Compensation for Lack of Flexibility among Autistic Foreign Language Learners by Applying Visual Prompts and Input Enhancement: the Case of Reaction Time

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Abstract

The past decade has seen increasingly rapid number of young people with a diagnosis of an Autistic Spectrum Disorder (ASD) coming into Foreign language classes. Autistic learners have several areas of difficulties, including impairment in social interaction, unusual social communication and lack of flexibility. This paper seeks to examine the effect of visual prompts and input enhancement on increasing level of flexibility among Iranian autistic EFL learners. In order to conduct the study, a sample of thirty participants, aged from 10 to 14, were recruited randomly from three autistic institutions in Isfahan, Iran. They were divided into three groups: (a) control group: they received neither visual prompts nor input enhancement, (b) Input enhancement group: they received an enhanced input by bolding target vocabularies, and (c) Visual prompts group: they received target vocabularies through visual prompts including pictures and drawing illustrations. After treatment, a software measuring reaction time was conducted. One-way measure ANOVA and Bonferroni test were used to assess efficacy of each method. The obtained results indicated a clear benefit of using visual prompts in increasing flexibility that is needed to acquire target words.

Keywords: Autism, flexibility, input enhancement, visual prompts

1. Introduction

Autism Spectrum Disorder (ASD) refers to a complex disorder of brain development. It is called spectrum because it can have a range of problems. These disorders might affect social interaction, verbal and non-verbal communication. Furthermore, Asperger or high functioning autism is a complex developmental disability marked by impairment in socialization, cognition and sensation. Lack of flexibility is one of the impairments in autism. In other words, learners with autism have difficulties in coping with change (Wire,2005). Being exposed to new input and vocabularies might be highly distracting for them. According to Wire (2005), rote learning and lots of repetition could alleviate this impairment.

Recently, the issue of input enhancement has received considerable attention. Smith (1993) proposed the term "consciousness raising", which refers to increasing learners' awareness. Also, input enhancement is a way to make input more salient (Smith, 1993). There are various techniques that can be employed to enhance input such as: manipulation of typography and use of typographic cues. Employing these strategies increases attention and noticing which are necessary for learning to take place (Schmidt, 2000).

Moreover, Effects of visual prompts on second language acquisition is undeniable. Samuel (1970) argues that nearly all learners are interested in visualized instructional material such as flash cards. Klinger (1998) stresses that pictures and texts should be presented simultaneously rather than separately. Although the efficacy of these techniques has been proven, more research is needed to investigate the effects of consciousness-raising on autistic pupils' learning.

2. Literature Review

Teachers may encounter with some pupils with autism coming to their classes. These learners are likely to have a diagnosis of Asperger syndrome or high functioning autism. Asperger syndrome may cause difficulties in social interaction, social combination and flexible thinking. Interestingly, many of those diagnosed with having Asperger Syndrome may have good language skills. However, they may become irritable if obliged to learn a new language explicitly without using visual prompts or input enhancement. According to Wire (2005), autistic individuals become anxious if external factors impede their progress. Having worked with pupils with ASD shows the importance of implicit learning by

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employing some techniques, such as input enhancement and visual prompts. Recently, SLA research has highlighted the ways in which attention mediates the process of selection and subsequent memory of input (Smith,1993). Input enhancement or input salience deals with the linguistic material which is presented in a bolded, italicized or underlined way. Leow (2001) explored the effects of textual enhancement and noticing on Spanish formal commands. 84 native English speakers were enrolled in Spanish learning programs. Some participants were provided with unmodified input and the others with enhanced texts. The results have revealed that there is no single benefit to input enhancement. In contrary, Jourdenais (1995) explored the impacts of input enhancement on imperfect Spanish verbs. Ten adults English speakers were received two different texts, each of 210 words. One group read enhanced texts, while the other read unenhanced texts. The researcher concluded that textual enhancement was an effective way for learning.

Furthermore, L2 instructional material is highly visual, such as textbooks, flashcards and multimedia software. Samuels (1970) believes that although pictures may use as prompts, they may divert learners' attention. in contrary, Heinlein (2013) claimed that pictures are read and understood much faster than words. Klinger (1998) believes that pictures and texts should be utilized simultaneously in teaching process.

In the empirical literature on L2 input processing, mean reading time for each word, sentence or paragraph is recorded by a timer in the computer. In this type of the research, sentence or text reading's time has been analyzed in comparison with a number of other variables, such as quantity or quality of verbal recall, types of input modification, and so on.

Although a lot of research has been carried out on efficacy of input enhancement and visual prompts, only a few studies have attempted to investigate some ways to motivate autistic pupils to learn a second language. So this study aimed to address the following research questions:

    1) Does Input enhancement lead to reduction of reaction time among autistic children?
    2) Do visual prompts lead to reduction of reaction time among autistic children?

3. Methodology

In order to conduct the study, 30 autistic pupils (both males and females) aging from 10 to 14 were selected randomly. They were all members of a non-profit autistic organization located in Isfahan, Iran. All the participants had received a diagnosis of ASD by trained clinicians. To make sure they are at the same level, a placement test was designed to give the quick assess of approximate level of learners.

All the pupils were at basic level so a simple text contains some concrete words was chosen from the book "Family and Friends", written by Simmons (2010). All target words were bolded, underlined, and colored to direct learners' attention. Moreover, visual prompts of the target words were all prepared. In order to measure the reaction time, a software was designed.

