage of verbs (*M* = 95.16, SD =7.24) were correctly endorsed than prepositions (M =89.03, SD = 14.84). Post hoc HSD (p<.05) tests revealed that, with the concession 20-25 years-old versus 30-35 years-old, all other age evaluations were statistically significant. No significant two-or-three-way interactions were pragmatic.

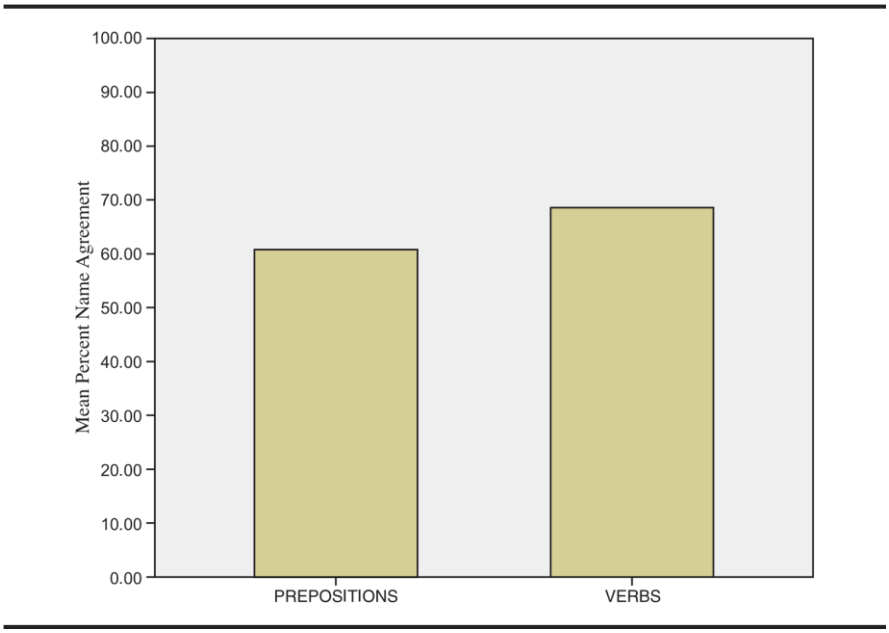

Figure 6. Overall mean percent designation arrangement scores for verbs and prepositions

Discussion

The purpose of this erudition was to dialogue the following queries: (a) What is the linear age grouping on percent slide (transparency), designation prearrangement (name), and approbation? (b) what is the efficacy of iconicity format on percent correct transparency, name arrangement, and approbation? (c) what is the efficacy of word class on percent correct transparency, name arrangement, and approbation?

Expediency of Age

Linear age yielded a consistent efficacy across the three dependent variables of iconicity format (motion-graphics vs static), age group (20-25-, 30-35-, and 40-year-old), and word class (verbs vs prepositions). Older-adults (compared

with younger-adults) incline to be better at guessing iconicity meaning, naming the iconicity's exactly, and endorsing the iconicity's from an array. This inveterate developmental effect is reliable with theoretic hypothesis that iconicity is experience bound (Brown, 1977; Otobo & Tukur, 2021). Stereotypically, 40-year-olds are expected to have more experiences than 30–35-year-olds and 20–25-year-olds. These results also support the previous reviewed research literature, which says that picture understanding is not innate but develops over time (Ainsworth, 2006; Ahmed, & Yusuf, 2020). For name prearrangement, the developmental effect found generally duplicates that found transparency and extends this developmental effect to a heretofore unstudied variable concomitant to graphic iconicity's in AAC. Conspicuously, an exception to the developmental effect for name arrangement is the fact there was no difference between 20-25-year-olds and 30-35-year-olds. It is conceivable that the added stringency of the response requirements may have the 40-year-olds act more like the 30-35-year-olds-or at least, the two groups were not satisfactorily distinct. Finally, the developmental expediency found for endorsement replicates the one yielded by Mineo et al. (2008) for verbs and extends it to a new word class (prepositions) and new set of graphic iconicity's (ALP Animated Graphic Set).

