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Massed/Distributed Sentence Writing: Post Tasks of Noticing Activity

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Abstract

The purpose of the study was to activate the passive lexical knowledge through noticing and to investigate the effect of sentence writing as the post task of noticing activity on strengthening the effect of noticing. Forty-two Iranian female adult upper-intermediate English students of a state university in 2 homogenous groups participated in noticing the lexical items whose production were not as easy as their comprehension through highlighting them in a reading passage. Then, the participants were involved in a four-week process of massed/distributed sentence writing; every week the participants of one group wrote one sentence with one of the 16 noticed words each day during 4 consequent days, and the other group experienced this process once a week in which they wrote 4 sentences with the 4 noticed words without time interval. As the results indicated, presenting the post task was significantly effective in promoting the productive lexical knowledge of both groups. The interaction between the time factor and the methods of learning was significant. Also, the distributed group outperformed the massed group, but not significantly.

Keywords: Massed, Distributed, Post task of noticing, Sentence writing.

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Introduction

Language learning is considered a goal for all EFL learners and in order to be a successful learner, noticing is essential (Schmidt & Forta, 1986, as cited in Lynch, 2001). To this end, language teachers have implemented different techniques of noticing in the classrooms for many years. The conducted research on noticing not only made language teachers think more deeply about using noticing as the facilitator of learning but also presented newer methods to achieve this intended goal (Batsone, 1996).

Regarding noticing, Ellis, Basturkmen, and Loewen (2001) stated that focus on form has been directed toward grammar. Nevertheless, it can be used for promoting noticing other linguistic features, such as vocabulary, as well. Considering the importance of productivity of lexical knowledge for language learners, the present study is one of the researches focused not only on vocabulary but also on production of lexical items. In other words, the study would be another research regarding noticing the comprehended knowledge of vocabulary and converting it to productive lexical knowledge through two ways of learning (massed vs. distributed sentence writing). Therefore, one of the characteristics which distinguishes the present study from the previous literature of EFL learning through noticing or massed/distributed practices is combining these two separate features complementarily which leads the learners to devote their more attention to the process of EFL learning.

Literature Review

Post Task of Noticing

Based on the literature and as Hawkes (2011) mentioned, during the process of a task and after focusing on meaning, the activity which helps the learners to turn their attention to form is a post task. In this regard, post task is considered as the activity of highlighting form in earlier task performance (Skehan & Foster, 1997, p. 189). Contrary to the aforementioned definition, what is intended in the present study includes presenting a productive task to improve the effect of noticing activity. According to the literature, a few studies were devoted to the investigation of the effect of the productive tasks on providing further noticing (e.g. Song & Suh, 2008). In other words, utilizing a practical

method to strengthen the effect of attention to productive lexical knowledge after the process of noticing did not draw the attention of researchers much.

Spacing Effect

In cognitive psychology, spacing effect is taken for granted as the equivalence of distributed vs. massed practice which includes spaced presentation (Dempster, 1988, p. 627) of the materials to the learners. In this regard, Dempster (1988) believed since the effect of spacing on acquiring the new things in the studies conducted in laboratory was proven, it could be considered as a potential that seems to promote learning in the classroom, too.

The effect of distributed and massed learning on several aspects of language including vocabulary in some studies was investigated and some controversies, in this vein, are seen among their findings. Some of them were in favor of massed practice of L2 materials. By taking intensive courses as a type of massed learning, some scholars showed their positive view on massed practice especially in foreign and second language fields (e.g. Collins & White, 2011; Freed, Segalowitz, & Dewey, 2004; White & Turner, 2005). In this regard, Serrano and Munaz (2007) stated that receiving the input intensively and in massed classes led to more learning than spaced classes. As they mentioned, the results of studies on language learning was in contrast with those of studies on cognitive psychology (p. 310) which were in favor of distributed practice.

Contrary to the above mentioned points, some of the conducted studies were in favor of distributed practice of materials including vocabulary (e.g. Bloom & Shuell, 1981; Goossens, Camp, Verkoeijen, Tabbers, & Zwaan, 2012). Supporting the effect of spacing on language learning, Cepeda, et al. (2009) claimed that intensive classes hinder the process of learning, since the time between learning and reviewing would be dramatically decreased. On the other hand, some other scholars were in favor of the positive effect of distributed practice, but on the long-term recall or retention of materials, especially the lexical items (e.g. Bahrick, Bahrick, Bahrick, & Bahrick, 1993; Bahrick & Phelps, 1987; Sobel, Cepeda, & Kapler, 2011). Related to what was mentioned, the present study as another

research on noticing and strengthening its effect, but this time on productivity of lexical knowledge in two ways (i.e. massed/distributed sentence writing), tried to answer the following question:

-Is there any significant difference in the productivity of lexical knowledge between groups experiencing massed vs. distributed sentence writing in the short vs. long term?

