

# Gaming as an English Language Learning Resource among Young Children in Denmark

Signe Hannibal Jensen

## Abstract

*This article presents a study of Danish young English language learners' (YELLs') contact with and use of Extramural English (EE) (N = 107, aged 8 [n = 49] and 10 [n = 58]). They have received little formal English instruction: two lessons per week for one year. Data on EE-habits were collected with a one-week language diary (self-report with parental guidance). Participants reported minutes spent each day on seven EE-activities: gaming, listening to music, reading, talking, watching television, writing, and other. Vocabulary proficiency scores were obtained using the Peabody Picture Vocabulary Test (PPVT™-4). The results show that most time was spent on gaming, music, and watching television. Boys gamed significantly more ( $p < .001$ ) than girls (235 minutes/week vs. 47 minutes/week). Additionally, the results show that gaming with both oral and written English input and gaming with only written English input are significantly related to vocabulary scores, in particular for boys. By investigating the EE-habits of YELLs and relations with second language (L2) English vocabulary learning, this study adds valuable new insights and knowledge about a topic that is becoming increasingly important for children in a globalized world.*

KEYWORDS: EXTRAMURAL ENGLISH; GAMING; YOUNG LEARNERS; YELLs; L2 VOCABULARY LEARNING; SLA; USAGE-BASED APPROACH

## Introduction

Being a small country with 5.6 million inhabitants, Denmark has always prioritized foreign language teaching, with English being taught as the primary foreign language in public schools since 1975. Following the trend in many other European countries (EACEA, 2012), as of 2014 the starting age for learning

---

## Affiliation

University of Southern Denmark.  
email: sihaje@sdu.dk

English was lowered from third to first grade. Given the fact that presently English is undoubtedly the lingua franca of the world, there is great political focus on English as a school subject in Denmark. Moreover, the possibilities of encountering English outside school in Denmark are rich. Many second language acquisition (SLA) researchers agree that there is a potential for language learning outside the formal educational system (cf. Benson & Reinders, 2011). A large part of the world's population has access to English on an everyday basis outside school, which has created an increased interest in the potential of out-of-class English as a “tool” for learning English, also known as extramural English (Sundqvist, 2009). However, very little research on extramural English targeting young English language learners (YELLs) has been carried out, and hardly any studies exist on YELLs and the potential language learning benefits of playing digital games. This article aims to, at least partly, fill this gap in research by firstly mapping the extramural landscape for Danish YELLs, and secondly by examining a particular activity (that is, gaming) to see whether it correlates with vocabulary learning outcomes and whether the language mode of the game might be relevant for vocabulary learning. The article addresses these issues from a gender perspective since previous research has found significant gender differences for extramural use (Gretlund & Heiselberg, 2013; Olsson, 2011; Sundqvist & Sylvén, 2014). In what follows, the article reviews previous research on extramural English and describes the situation for English in Denmark, after which the research questions and study design are described. Results are subsequently presented and discussed, and suggestions for further research are provided.

## Background

The term *extramural English* (EE), coined by Sundqvist (2009, p. 1), refers to English that users engage in in various forms outside the classroom. EE is related to the notion of incidental learning defined by Laufer and Hulstijn (2001, p. 66) as “the learning without an intent to learn, or as the learning of one thing, e.g. vocabulary when the learner’s primary objective is to communicate.” In connection with EE, this is not to say that learners are unaware of the potential language-learning benefit of engaging in EE, but it is not the primary reason for engaging in the activity, which is rather to be entertained, challenged, to communicate, etc. In line with such reasoning, Sockett (2014, p. 14) suggests that the term *language user* rather than *language learner* is more appropriate in the context of incidental learning. Sockett’s term is employed in this article where the activities under investigation are situated outside the formal school system and, thus, the “identity” of the child during engagement in the activities is that of user rather than learner, in the formal sense of the word. In usage-based theories of second language (L2) learning, frequency of input is highly important; that is, the more input and repetitions of this input

a user encounters the more likely s/he is to benefit from it (Ellis, 2009). Gee (2012, p. xiii) notes that good games will provide exactly this by “present[ing] players or learners with many more instances in a short time of important cases [e.g., language associated with actions] than they would see in reality.” Moreover, Ellis (2009, p. 4) notes: “[l]earners must be exposed to a representative sample of authentic input that is relevant to their needs.” EE activities in sufficient quantity (and quality) may potentially offer such relevant input, relevant in that it enables engagement in the EE activities, in turn motivating the user to seek to understand the input.