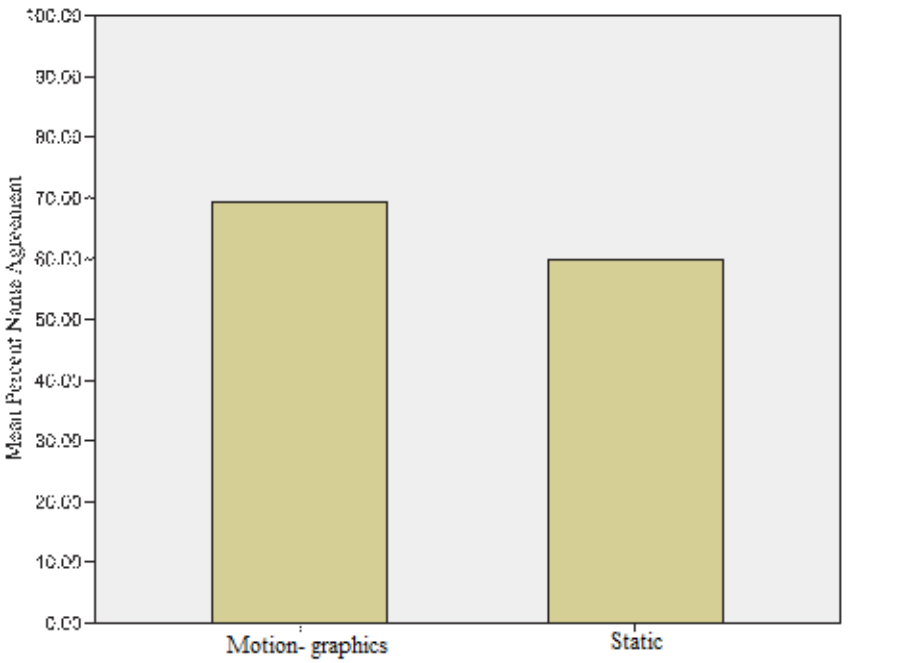

Figure 7. Overall mean percent designation (names) prearrangement scores for motion-graphic and static iconicity's

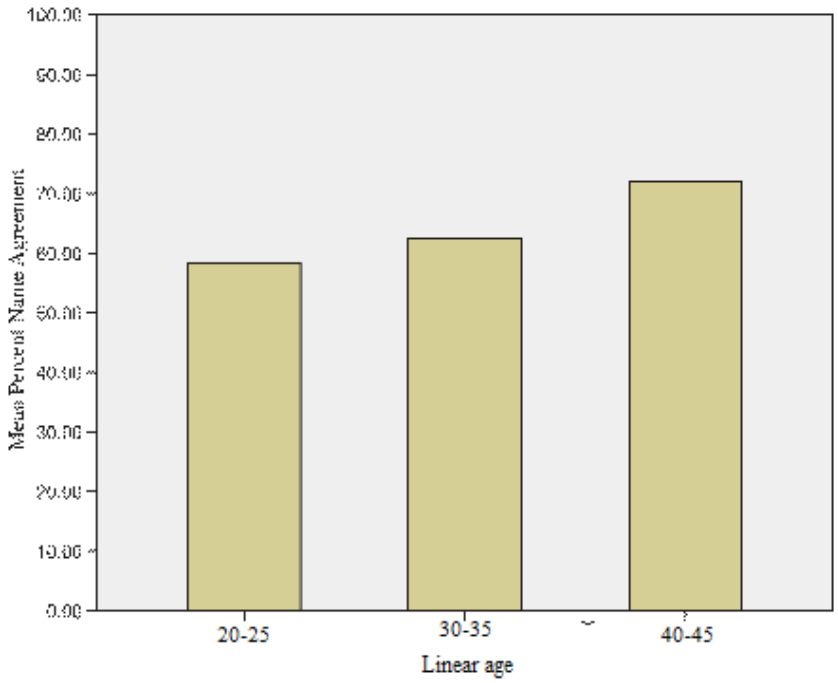

Figure 8. Overall mean percent designation prearrangement scores across the three age groups

