Original Article

Object and Action Naming:A Study on Persian-Speaking Children

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Objectives: Nouns and verbs are the central conceptual linguistic units of language acquisition in all human languages. While the noun-bias hypothesis claims that nouns have a privilege in children's lexical development across languages, studies on Mandarin and Korean and other languages have challenged this view. More recent cross-linguistic naming studies on children in German, Turkish, English and Korean demonstrate that all languages, including Korean show a noun advantage; however the degree of this discrepancy differs between languages. The aim of this study wasto look at object and action naming in normal Persian children as a measure of conceptual developmentin preschool children and its possible use for screening and therapeutic procedures.

Methods: In this analytical study, noun bias and processing dissociation of object and action naming in 64 three to six year old healthy monolingual Persian-speaking children was investigated. A black and white picture naming task, consisting of 36 nouns (natural and man-made), and 36 verbs (transitive and intransitive) was designed using DMDX software to measure response accuracy and reaction time of the subjects.

Results: The results indicate a significant noun advantage with regard to accuracy and naming latencies. The results also reveal that transitive verbs are named more accurately than intransitive ones in Persian-speaking children. Also,the data indicate that accuracy of object and action namingimprove with age (p=0.000).

Conclusion: Based on the resultswe recommended that a standardized Persian object and action naming battery be used. Such a tool would have the potential of screening lexical development delay and possible noun-verb performance gap in preschool children .

Keywords: object naming, action naming, noun-bias, naming accuracy, reaction

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Introduction

Nouns and verbs are the central conceptual lexical categories of any language. Theories proposing a noun advantage have been the focus of debate and study for a long time. The 'noun-bias' view proposed by Gentner(1) holds that nouns have the privilege of naming the highly cohesive parts of the world, they are less complicated than verbs, and, as a result are learned earlier in childhood. This universal noun bias predicts that "nouns will predominate over verbs in children's first vocabularies cross-linguistically" (2). Gentner's view, despite being generally accepted, has not remained unchallenged. Studying Mandarin-speaking children has shown they have fewer nouns and more verbs than their English speaking peers(3). Additionally, while nouns dominated their vocabularies in some contexts (e.g. book reading),this was not true in other contexts (e.g. playing with toys). Gopnik & Choi (4)found that the noun spurt observed in English-speaking children came significantly later in infants whose native language was Korean(4). As a result of being exposed to a language in which verbs are more salient, Korean-speaking children productively used verb morphology earlier, and even showed a verb spurt, that came prior to the noun spurt for most children involved in the study. Consistent with

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Gopnik and Choi(4), Fernald & Morikawa(5) found that Japanese infants have a smaller number of nouns in their vocabulary than American infants(5). They also suggest that this may be a result of different patterns in infant directed speech rather than a structural difference between English and Japanese. Results of a study on bilingual English-Filipino speaking children(6) show a noun bias in these children's English responses, but no such bias was found for the Filipino spoken by these same infants.

A cross-linguistic study comparedobject and action naming in Korean, Turkish and German children(7). This study analyzed combined data from these three languages.the results showed a noun advantage in all three languages; German, in part due to its salient positioning of nouns, demonstrated the greatest noun advantage amongst the three languages. German children show significantly better performance at naming nouns than their Turkish counterparts; however there is no significant difference between the two languages in naming verbs. Interestingly, the noun advantage that was observed in all age groups in German and Korean children was only present in 3 to 5 year old Turkish children. For the majority of Turkish-speaking children, the noun advantage was observed; however, there were also a number of children (21%) who named verbs better than nouns. It has been proposed that German is more noun-oriented due to its high degree of differentiation between the noun and verb class. In Turkish on the other hand, there exists some overlap between nouns and verbs, and conversion between the two categories is frequent and productive. This accounts for the smaller discrepancy between noun and verb naming performance in Turkish speaking children.

Dissociation based on grammatical category has also been the subject of imaging studies. For example Shapiro, Moo, & Caramazza (8) reported that different brain regions were activated during noun and verb production in English-speaking subjects(8). Similar results were reported for German speakers (9).This view is supportive of the noun-verb dissociation in aphasic patients where Wernicke patients display more difficulty with nouns, while Broca patients show impairment with verbs (10). However, the assumption that grammatical category is the main factor in processing has been questioned by studies exploring the idea that what differentiates processing of nouns and verbs is not the grammatical category itself, but rather the semantic differences. A study on Italian (11)found that in controlled pairs of nouns and verbs both referring to events,different regions were activated based on motion or sensory information, irrespective of noun or verb.