## Previous Research

Previous research on extramural contact and influence on L2 English proficiency suggests a positive relationship, and results show that the most popular out-of-school activities are watching TV, using computers (gaming and net-based activities, such as YouTube), and listening to music (Lefever, 2010; Lindgren & Muñoz, 2013; Sundqvist, 2009). Several studies have established that watching subtitled television has a positive effect on L2 acquisition (d’Ydewalle & Van de Poel, 1999; Lindgren & Muñoz, 2013; Sockett & Kusyk, 2015). Investigating very young learners, below the age of eight, Unsworth, Persson, Prins, and De Bot (2014) found no significant effect of extramural engagement for TV and “other media.” However, it is speculated that the lack of effect could be ascribed to the fact that children that young do not engage in sufficient amounts of EE for it to have a learning effect. Furthermore, the researchers only had access to a limited set of data on extramural use. Studies on extramural as well as classroom-instructed gaming among teenagers and learners in their early twenties have shown a variety of benefits from gaming on different language parameters such as, for example, vocabulary acquisition and pragmatic language cues (Benson & Chik, 2011; Cheung & Harrison, 1992; Marsh & Tainio, 2009; Miller & Hegelheimer, 2006; Olsson, 2011; Rankin, Gold, & Gooch 2006; Reinders & Wattana, 2012; Sundqvist & Sylvén, 2012; Sundqvist & Wikström, 2015; Thorne, 2008; Turgut & Irgin, 2009).

Studies on YELLs are rare, and in particular studies that target extramural gaming and L2 proficiency, but a few studies have been carried out. In a Swedish study with 112 10-year-olds, Sundqvist and Sylvén (2014) found a correlation between self-assessed L2 English proficiency, gender, and digital gaming. The children were divided into three groups based on their digital gameplay habits (as noted in a language diary): non-gamers, moderate gamers, and frequent gamers (more than four hours of gaming per week). Boys comprised 88% of the frequent-gamer group. A questionnaire revealed that all frequent gamers were highly motivated for learning English, whereas the non-gamers were the least motivated. All the children assessed their English abilities as

being “good,” but whereas some children in the non-gamer and moderate-gamer groups assessed their abilities as “very bad,” none in the frequent gamer group did so. For 11- and 12-year-olds, Sylvén and Sundqvist (2012) found a positive relation between gaming on the one hand and listening comprehension, reading comprehension, and vocabulary proficiency on the other, where frequent gamers (more than five hours of gaming per week) outperformed non-gamers and moderate gamers. In another Nordic study, Lefever (2010) reports how Icelandic parents attribute English-language competence among their 8-year-old children to motivation and to English media exposure, including video games. The children had received no teaching of English prior to the study, yet they ranged from being able to understand basic spoken English to being able to participate in “simple conversations” (p. 8). The boys in the study outscored the girls on a conversational skills test, whereas the girls by far outnumbered (75%) the boys in the lowest scoring group. The study does not identify any specific extramural source of learner proficiency. Nevertheless, the participating parents attested that their children particularly engaged extensively in watching television and playing computer games. As other Icelandic studies have established that boys spend more time on digital games than girls and, moreover, that the boys in his own study showed superior conversational skills, Lefever (2010) calls for further research to examine a possible connection between gaming and L2 English proficiency.