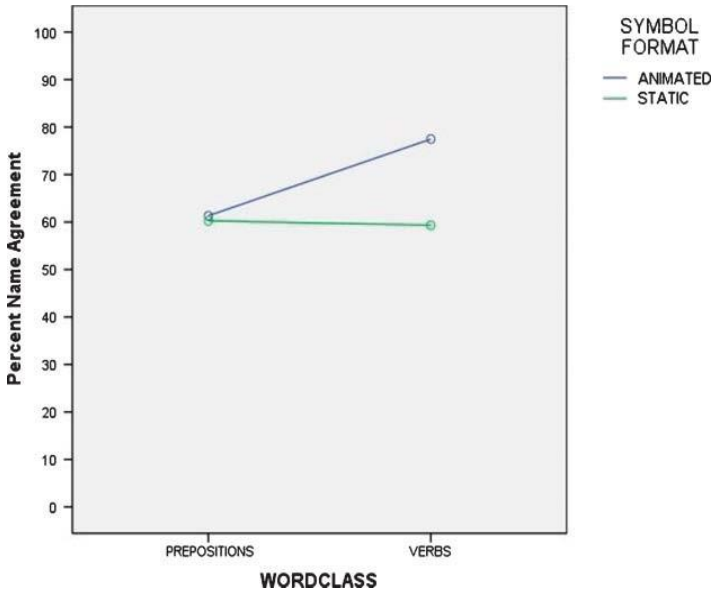

Figure 9. Mean percent designation prearrangement correct as a function of iconicity format and word class.

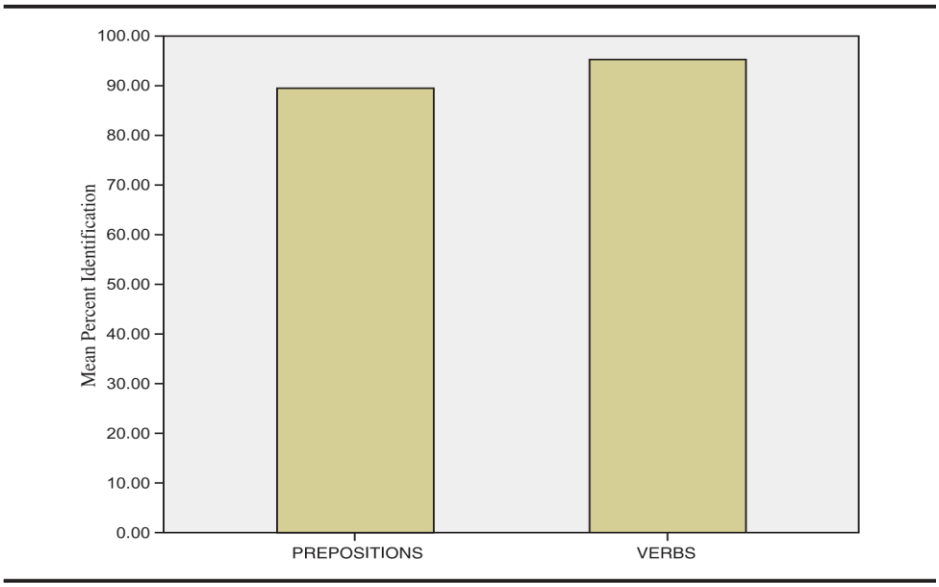

Figure 10. Overall mean percent approbation scores for verbs and prepositions.

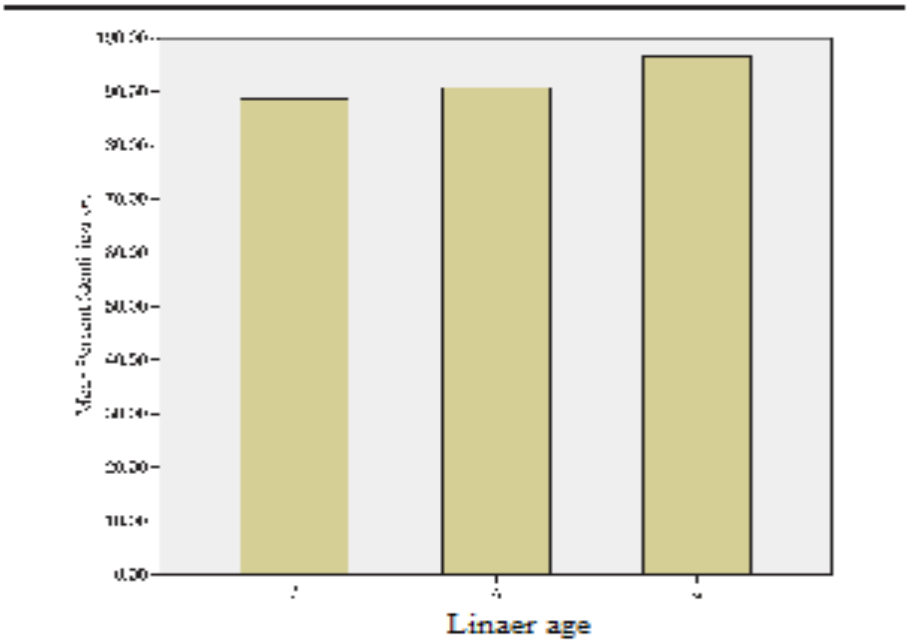

Figure 11. Overall mean percent approbation scores across three age groups.