Methodology

Participants

The participants of the present study were 42 Iranian female upper-intermediate B.A students of English of two intact classes from a state university in Tehran ranging from 18-40 years old. They participated in the study in two homogenous groups which each one included 21 participants.

Instrumentation

The study was conducted through implementing the following instruments:

1. A TOEFL test (2004) which was retrieved from Ebteda Publication (2010), and included reading comprehension and structure and written expression sections was utilized, to ensure that the participants were at the same proficiency level. In fact, to be more practical, the listening section of the test was excluded.
2. A rational c-test (Huhta, 1996, p. 218) which consisted of the noticed vocabulary items in the pilot study and was taken from a passage from Acklam and Crace (2006) --*Total English (Upper intermediate)*-- was tailored by the researchers to investigate the participants productive lexical knowledge in the pre test and the two post tests (see Appendix). According to Acklam and Crace (2006), the aforementioned book and the passage were designed for the learners at upper-intermediate level. Indeed, as different versions of the C-tests in the previous literature were taken for granted as the means of testing productive lexical knowledge of the learners (e.g. Laufer & Nation, 1995), and also due to the fact that the number of the presented letters for every deleted word was

flexible in the related literature (Laufer & Nation, 1995; Sigott & Koberl, 1996), the first two letters of every deleted word were presented in the devised C-test. The readability of the selected text was tested through Flesch Readability Formula (Mousavi, 1997), and the reliability of the abovementioned test was computed through test-retest method (Brown, 2005, p. 175) demonstrating to be highly reliable (i.e. $r = .8$; $p < .01$). Also, the content validity (Brown, 2005, p. 221) of the test was confirmed by three of the professors of English Department of that university; as they admitted this C-test as the indicator of productive vocabulary knowledge of the participants of this study. Moreover, the criterion-related validity (Brown, 2005, p. 234) of the C-test was proven through validating the results of the two post tests with the results of the TOEFL test (2004).

Procedure

The study was conducted in three phases of pre-noticing, noticing, and post tasks of noticing. The first two phases which acted as the prerequisite for the post tasks of noticing were somehow similar to that of Abednia and Tajik (2012) but with two differences. To do the study, two intact classes from a state university in Tehran at upper-intermediate proficiency level were selected. They sat for a TOEFL test (2004) and based on 1 SD above or below the mean, 21 out of 28 participants in one class, and 21 out of 29 in the other class were selected as the main participants of this study. Then, they were randomly assigned to the two groups of massed and distributed task. The other participants took part in the activities but were excluded from the data.

In the first phase, to select the words whose production was not as easy as their recognition to be worked on by the main participants, a pilot study was carried out among 10 English students of an English language institute. The results of the independent samples t-test showed no significant difference between the pilot and the main participants [i.e. $t(50) = -.081$; $p = .936$]. Therefore, the blank parts of the C-test were based on the result of the pilot study which finally led

to the selection of the most frequent 16 highlighted words out of 25, selected by the participants in the pilot test.

Following assigning the participants to two groups of massed and distributed, a C-test was given as the pre test to the learners of this study to know about their productive lexical knowledge before the noticing phase (i.e. highlighting the words in the text). The C-test for the participants of the study included 16 deleted words.

One week after implementing the pre test, to conduct the noticing phase, the complete text of the previous C- test was given to the learners of both groups to be read and discussed. Next, they were asked to highlight 25 words of the most problematic words in the text that they could comprehend easily but could not produce well. Therefore, noticing was conducted equally among all the participants. In fact, the meaning of the highlighted words was reviewed in this session, too. It is necessary to mention, to be sure that the selected words by the participants of main groups and the pilot group were the same, 16 words of the most frequently highlighted words by the participants of the pilot group from among the 25 highlighted words were used as the deleted words for the C-test, and also were utilized in the treatment phase.

The procedure conducted up to this level, i.e., pre-noticing and noticing was similar to what Abednia and Tajik (2012) did in their study to some extent. They selected the intended words by intuition and did not pilot them, whereas in the present study, the words deleted from the C-test were piloted. Moreover, they used a cloze test as an instrument, but in the present study, a C-test was utilized to achieve more accuracy. In fact, the procedure up to this level was considered as a prerequisite for the treatment (i.e. the massed sentence writing vs. distributed sentence writing). Thus, redoing these two phases was essential for the treatment procedure --post task phase.