Kuppens (2010) studied 361 11-year-old Flemish students to determine extramural effects on L2 English proficiency. As in the Icelandic study, the children had received no prior formal instruction in English. The students filled out a questionnaire on EE habits and were tested on oral proficiency and translation skills. Again, the boys scored significantly higher on the oral test and, in parallel to Sundqvist and Sylvén’s (2014) study, the boys’ self-assessed proficiency outranked that of the girls. Boys spent significantly more time on gaming than girls. Statistical analysis revealed that playing computer games had a significant but limited effect on translation skills (Kuppens, 2010). Kuppens speculates that this limited effect was found because the study did not distinguish between different types of computer games offering various levels of English difficulty, that is, ranging from games where a few single written or oral words are used for simple commands to games with more complex narrative setups including both oral and written language.

### The Presence of English in Denmark

According to the English Proficiency Index (EFEPI, 2015, p. 1), adult Danes are ranked among the top three countries in the world as having “very high proficiency.” The situation for English in Denmark may thus well be described as one of societal bilingualism (cf. Sebba, 2010). The opportunities for Danish

children to encounter English in their spare time are substantial. In Denmark and the other Nordic countries (Finland, Iceland, Norway, and Sweden) English-language television is not dubbed and, as a consequence, English is readily available both on TV as well as on net-based services such as Netflix and the web. Much popular music is in English and easily accessible. Many ads and commercials are in English, and so are many products, toys being no exception, for example, Nerf guns, Monster High dolls and Lego Star Wars, to mention a few. English is in general, as in the rest of the world, the language of popular culture to which many children are drawn. In a summary of the European Survey *EU Kids Online* Mascheroni and Ólafsson (2014) report that Danish children go online already at the age of 7, whereas the average European child goes online at the age of 9. Furthermore, 94% of Danish children use the Internet every day compared to the European average of 79%. Additionally, 77% of Danish children between the age of 9 and 16 have access to the Internet at home in their own bedroom compared to 55% across Europe. Also, Mascheroni and Ólafsson (2014) found that boys between the ages of 9 and 12 in general spend more time online than girls, playing computer games as well as watching YouTube clips. With the dominance of English-language entertainment online, it is fair to assume that for many children a great deal of their free-time activities are mediated in English.

## Aims and Research Questions

As mentioned, this study focuses on YELLS in Denmark. Two groups are compared, *early starters* (aged 8) and *later starters* (aged 10) (explained below). The focus is (a) on EE use in general and (b) on gaming and language vocabulary learning specifically. Since previous research has found significant differences between boys and girls with regard to EE, gaming, and language learning, gender is included as a possibly relevant background variable. In particular, the study investigates whether there is a correlation between gaming (in different language modes) and L2 English vocabulary proficiency. The language modes examined are games with (i) only English oral input, (ii) only written English input, (iii) both written and oral English input, (iv) Danish oral input and written English input, and (v) games with oral English input and Danish written input. The study states the following research questions (RQs):

RQ1: (a) What EE activities do Danish YELLS engage in, and to what extent? (b) Are there gender-related differences?

RQ2: (a) What gaming activities (in varying language modes) do Danish YELLS engage in, and to what extent? (b) Are there gender-related differences? (c) Is there a correlation between these gaming activities and vocabulary scores?

## The Study

### Participants

For the purpose of this study, a subsample was drawn from an ongoing large-scale project on the role of age in language learning funded by the Danish government. As mentioned, the Danish school law was changed in 2014, introducing English from grade 1. Thus, in 2014, both first graders (7 years of age then, henceforth early starters) and third graders (9 years of age, henceforth later starters) were introduced to English lessons for the first time. At the time of the data collection for this study (the fall of 2015) both early and later starters had had English lessons for a little more than one school year and were 8 and 10 years old respectively. For the present study, a subgroup of 144 children was chosen from seven classes at five schools. All participants had received two English lessons per week. The participants differ in terms of age and gender but have had approximately the same hours of formal English instruction in school. There are both private and public schools in Denmark; the norm is to attend public schools.

Of the 144 potential participating YELLs, 112 returned language diaries, of which five (3%) were excluded, three due to insufficient data (that is, less than four days were filled out) and two because they were outliers in terms of EE use (reporting more than 25 hours weekly). Thus, there are 107 participants in the present study (61 girls and 46 boys). Of these, 49 are early starters (16 from one public school; 33 from one private school) and 58 later starters (from four public schools).