Research has also been directed toward paying greaterattention to the subcategories within nouns and verbs. Davidoff and Masterson (12) conducted a study on English speaking children comparing naming accuracy of nouns, transitive and intransitive verbs. Their results indicate that while intransitive verbs are named with less accuracy, there is no difference between naming accuracy for nouns and transitive verbs. They attribute this effect to intransitive verbs needing only one argument, opposed to at least two required by transitive verbs(12). Naming studies on young children have been conducted in several languages other than English. Schelletter & Kauschke (13) conducted a study on monolingual German and English speaking children aged 3 to 6. The children were presented with a naming task of nouns (half natural and half man-made) and verbs (half transitive and half intransitive). Although all children were better at naming nouns than verbs, results showed the German children to be significantly better at naming nouns than their English counterparts. More interesting results are found in verb naming as German children are better at naming intransitive verbs, while English children show better performance in naming transitive verbs(13). The German results are not consistent with Davidoff and Masterson (12), suggesting that structural differences in languages can lead to differences in ease in usage of transitive versus intransitive verbs. This has been attributed to the fact that while transitive verbs are associated with objects in a VO pattern in English; this is not the case in German (13).

Another study by Kauschke and Ari (14) compared naming abilities between German and Turkish children. The results of this study showed that although nouns are named better than verbs in both languages, German children were significantly stronger than Turkish children in naming nouns, in the absence of cross-linguistic differences in naming verbs. Another interesting finding of this study showed that Turkish-speaking children, in contrast to German children, named intransitive verbs better, consistent with children speaking English(14).

What these previous studies have helped strengthen is the hypothesis that structural difference between languages may be the reason behind the

discrepancies that are observed in the degree ofnoun-bias in some languages. 'Verb-friendly' or 'verb-dominant' languages, those who place verbs in more salient positions (for example initial or final positioning) show less noun dominance. These are languages in which verb morphology is regular and transparent, and subjects can be omitted from sentences, leading to extended noun ellipsis.

The present study focuses on processing skills of object and action naming in 3 to 6 year old Persian speaking children. Persian, an Indo-European language belonging to the Iranian branch of the Indo-Iranian group, is a fairly rich inflected language, and morphologically richer than English. Suffixes are more common; however there also exist a small number of prefixes. The word order for canonical sentences is SOV. However, the major components of a sentence may vary for pragmatic purposes due to the direct object marker, /ra/, and the indirect object preposition (e.g. /be/). The subject may be omitted in some contexts where a subject pronoun would be used in English. There is no case ending on nouns, but verbs are inflected for mode, tense, number and person. Since verb morphology is more complex than noun and infinitive form is a multi-morphemic formPersian can be considered as a noun-friendly language(15).

Methods

1. Participants

The participants in this study were 64 children of 3 to 6 yearsof agein 3 age groups (3 year-olds: 9 boys & 7 girls, 4 year-olds: 10 girls & 5 boys, 6 year-olds: 12 girls & 21 boys). They were chosen from three daycare centers in Tehran, and were all monolingual native speakers of Persian. They did not suffer from any language disorders, and were healthy with normal hearing, intelligence and sensory-motor ability.

2. Stimuli

A picture naming task was designed based on the design of a previous study by De Bleser and Kauschke (16). A pool of 121 pictorial concrete nouns and 115 common action verbs in Persian were initially considered. A black and white picture drawing depicting each noun and verb was chosen. The stimuli were then presented to a group of 30 freshmen and sophomore university students and were asked to name each picture for cultural adaptation. The answers were collected, from which 36 nouns (18 natural and 18 man-made) and 36 verbs (18 transitive and 18 intransitive) with the highest accuracy (over 90%) were selected. Figure 1 shows a sample of the noun and verbselectedfor the final task stimuli.

Figure 1.A natural noun/gold/ "flower", and an intransitive verb/dastzadan/ "clapping"

A pilot study was conducted on 22 children (12 girls and 10 boys) between 3 to 6years of age(4 aged 3:0-3:11, 9 aged 4:0-4:11 and 9 aged 5:0-5:11). The items in the task were revised and improved based on the results of the pilot study. The exposure time of each item was also increased from 3 seconds to 5 for the nouns and 8 seconds for the verbs, to allow the children a chance to name each item. Once the child named each item, the next item would appear regardless of the remaining presentation time.

3. Procedure

The task stimuli were put into two separate blocks of nouns and verbs for testing. The order of presentation was random for both nouns and verbs. Each noun item was shown for 5 seconds, and each verb item was shown for 8 seconds. DMDX software was used to design the task and to collect data on each subject's responses and reaction time to each item. Each block started with several entry items aimed at familiarizing the subject with the task. The child was asked to identify and name the object or the action depicted in the picture.All the tests were performed in the child's daycare center, in a quiet room other than the class, in the presence of the experimenter. The same laptop computer was used to present the tasks to all subjects.