One week later, the treatment phase for both groups started to be carried out. The participants of both groups made sentences with the noticed words. As a result, not only were the participants aware of the noticed words but also they practiced the noticed words. This process for both groups was conducted 4 times during 4 weeks. Thus, the participants of both groups were involved in the process of sentence writing as the post task of the noticing activity, but the difference was

in the kind of the treatment. Indeed, every week, the participants of one group were asked to write 4 sentences with the noticed words without any time interval in the process of their sentence writing. As a result, every week the researchers received the 4 written sentences, once in one day, i.e. this kind of writing was considered to be the massed sentence writing. However, the members of the other group wrote every 4 sentences with time interval. Hence, every day they wrote only one of the sentences and delivered it to the researchers in that day; every week, the process of treatment in this group took 4 successive days, and every day the researchers received one of the sentences from the participants of this group. Then, the participants of this group were involved in the distributed sentence writing. It is necessary to mention, to ensure that the process of the treatment was conducted well in both groups and to collect the sentences, every week, one of the researchers participated in every treatment session in each of the classes that the participants of every group were present and asked them to write the sentences in the class and then deliver them to the researchers in that day.

In fact, in every treatment session for both groups, the researchers gave one dictionary example for the presented word(s), as well. Then, the participants were asked to write the sentences. Furthermore, although Nasrollahy Shahry (2010) provided evidence that using the dictionary sentences or writing the sentences did not show any difference in the speed of remembering of vocabulary items among the learners at higher proficiency level, to get control over the process of the treatment, the researchers asked the participants to write the sentences by referring to their own knowledge and not by copying the dictionary examples.

In the following week, the same C-test was given to both groups to be completed to test the effect of the treatment in the short term. Since, according to the related literature of spacing, the time span between the first and the delayed post test was flexible (i.e. 4 days, 1 month, 5 weeks, or some years) (e.g. Bahrick & Phelps, 1987; Bloom & Shuell, 1981; Goossens et al., 2012; Moinzadeh, Talebinezhad, & Behazin, 2008), the same C-test as the delayed post test was administered in two weeks, as well.

Results

To analyze the data, all the data went under the process by using SPSS software computer program, version 20. To be able to conduct, first the normality of distribution was checked through One-Sample Kolmogorov-Smirnov test. Then, a two factor mixed design ANOVA (Hinton, Brownlow, McMurray, & Cozens, 2005, p. 221) was implemented.

Table 1

One-Sample Kolmogorov-Smirnov Test for Massed/Distributed Groups in Pre Test, Post Test, and Delayed Post Test

		Pre-test, Massed Group	Pre-test, Distributed Group	Post-test, Massed Group	Post-test, Distributed Group	Delayed Post-test, Massed Group	Delayed Post-test, Distributed Group
<i>N</i>		21	21	21	21	21	21
Normal Parameters ^a	<i>Mean</i>	3.43	3.57	8.95	9.86	6.86	8.76
	<i>SD</i>	1.076	1.121	2.397	2.744	2.632	2.095
Most Extreme Differences	Absolute Positive	.179	.220	.175	.233	.141	.213
	Negative	-.179	-.220	-.175	-.233	-.096	-.095
<i>Kolmogorov-Smirnov Z</i>		.819	1.009	.800	1.067	.645	.978
<i>Asymp. Sig. (2-tailed)</i>		.514	.260	.544	.205	.800	.295

According to Table 1, both groups contained a normal distribution in all the tests. Also, Table 2 reveals the descriptive statistics of the two groups

Table 2

Descriptive Statistics of Two Groups in Pre Test, Post Test, and Delayed Post Test

	<i>n</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>N</i>
Pre Test	Massed Group	3.43	1.076	21
	Distributed Group	3.57	1.121	21
	Total	3.50	1.088	42
Post Test	Massed Group	8.95	2.397	21
	Distributed Group	9.86	2.744	21
	Total	9.40	2.586	42
Delayed Post Test	Massed Group	6.86	2.632	21
	Distributed Group	8.76	2.095	21
	Total	7.81	2.540	42

Based on Table 2, the mean scores of massed and distributed groups in the post test and the delayed post-test seemed close. Therefore, to see how the participants of each group of the massed/distributed improved in the post test/delayed post-test in comparison with the pre-test, the within-subject effect is provided in Table 3.