### Data Collection Methods

Receptive vocabulary proficiency scores were obtained using the Peabody Picture Vocabulary Test (PPVT™-4) (Dunn & Dunn, 2007). In the test, the children hear a pre-recorded word, e.g., cat, and choose a matching image from four possible choices. A pretest was administered in the fall of 2014 and a post-test was administered one year later. The posttest results are used for this study as EE data is only available from the fall of 2014; that is, it cannot be assumed that the pretest scores are related to EE use at the time of the EE data collection as the two measurements are one year apart.

Data on EE habits were collected through a one-week language diary. The diary is a modified version of Sundqvist and Sylvén (2014). Via self-report with parental guidance, children reported the minutes spent each day on seven activities presented in the following order in the diary: listening to music, reading books/magazines/webpages, speaking in English, writing, “other,” watching television/YouTube/Internet and gaming. The gaming and TV sections were designed to get detailed knowledge of the language of the activities the children engaged in and an estimate for time spent on these. The

children also specified whether the activities had (i) only English oral input, (ii) only written English input, (iii) both written and oral English input, (iv) Danish oral input and written English input, and (v) oral English input and Danish written input. They did this by writing D (Danish) or E (English) or a minus sign (no language) in a box under the heading: “Language spoken in the game/TV/YouTube.” Next to this box, they ticked one of three boxes: “no text,” “English text,” “Danish text.” The system was devised to elicit detailed gaming information as the language mode may affect learning outcomes. The diary was extensively piloted at two schools outside the project among 72 learners in two separate rounds. The researcher attended parental meetings at the participating schools where possible (six out of seven), preparing the parents to receive the diaries. Additionally, teachers sent reminders to the parents twice during the diary week. The diary was introduced by the researcher in each class with the help of a large laminated sample page that was filled out together with the children, who were asked to provide personal examples of extramural activities. Thus, the children became familiar with the diary. They appeared to enjoy the task and were happy to share their own examples of activities.

The language diary was coded by the researcher following a stringent system which was devised after the coding of 40 diaries. The 40 diaries were coded twice: once for devising the system and the second time for making sure that the initial coding matched the system. An interrater reliability test of 10% of the diaries performed by a colleague gave a 95% match, which was considered satisfactory. The language information provided about the games was taken at face value, that is, the researcher did not check if the information was accurate; this was deemed too difficult to assess, as many games can be played in different versions and online/offline, and not all children provided titles of games. Thus, oral input may be as little as a single utterance throughout a gaming session or it may constitute a dense dialogue throughout gameplay, and even include oral/written chat. PPVT™-4 was coded according to test guidelines for obtaining raw scores.

### **Ethics**

Strict ethical guidelines for conducting research involving minors were adhered to at all stages of this research. The language diary task was presented as optional in order to avoid the children feeling coerced into sharing personal information.

### **Design**

Each activity in the diary was coded separately for minutes spent per day and entered into Excel. Sum totals (weekly use) were generated in Excel and the

data were analyzed using Stata 14.0. Means were calculated for the dependent as well as independent variables in total and in relation to gender and age. As the diary data were found to have a non-normal distribution (skewed to the right), a two-sample Wilcoxon rank-sum (Mann-Whitney) was performed checking for between-group significance (between gender and early or later starters and extramural habits). Two-sample *t*-tests were employed to check for variance on Peabody in relation to gender, private versus public school, and early versus later starters. Given the focus on gaming, the following gaming variables were singled out for elaboration: gaming with oral English input and no written input (GEZ), games with both oral and written English input (GEE), games with oral English input and written Danish input (GED), games with no oral input and written English input (GZE), and games with Danish oral input and written English input (GDE). Due to the small sample size, Kendall Tau b-correlation was employed to check the gaming variables for possible correlations with scores on the Peabody test. Regression analyses with “School” as cluster were run with the independent variable Gaming: “GEE” as well as the categorical variables “Gender” and “Starting age” (early or later starters). Due to the non-normal distribution of the gaming data, regressions on the GEE gaming variable with a cutoff point at 240 minutes a week were also run. The cutoff point was chosen on the basis of previous YELL studies which have defined more than 240 minutes (4 hours) of gaming per week as frequent use (Sundqvist & Sylvén, 2014).