Expediency of iconicity format

Iconicity format generated mixed results across the three dependent variables, with iconicity format networking with word class for both transparency (slide) and name prearrangement (designation), and no expediency (main or interaction) for approbation. This is the foremost erudition in which author premeditated the pragmatism of motion-graphic on transparency of graphic iconicity's in AAC. When iconicity's are transparent, the iconicity-referent relation does not need to be taught explicitly. Hereafter, iconicity's that are guessable help reduce the "cost of uninhibited dexterity" (Beukelman, 1991). The interaction sensibleness generated for iconicity format and word class inveterate that this facilitative efficacy of motion-graphics toward greater transparency was more noticeable for verbs than for prepositions, supportive the transparency-enhancing hypothesis of motion-graphics specified by erudite Jagaroo & Wilknson (2008), at least for verbs. The status quo is conceivable that verbs, with their focus on movement and action, offer themselves more to motion-graphics than prepositions do. After all, actions require movement, and exactly what motion-graphics adds to a static representation. When in static form, prepositions were easier to guess than verbs. With three-dimensional prepositions, ease of guessing may depend on whether they are directional or static (Cowan, 2008; Clark, & Lyons 2004). All but one of the prepositions (e.g., *off*) involved in this erudition can be classified as static, and even *off* could be dually classified as directional or static depending on its use within a lexical structure. Hence, it is conceivable that motion-graphics, which adds movement, may not help "three RRR pedagogy" adult as much to decipher the meaning of static prepositions in graphics memo.

Reminiscent slide (transparency) results succumb that, on average, nearly 8 of 10 (motion-graphics) and 6.7 of 10 (static) graphic iconicity's from the Animated Graphic set are transparent and, consequently, would not need to be taught explicitly. It is futile that analogous performance statistics for any of the other AAC iconicity set are not available for verbs or prepositions. Mirenda and Locke (1989) did measure the transparency of several graphic sets-but only for the word class of nouns, and by using a different task. Given that name prearrangement (designation) is derived from the same transparency measure, it is not surprising that iconicity format interacted with word class as well. That is, motion-graphics appeared to aid the naming of verbs to greater extent than it does for prepositions. In other words, motion-graphics permitted the "three RRR pedagogy" adults to be more efficacious naming the exact name of verbs but added nothing to their naming success with prepositions. It is possible that the motion-graphics of verbs reduced any naming ambiguity that may have been seeming for some of the verb iconicity's (because movement is action), whereas that was not the case for prepositions. Alternative possibility is that three-dimensional prepositions are largely not abstruse; one is able to read them either accurately or not at all.

For paradigm, this is the foremost erudition to include designation (name) arrangement as dependent variable, it is not conceivable to relate this to other AAC scholarships. Tartan the cognitive psychology literature is not helpful either, because existing designation prearrangement scholarships involving pictorial stimuli tend to involve exclusively nouns and no other word classes, and they use only static visuals (Cycowicz, Friedman, & Rothstein, 1997; Snodgrass & Vanderwart, 1980; Otobo & Palnam, 2022). Hence, it is problematic to relate our findings to the existing erudition base outside the AAC field. In this erudition, motion-graphics did not abridge the correct approbation of graphic iconicity's. This finding was not anticipated based on previous scholarship (Mineo et al. 2008) and thus warrants some discussion. Unlike the transparency task where the adult has to produce an answer based on being presented with one stimulus (i.e., the graphic iconicity) and the question "what's this", approbation involves the selection of an iconicity from an array of iconicity's when presented with target word and voice instruction "point to----." Thus, in the approbation task the "three RRR pedagogy" adult can rely on recognition memory. The variation in these tasks is analogous to having to write a short lexical configuration retort versus a multiple-choice retort. In our learning, this task may have made it too easy to endorse iconicity's regardless of format. An assessment of the transparency percentages with approbation prerogative and leads to the conclusion that the approbation task served as a counterpoise for any disadvantages that may have been presented by static iconicity's. Even though the endorsement seemingly made it too easy for the adults in this erudition, it may be precipitate to completely discount the option of any expediency of motion-graphics approbation. After all, the endorsement task bears some parallels to what individuals using AAC may experience when seeking a conjecture

massage on a display of graphic iconicity's. In all chance, though, the display of an individual using AAC will contain more than four iconicity's and/or multiple levels if it is a dynamic display. Feasibly the task can be adapted in order to increase task difficulty while maintaining or even further enhancing the ecological validity of this task.