Table 3
Tests of Within-Subjects Effects in Pre Test, Post Test, and Delayed Post Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	
Test	Sphericity Assumed	783.762	2	391.881	192.128	.000	.828
	Greenhouse-Geisser	783.762	1.642	477.238	192.128	.000	.828
	Huynh-Feldt	783.762	1.746	448.866	192.128	.000	.828
	Lower-bound	783.762	1.000	783.762	192.128	.000	.828
Test *	Sphericity Assumed	16.397	2	8.198	4.019	.022	.091
	Greenhouse-Geisser	16.397	1.642	9.984	4.019	.030	.091
	Huynh-Feldt	16.397	1.746	9.391	4.019	.027	.091
	Lower-bound	16.397	1.000	16.397	4.019	.052	.091
Error (test)	Sphericity Assumed	163.175	80	2.040			
	Greenhouse-Geisser	163.175	65.692	2.484			
	Huynh-Feldt	163.175	69.844	2.336			
	Lower-bound	163.175	40.000	4.079			

Based on Table 3, the productivity of lexical knowledge of each group was boosted in the two post-tests in comparison with the pre-test in that group; $F(1.642, 65.692) = 192.128$; $p < .05$, but to know where the difference was, the bonferroni test was conducted (Field,

2009). Besides, the interaction of test (i.e. the pre-test, the post test, and the delayed post-test) and the methods of learning in each group (massed vs. distributed) was shown to be significant [$F(1.642, 65.692) = 4.019; p < .05$]. Table 4 shows the results of the bonferroni test.

Table 4

Pairwise Comparisons in Pre Test, Post Test and Delayed Post Test

(I) Test	(J) Test	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
Pre Test	Post-test	-5.905*	.363	.000	-6.812	-4.997
	Delayed Post-Test	-4.310*	.324	.000	-5.119	-3.500
Post Test	Pre-Test	5.905*	.363	.000	4.997	6.812
	Delayed Post-Test	1.595*	.234	.000	1.012	2.179
Delayed Post Test	Pre-Test	4.310*	.324	.000	3.500	5.119
	Post-Test	-1.595*	.234	.000	-2.179	-1.012

Note: Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Based on Table 4, there was a significant difference in the productivity of lexical knowledge of each group in the pre-test, the

post test, and the delayed post. To sum up, by considering the mean score of each group in three tests (see Table 2), it can be concluded that the productive lexical knowledge of every group improved significantly in the post test in comparison with the pre-test. But, this score decreased in the delayed post-test in comparison with the post test.

To see the development of each group in the post test and the delayed post-test in comparison with the pre-test, the estimated marginal means of two groups in three tests are shown in Figure1.

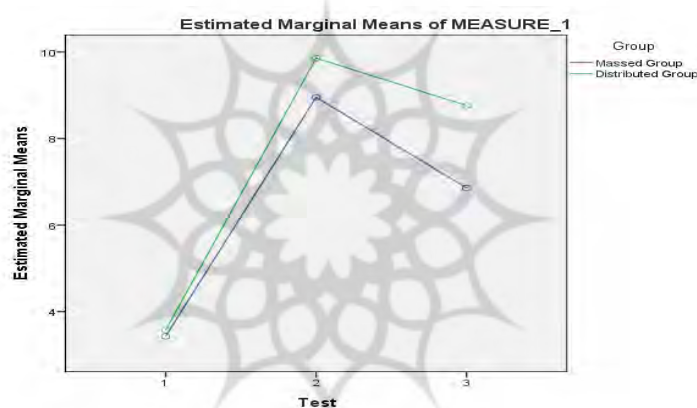


Figure 1. Estimated Marginal Means for 1 (Pre Test), 2 (Post Test), and 3 (Delayed Post Test) of Massed/Distributed Groups

Also, to investigate which of the two groups of massed vs. distributed could outperform the other in the pre-test, the post test, and the delayed post-test, the test of between-subject effect is provided in Table 5, as well.

Table 5
Tests of Between-Subjects Effects of Massed/Distributed Groups in Pre Test, Post Test, and Delayed Post Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	6007.143	1	6007.143	637.336	.000	.941
Massed/ Distribut ed Groups	30.508	1	30.508	3.237	.080	.075
Error	377.016	40	9.425			

Based on Table 5, no significant difference [$F(1, 40) = 3.237; P > .05$] was seen between the massed group and the distributed group, though according to Table 2, the mean scores of the distributed group in the post test and the delayed post-test were more than those of the massed group.