## Results

RQ1 asked what activities Danish YELLs engage in and to what extent there are gender-related differences.

Table 1 illustrates the participants’ reported weekly use of EE in minutes ( $M = 365.7$ ). The girls preferred *listening to music* ( $M = 115.4$ ), followed by *watching television* ( $M = 69.8$ ) and *gaming* ( $M = 46.8$ ). The boys preferred *gaming* ( $M = 235.1$ ), followed by *watching television* ( $M = 120.9$ ) and *listening to music* ( $M = 78.4$ ). A two-sample Wilcoxon rank-sum (Mann-Whitney) test indicated that the time boys reported spending on gaming was significantly higher than the time reported by girls:  $Z = 5.464$ ,  $p < .001$ . There was also a significant difference between the time spent on *listening to music*; boys reported listening significantly less to music than girls:  $Z = -1.981$ ,  $p = .047$ . The difference in *watching television* was non-significant:  $Z = 1.623$ ,  $p = .104$ . Time spent on the remaining four EE activities (*writing*, *reading*, *talking*, and *other*) was negligible and therefore excluded from Table 1; the means of use were at 14.0, 4.3, 24.5, and 7.1 minutes per week respectively. Early starters spent more time on gaming in total than later starters, but not significantly so:  $Z = 0.421$ ,  $p = .674$ .

Table 1  
Extramural activities total and divided between gender (M = male, F = female) and early (ES) and later starters (LS) (minutes per week)

<b>Listening to music via CDs, web-based services, radio, etc. (minutes per week)</b>					
<b>Group</b>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>Min.</b>	<b>Max.</b>
Total	107	99.5	159.28	0	980
M	46	78.4	129.74	0	660
F	61	115.4	177.76	0	980
ES	49	95.4	132.14	0	651
ES/M	24	77.5	121.58	0	472
ES/F	25	112.6	141.88	0	651
LS	58	102.9	180.13	0	980
LS/M	22	79.4	140.98	0	660
LS/F	36	117.3	200.89	0	980
<b>Watching TV, YouTube, other web-based services, cinema, etc. (minutes per week)</b>					
<b>Group</b>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>Min.</b>	<b>Max.</b>
Total	107	91.8	125.01	0	552
M	46	120.9	150.82	0	552
F	61	69.8	96.98	0	450
ES	49	102.9	129.19	0	545
ES/M	24	122.9	153.68	0	545
ES/F	25	83.7	99.80	0	315
LS	58	82.3	121.70	0	552
LS/M	22	118.8	151.21	0	552
LS/F	36	60.1	95.16	0	450
<b>Gaming – online or PC games, PlayStation, etc. (minutes per week)</b>					
<b>Group</b>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>Min.</b>	<b>Max.</b>
Total	107	127.8	160.92	0	645
M	46	235.1	184.58	0	645
F	61	46.8	68.64	0	300
ES	49	132.3	153.43	0	540
ES/M	24	209.2	176.31	0	540
ES/F	25	58.5	75.48	0	240
LS	58	123.9	168.23	0	645
LS/M	22	263.3	193.29	0	645
LS/F	36	38.7	63.29	0	300

Group	<i>n</i>	EE activities total (minutes per week)			
		<i>M</i>	<i>SD</i>	Min.	Max.
Total	107	365.7	315.96	0	1590
M	46	491.5	367.48	0	1590
F	61	270.8	231.96	0	1025
ES	49	364.8	288.84	0	1315
ES/M	24	437.1	328.39	0	1315
ES/F	25	295.5	230.83	0	875
LS	58	366.4	339.70	0	1590
LS/M	22	550.9	405.20	0	1590
LS/F	36	253.7	234.44	0	1025

RQ2 asked what gaming activities (in varying language modes) Danish YELLs engage in, to what extent, and whether there are gender-related differences, and also if there is a correlation between gaming activities and vocabulary scores.