The procedure of the study can be summarized as follow: 30 basic autistic learners were selected randomly. they were divided in to three different groups: Group A received unenhanced text, group B received texts with bolded and underlined target words, and Group C received visual prompts. In order to collect the data, pictures of 10 target words were displayed on the monitor screen and the participants were required to hit the key as soon as they say the words. The mean time was measured from the onset of each picture until participants pressed a key. In order to answer the research questions which intended to examine the effects of input enhancement and visual prompts on learners' reaction time, a one-way ANOVA and Bonferroni test were conducted.

4. Results

In order to analyze the data, one-way ANOVA and Bonferroni correction were employed. Before it, Shapiro- Wilk and Levene's test were conducted to confirm population is normally distributed and assess the equality of variances for variables.

Table 1, Mean Reaction Time

	N	Minimum	Maximum	Mean	Std. Deviation	F	df	Sig.
Control	10	.45	1.70	.997	.474	9.650	(2,27)	.001
Input enhancement	10	.34	1.45	.807	.354			
Visual prompts	10	.00	.91	.276	.291			

According to table 1, mean of reaction time in control group is 0.997±.474, in input enhancement group is 0.807±.354, and in the group who received visual prompts is 0.297±0.291.

To compare the mean of reaction time among three groups, one-way ANOVA was run and a significant difference was observed (p< 0.05). To do multiple comparison, Bonferroni test was administered.

Table 2, Multiple comparison on reaction time of three gropus

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
control	Input enhancement	.18947	.17018	.826	-.2449	.6238
control	Visual prompts	.72104*	.17018	.001	.2867	1.1554
Input enhancement	Visual prompts	.53157*	.17018	.013	.0972	.9659

According to the results, there is no significant difference between control group and input-enhanced group regarding the reaction time (P>0.05). Also, the results indicate that there is a significant difference between control and the third group (who received visual prompts) regarding the reaction time (P< 0.05).

5. Discussion and Conclusion

To address the first research question which aimed to investigate the efficacy of input enhancement on faster lexical processing and reaction time, one-way ANOVA and Bonferroni test were employed. According to results, input enhancement could not lead to faster lexical processing and shorter reaction time. This result is in the same line with Leow's (2001) findings who did not find any benefits for input enhancement. However, it is in contrary to the study done by Jourdenais (1995) who claimed that textual enhancement was an effective way for learning.

To address the second research question which tended to determine the efficacy of visual prompts on faster lexical processing and shorter reaction time, one-way ANOVA and Bonferroni test were utilized. Accordingly, visual prompts lead to considerable shorter reaction time. This is consistent with Heinlein (2013) who claimed that pictures are read and understood much faster than words. However, it is in contrast to Samuels (1970) who believes that pictures and prompts divert learners' attention.

In conclusion, growing up in a multilingual world may seem demanding for high functioning autistic children who are delayed in language acquisition. However, lack of flexibility among autistic pupils could be compensated by using visual prompts. Results of the study demonstrate that autistic learners have a preferred sensory modality when a lexical item is presented visually. In other words, visual supports help autistic L2 learners understand what to expect and will happen next and also reduce anxiety. Taken together, the results of the study suggest that visual supports ought to be used with children who have autism spectrum disorder so that their lack of flexibility could be compensated. Moreover, learning visually could help them process lexical items faster which leads to shorter reaction time.

The generalizability of these results is subject to certain limitations because larger sample size is needed to ensure a representativeness distribution of the population. Despite this fact, accessing to autistic pupils with Asperger's syndrome who are willing to learn a second language was too difficult. Obviously, further research is needed to investigate different L2 learning strategies among children with autism with a larger sample size.

References

[1] Byers-Heinlein, K., Fennell, C. T., & Werker, J. F. (2013). The development of associative word learning in monolingual and bilingual infants. *Bilingualism: Language and Cognition*, 16 (1), 198-205.

[2] Fombonne, E. (2001). Report by R Rollens on international meeting for autism research conference [Online at http://osiris.sunderland.ac.uk/autism/incidence.htm] Accessed 20/2/05.

[3] Jourdenais, R. (1995). Does textual enhancement promote noticing? A think-aloud protocol analysis. In R. Smith (Ed.), *Attention and awareness in foreign language learning* (pp. 183-216). Honolulu, Hawai: University of Hawai'i Press.

[4] Klinger, W. (1998). Card games for language learning. *Academic Reports of the University Center for Intercultural Education*, 4, 79-98.

[5] Leow, R. (2001). Do learners notice enhanced forms while interacting with the L2: An online study of the role of written input enhancement in L2 reading. *Hispania*, 84, 496-509. http://dx.doi.org/10.2307/3657810

[6] Samuels, S. J. (1970). Effects of pictures on learning to read, comprehension and attitudes. *Review of Educational Research*, 40, 397-407.

[7] Schmidt, R. (2001). Attention. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 3-32). Cambridge: Cambridge University Press.

[8] Sharwood Smith, M. (1993). Input enhancement in instructed SLA: Theoretical bases. Studies in Second Language Acquisition, 15, 165-179.

[9] Wire, V. (2005). Autistic Spectrum Disorders and learning foreign languages. Support for Learning, *the British Journal of Learning Support*, 20 (3).