Discussion

The first point worth discussing is considering the effect of time. As the findings of the present study regarding the productive lexical knowledge showed, both groups were at the same level of proficiency before the treatment, but both groups productive vocabulary knowledge improved significantly in the two post-tests in comparison with the pre-test. Hence, it is clear that presenting a task as the post task of noticing was significantly influential in enhancing the noticed productive lexical items in the short/long term. Indeed, involving the learners with more exercises (i.e. sentence writing in this case) led them to more retention of the noticed productive vocabulary items. However, the two-week time interval between the two post-tests in which no more tasks were presented to the participants caused the effect of the post task weaker and consequently less retention occurred in the delayed post-test than in the post test.

Similar to the results of the present study, Song and Suh (2008), and Alizadeh Kolagar (2012) were in favor of presenting a kind of post task of noticing activity (i.e. picture-cued written task and reconstruction task as two sorts of post tasks in their studies). Indeed, similar to the results of the present study, Song and Suh (2008) proved that any kind of post task was significantly effective in enhancing the effect of noticing after the process of treatment. Also, like the results of the present study, their findings showed no significant difference between the effect of two types of post tasks (i.e. picture-cued written task and reconstruction task) after the process of noticing. But, as Alizadeh Kolagar's (2012) results indicated, only one of the two groups who received a kind of post task (i.e. reconstruction task) improved in the post test in comparison with the pre-test, which was contrary to the findings of the present study and Song and Suh's (2008). These results were perhaps on the basis of the issue that unlike the present study and Song and Suh's (2008), Alizadeh Kolagar (2012) included teenage students in her study, and also contrary to the present study -working on productive lexical items-- and different from Song and Suh (2008) -working on a type of conditional sentences-- she focused her study on improving the effect of noticing a specific aspect of structure.

From another point of view, the interaction between the time factor (i.e. the time between the pre-test, the post test and the delayed post-test) and the methods of learning in each group (i.e. massed vs. distributed) is worth discussing. On the one hand, the achieved results of both groups of massed/distributed in the short term were significantly better than those of the massed/distributed groups in the long term, in general, on the other hand, the mean score of the distributed group in the short term was better than that of the massed group in the long term, and the mean score of the massed group in the short term was slightly better than that of the distributed group in the long term.

In short, considering the interaction of time between the two post-tests in comparison with the pre-test, and the types of learning in each group (i.e. massed/distributed), it is worth stating that the retention of the learnt productive vocabulary items in the short term was more effective than that in the long term, and also the difference between

the results of the two groups in each test was not significant; however, the interaction between the time and the methods of learning was significant. Possibly, the significance of the interaction was due to the point that firstly the effectiveness of the time in the interaction was more than that of the types of learning. Besides, it was perhaps as a result of the issue that the mean difference between the massed vs. the distributed groups in the long term was much more than that in the short term. The findings of the present study, in this vein, supported Goossens, et al. (2012). The findings of their study showed the children's learning of the words was more successful through spaced repeating than the massed repeating in the short/long term. But, the interaction between the method and the time interval of two tests was not significant in their study. It was possibly as a consequence of the issue that contrary to the present study, the children were the participants of their study and children differ from adults in remembering things.

The present study had some common points with another study in this field (Moinzadeh, et al., 2008). Some groups of the participants took part in their study; one of the groups received the exposure once a day during 6 consecutive days in each week, another group experienced this process 3 times in every week, the other group received the English materials twice a week, and the last group experienced the process once a week. According to them, one session exposure of L2 materials in every week was not enough for the retention of the learnt materials in EFL. The present study confirmed their results. Moinzadeh et al. (2008) believed that one day exposure in a week was not significantly effective in the retention of vocabulary items after the treatment in comparison with the pre-test, and also the mean score of the group who experienced one day exposure in the pre-test was lower than those of the other groups, having more sessions of exposure in each week, in the post tests. Indeed, one day exposure, which was considered as the massed learning in the present study, included one session exposure of vocabulary items to the participants in Moinzadeh et al. (2008) study which seemed to be the most distributed way of learning investigated in their study. In other words, in the present study, once a week four sentences were written in the massed group, but in their study, every week, one group of learners

received only one session exposure of materials that lasted for 6 weeks. Moreover, they did not consider 4 successive days in their study, and did not include four-session exposure of vocabulary items in one day to the participants.