While this might elucidate why motion-graphics did not make a difference for endorsement in this erudition it does not reconcile the incongruity with the findings of the scholarship by erudite Mineo et al. (2008). In their scholarly, motion-graphics iconicity's for verbs were superior to static iconicity's, using the same task. These incongruities could be due to several differences in resources and procedures. For paradigm, in terms of resources, only 12 verbs overlay across the two eruditions. in terms of procedures, Mineo et al. (2008) pilot-test their participants with shapes, whereas in the present scholarship, graphic iconicity's that were used were similar to the experimental stimuli. There are other procedural differences, but what is proposed as the most credible explanation were affiliated to the efficacy of the static verbs in this erudition compared with the static in the Mineo et al. (2008) knowledgeability. The percentage for verbs in this knowledge were well above the percentages in Mineo et al. (2008), in which static verbs generated 59.58% (20-25-year-olds), 66.25% (30-35-year-olds), and 76.25% (40-year-olds) compared to mean percentages in the 90% range in the present knowledge (see Table 2). Hereafter, when static iconicity's are so expedient in this task, it becomes more difficult or perhaps implausible for motion-graphics to add to approbation accurately. Otherwise, when the accuracy is between 60% and 76%, there is much more for augmentation.

Expediency of Words Class

Word class induced in a main expediency for approbation only and otherwise interacted with iconicity format for transparency and name prearrangement (these communications were tackled in the *Expediency of Iconicity Format* section). In terms of endorsement, the main expediency for word class indicates that verbs (M = 95.25) were easier to endorse than prepositions (M = 88.81), notwithstanding of iconicity format. Since the verbs and prepositions selected for this erudition are generally in the dialectal repertoire of stereotypically developing untutored adults and our pre-assessment affirmed that they were in the repertoire of included participants, it is possible that these differences attributable to the graphic representation or display rather than the referents involved. The endorsement task tangled the selection of a target iconicity from an array of four iconicity's. The adult (three RRR pedagogy) required to be able single out the target iconicity from the thwarts. The results suggest that prepositions are more problematic to distinguish from one another unrelatedly of whether they are in motion-graphic or in static format. Erudite have found that naturally emerging adults comprehend and produced spatial prepositions (three-dimensional) with relative ease when the task includes three-dimensional objects (Washington & Naremore, 1978). However, when the stimuli are two-dimensional silhouette drawings, the adults tend to have more difficulty with prepositions. Even though Washington and Naremore (1978) did not use AAC iconicity's and their task was not an approbation task, their erudition does not support the added determination that untortured adults experience with spatial prepositions when in the graphic sense modality. The word class of prepositions endures to be an understudied class in graphic research in AAC and requires future research consideration.

Conclusion

Motion-graphics made it easier for the "three RRR pedagogy" adults to guess the meaning of iconicity, although this was more definite for verbs than prepositions. This is a substantial finding in that the strategies that enhanced slide (transparency) reduce the instruction burden. The older adults outperformed younger adults, showing that guessing the meaning of graphic iconicity is acquired over time. Designation (name) prearrangement, the more stringent of the two measures, generated no difference between static and motion-graphic formats. Regardless of format, however, verbs were named more accurately than prepositions. Again, older adults outperformed younger adults on name (designation) prearrangement. Motion-graphics also failed to be more expedient than static formats when it came to approbation task. Generally, verbs were approbated more readily than prepositions notwithstanding of format, and older adults approbated iconicity more accurately than younger adults. The descriptive approbation

results compared propitious to an earlier erudition conducted on the expediency of motion-graphics on approbation of AAC iconicity.

This eruditeness twisted graphic iconicity from only one set, hereafter, the results that were generated and inferences that were drawn are valid only for this set. In addition, this erudition relied on developer-directed motion-graphics only, that is the "three RRR pedagogy" adults had no explanation to manipulate the motion-graphics. This is a check for external validity of the results since the generated statistics may not hold for adult-directed motion-graphics. This erudition was not an instruction learnedness in that no instruction was provided; the goal was to determine the expediency on iconicity format on "interpretation" iconicity meaning without instruction.

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