Results

The performance of the subjects for manmade and natural object naming tasks is presented in Table 1 and the accuracy results for transitive and intransitive verbs are given in Table 3. The accuracy results on nouns indicate that object naming ability increases with age, with the 5 year olds showing the highest average accuracy (94.52%). Although this was to be expected, it is interesting to note that even the 3 year old group gained an average of 81.05% accuracy in object naming. Standard deviation decreasedwith age indicating less dispersion in the data. Variance analysis showed asignificant difference between the age groups (P=0.000). Post-hoc tests showedno significant difference between 3 and 4 year olds, while the difference between 3 and 5 year olds (P=0.000), and 3 year olds and 4 year olds wassignificant (P=0.002).

Table1. Object naming accuracy for natural and manmade nouns in each age group

Variable	Age group	mean	SD	f	P-value
Natural-noun naming accuracy	3 year olds	15.25	2.76	8.49	0.014
	4 year olds	15.60	2.09		
	5 year olds	17.03	1.04		
Manmade-noun naming accuracy	3 year olds	13.93	2.23	24.72	0.000
	4 year olds	12.20	2.04		
	5 year olds	17.00	1.41		
Total naming accuracy	3 year olds	29.18	4.36	13.57	0.000
	4 year olds	30.80	3.85		
	5 year olds	34.03	2.11		

A similar pattern was observedfor object naming accuracy in noun subcategories, i.e. natural and man-made nouns. As shown in Table (1), object naming accuracy, both for natural and manmade nouns, increasedwith age. A decrease in standard deviation with an increase in age wasobservedonce again. Using the Kruskal-Wallis non-parametric method, we found that the difference in object naming between different age groups was significant for natural (P=0.014) and manmade nouns (P=0.000). Post-hoc analysis showedthat the difference between 3 and 4 year olds was not significant. However, 5 year olds hada significant difference with both younger age groups (natural nouns; 5 year olds and 3 year olds P=0.003, 5 year olds and 4 year olds P=0.016. Manmade nouns; 5 year olds and 3 year olds P=0.000, 5 year olds and 4 year olds, P=0.017). Natural nouns were named better in all age groups, but a paired t-test showed that the difference was not significant.

The results of action naming accuracy indicated a similar increase with age (Table 2). Variance analysis indicatedsignificant differences between the age groups (P=0.000). Post-hoc tests showed significant differences between 3 and 5 year olds (P=0.000), and 4 and 5 year olds (P=0.003). Variance analysis also showedsignificant differences for both transitive (P=0.000) and intransitive verbs (P=0.001). Post-hoc results revealed significant differences between 3 and 5 year olds (transitive, P=0.00; intransitive, P=0.000), and between 4 and 5 year olds (transitive, P=0.001; intransitive, P=0.021). The difference between 3 and 4 year olds, although in favor of the 4 year olds, was not significant. Additionally, transitive verbs werenamed significantly better than intransitive verbs in all age groups. According to the paired t-test results this difference was significant in 4 year olds (P=-0.001), 5 year olds (P=0.000), and all the participants (P=0.000). No difference in performance was observed between girls and boys on action naming either.

Table 2. Action naming accuracy for transitive vs. intransitive verbs in each group

Variable	age	mean	SD	f	P-value
intransitive verb naming accuracy	3 year olds	7.50	2.65	8.46	0.001
	4 year olds	8.84	2.70		
	5 year olds	11.09	3.03		
transitive verb naming accuracy	3 year olds	8.64	3.87	16.83	0.000
	4 year olds	10.23	2.97		
	5 year olds	14.03	3.26		
total verb naming accuracy	3 year olds	16.14	6.12	12.82	0.000
	4 year olds	18.75	5.69		
	5 year olds	25.12	6.05		

Interestingly, accuracy results on verbs showed that the average action naming accuracy scores were much lower than those for nouns; with the 3 year olds naming only 44% correctly. Their score roseup to 69% in the oldest group, which means that even the 5 year olds were unable to name 30% of the verbs correctly. Comparison of accuracy results of nouns and verbs indicates that in all age groups, nouns were named significantly better than verbs (P<0.001). But no significant difference was seen between girls' and boys'performances (see Table 3 for more details).

Table 3.Comparison of naming accuracy for gender

Variable	Sex	No	Mean	SD	t	p-value
Object naming accuracy	Female	31	31.67	3.76	-.778	0.439
	Male	33	32.42	3.90		
Action naming accuracy	Female	29	21.17	7.68	-.551	0.584
	Male	30	22.20	6.61		

No specific trend was observed in the object naming reaction times, with the 5 year olds showing the fastest performance, while the 4 year olds were slower than 3 year olds (average reaction times: 3 year olds:954.5ms; 4 year olds: 1120.62 ms; 5 year olds: 955.96 ms). Action naming average reaction times decreased with age (3 year olds: 898.57 ms; 4 year olds: 1169.69 ms; 5 year olds: 1220.76 ms).