In fact, the findings of present study can have the implication that if improving the productive lexical knowledge without considering the type of teaching (i.e. massed vs. distributed) is the goal, the massed/distributed sentence writing in the short term is better than in the long term; since the massed/distributed sentence writing are both considered as two sorts of practice, they help the process of learning but in longer time, the distributed one can be more beneficial.

As the third point worth discussing, in the present study, the mean scores of the distributed group in the post test, and the delayed post-test were more than those of the massed group in the two post-tests; however, the differences were not significant. Therefore, more retention happened in the distributed group in the long term than in the massed group. In supporting the beneficial effect of distributed learning of vocabulary items in the long term, this study was in line with Bahrck et al. (1993), and Sobel et al. (2011), as well. The achieved results of the present study at this part will help the EFL learners keen on developing their lexical knowledge through self study in the long term. They would know that acquiring the vocabulary items through the distributed way would be more effective than learning them in the massed way. Besides, the EFL teachers would be informed that if the kind of teaching to improve the productive lexical knowledge, especially in the long term, is the aim, the distributed sentence writing is more suggested.

Conclusion

Regarding the effect of time, it can be concluded that presenting a task as the post task of noticing was significantly influential in enhancing the noticed productive lexical items in the short/long term. But, due to the two-week time interval between the two post-tests, less retention happened in the long term than in the short term, in general. Moreover, the interaction between the time factor and the techniques of massed vs. distributed learning was significant. Hence, it can be concluded that the achieved results of both groups of

massed/distributed in the short term were significantly better than those of the massed/distributed groups in the long term, in general. In other words, regardless of types of learning (i.e. massed vs. distributed), more retention in the short term in comparison with the long term occurred in both groups. As another point, due to the superiority of the distributed way of learning to the massed way in both post-tests, though not significantly, it can be concluded that the distributed way of practicing the noticed items was more effective than the massed way in enhancing the productive vocabulary knowledge, especially in the long term.



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Appendix

C-Test

Who comes first?

A child's place in family birth order may play a role in the type of occupations that will interest him or her as an adult, new research suggests. In two related studies, researchers found that only children° and to certain extent first-born children° were more interested in intellectual, co.444.. (cognitive) pursuits than were later-born children. In contrast, later-born children were more interested in both artistic and outdoor-related careers.

These results fit into theories that say our place in family birth order will influence our personality, said Frederick T. L. Leong, co-4444(co-author) of the study and professor of psychology at Ohio

State University. Parents typically place different demands and have different expectations of children depending on their birth order, Leong said.

For example, parents may be extremely protective of only children and worry about their physical safety. That may be why children are more likely to show interest in academic pu4444.(pursuit) rather than physical or outdoor activities. Only children will tend to get more time and attention from their parents than children with si44 44.(sibli ngs) . This will often make them feel special but the downside is that they may suffer occasional pa4444. (pangs) of jealousy and loneliness when friends discuss their brothers and sisters and family life.

The first-born is an only child until the second child comes along transforming them from being the centre of attention, to then sharing the care of parents. Parents will also expect them to be responsible and set an example. The change from being the focus of a family may be quite a shock and so shape the first-born s su...4444 .(subsequent) outlook on life. Therefore, fist-borns may try to get back their parents attention and ap4444.. (approval) by achieving success and re4444. in their careers. It has been noted that first-borns are si4.. 4444 (significantly) more often found as world political leaders than any other birth order position.

As they have more children, parents tend to become more open and relaxed and that may allow younger children to be more risk-taking, Leong said. If the first-born or only child wants to be poet, that may concern parents. But by the fourth child, parents may not mind as much.

Being the youngest in the family can sometimes be a st...4 44..(stifling) and frustrating experience, especially if they are looking to be taken seriously and treated like an adult. The last-born is more likely than the other birth order positions to take up dangerous sports. This may be a sign of last-born s re..4 4444. (rebellious) streak ° a result of being fed up with always being bossed about by everyone else in the family.

Middle children, however, have different issues. Middle child syndrome can means feeling sandwiched between two other more important people ° an older sibling who gets all the rights and is

treated like an adult and a younger sibling who gets all the privileges) and is treated like a spoiled child. Middle-borns have to learn to get on with older and younger children, and this may contribute to them becoming good negotiators of all the birth order positions they are most skillful at dealing with authority figures and those holding inferior positions.

Leong said the biggest differences in the study were between only children and later-born children. First-born children are difficult to classify because they start out as only children but later give up that position. It may be that the length of time a first-born child is an only child makes difference in his or her personality.