Table 4. Object and Action naming latency in each group

Age group	Variable	Mean(SD)	df	t	P-value
3 year olds	Object Naming	954.50(255.52)	14	.876	0.396
	Action Naming	898.57 (296.11)			
4 year olds	Object Naming	1120.62(226.33)	13	.335	0.723
	Action Naming	1169.69 (479.13)			
5 year olds	Object Naming	955.96 (195.13)	32	-5.092	0.000
	Action Naming	1220.76 (330.11)			

The reaction times for lexical subcategories (natural vs. man-made, and transitive vs. intransitive), or genderwas significant more interesting results were observed uponcomparing reaction times between nouns and verbs. The data indicates that nouns were named faster than verbs in the 5 year old group, and in the whole group of children pooled together. This noun advantage was not found in the 3 and 4 year old groups independently.

Discussions

According toourresults naming accuracy of nouns and verbs both improved with age in our population of Persian-speaking children. The children did significantly better in naming nouns than verbs, suggesting that a noun advantage is present in young Persian-speaking children. Figure (2) shows this discrepancy. This is consistent with results of studies in English (1), German, Turkish, and Korean (7). The results from Persian as a noun-friendly language thus confirm the word category effect in naming.

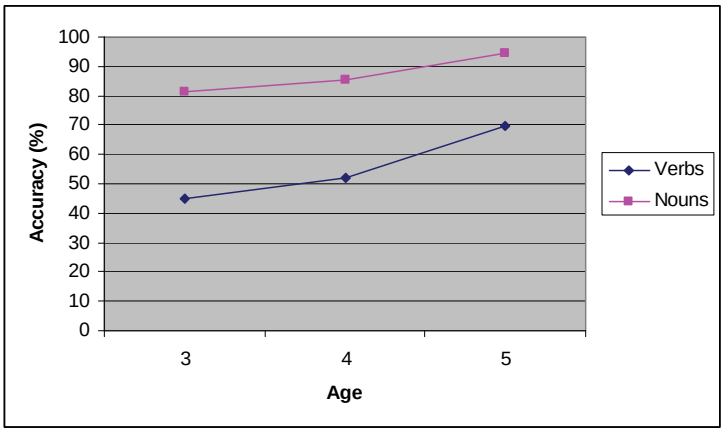

Figure 2. Object and Action naming accuracy for different age groups

As with previous studies, no differences were distinguished for gender. There was also no difference between natural and manmade nouns. However, verb category yielded some interesting results (Figure 3). Transitive verbs were named betterthan intransitives, which is consistent with results of studies in English and Turkish, but not in German. Davidoff and Masterson (1996) argue that transitive verbs may be privileged because of the presence of more arguments that can serve as an "anchor function"(12). This relates to the fact that the pictures used for transitive action naming not only depict the action, but are also associated with objects that may facilitate and support retrieval of transitive verbs.

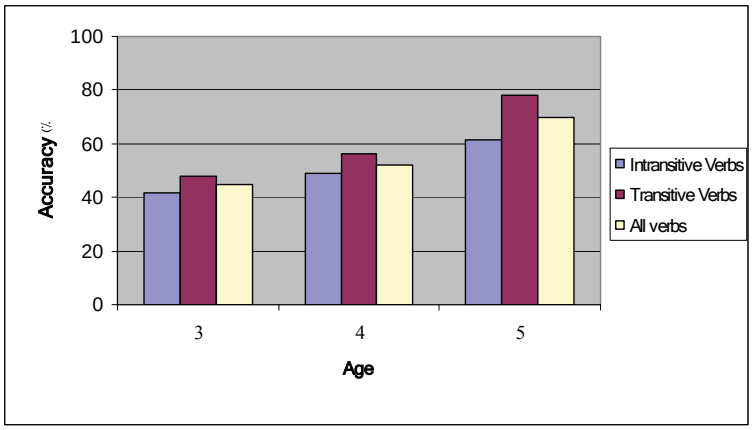

Figure 3. Action naming accuracy for different age groups

Beyond the accuracy data, there was a tendency towards a noun advantage in the reaction time data. There appears tobe a noun naming speed advantage in the oldest group of children, and in the whole group. Five year old children named nouns significantly faster than verbs. The same effect has been observed inGerman adults (17), as well as in other languages. Thus, from age 5 children show a pattern similar to adult speakers. The reaction time data of younger children are ambiguous. More conclusive conclusions about reaction times cannot be reached from the present data at this point. However, the general inclination of the data seems to suggest faster reaction times for nouns than verbs.

Conclusion

Further generalizations on object and action naming latencies in children will have to wait for further studies and norms obtained from larger samples based on a standardized naming battery for Persian speaking children. Based on the results it is recommended that standardized Persian object and action naming battery norms have the potential of screening for lexical developmental delay and possible noun-verb performance gap in preschool children.

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