A two-sample *t*-test showed no significant difference between scores on PPVT, neither between later starter boys and girls nor between early starter boys and girls. As shown in Table 2, the test indicated that early starters (boys and girls together) scored significantly lower than later starters (boys and girls together) on PPVT ( $p < .001$ ). It can be mentioned that there were no significant differences between private and public school test scores.

Table 2  
Peabody according to gender (M = male, F = female) and early (ES) and later (LS) starters

Group	<i>n</i>	PPVT raw score			
		<i>M</i>	<i>SD</i>	Min.	Max.
Total	107	56.8	25.69	11	132
M	46	60.9	24.23	24	132
F	61	53.8	26.52	11	129
ES	49	46.1	25.92	11	132
ES/M	24	51.5	24.66	24	132
ES/F	25	40.9	26.54	11	129
LS	58	65.9	21.86	26	107
LS/M	22	71.1	19.53	26	104
LS/F	36	62.7	22.85	27	107

The most popular language mode for games was using both oral and written English input (GEE), followed by games with only oral English input (GEZ) and games with English text only (GZE) (see Table 3). Games with Danish input (oral or written) were of such negligible nature that they were excluded. Boys reported gaming significantly more than girls in the categories GEZ ( $Z = 2.962, p = .003$ ) and GEE ( $Z = 4.295, p < .001$ ), but not significantly so in GZE ( $Z = 1.010, p = .312$ ).

Table 3

Gaming activities total and divided between gender (M = male, F = female) and early (ES) and later (LS) starters (minutes per week)

<b>Gaming with English oral input and no text (GEZ)</b>					
<b>Group</b>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>Min.</b>	<b>Max.</b>
Total	107	39.8	85.65	0	420
M	46	72.8	114.48	0	420
F	61	15.0	40.87	0	200
ES	49	23.1	53.20	0	200
ES/M	24	26.5	52.89	0	195
ES/F	25	19.8	54.38	0	200
LS	58	54.0	103.99	0	420
LS/M	22	123.27	141.07	0	420
LS/F	36	11.6	28.41	0	134
<b>Games with English oral input and English text (GEE)</b>					
<b>Group</b>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>Min.</b>	<b>Max.</b>
Total	107	49.8	100.54	0	645
M	46	97.5	136.08	0	645
F	61	13.9	30.26	0	140
ES	49	54.2	99.49	0	430
ES/M	24	97.1	127.63	0	430
ES/F	25	13.1	24.25	0	70
LS	58	46.1	102.13	0	645
LS/M	22	97.9	147.78	0	645
LS/F	36	14.5	34.14	0	140
<b>Gaming with English text only (GZE)</b>					
<b>Group</b>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>Min.</b>	<b>Max.</b>
Total	107	31.0	91.15	0	520
M	46	54.8	128.49	0	520

F	61	13.1	39.15	0	205
ES	49	53.4	126.18	0	520
ES/M	24	82.3	167.60	0	520
ES/F	25	25.7	57.31	0	205
LS	58	12.1	35.28	0	180
LS/M	22	24.8	52.92	0	180
LS/F	36	4.3	13.52	0	60

Kendall's Tau correlations were run to assess the relationship between test scores on the PPVT test and minutes per week spent on gaming in the various language modes. Results are presented in Table 4. Only significant results are reported.

Table 4

Kendall Tau and PPVT scores (M = male, F = female) and early (ES) and early (ES) and later (LS) starters (minutes per week)

	<b>GEE</b>	<b>GZE</b>
Total	.2178**	ns
M	.2925**	ns
F	ns	ns
ES	.2631*	ns
ES/M	.3959*	ns
ES/F	ns	ns
LS	.2054*	ns
LS/M	ns	.3685*
LS/F	ns	ns

Coefficients shown are significant at the .05 and .01 levels, indicated by one and two asterisks respectively; *ns* = nonsignificant.

A regression was run with GEE as this variable correlated significantly with PPVT scores. (For lack of space, non-significant results are not elaborated on.) Regressions with "GEE," "Starting age," "Gender," and "School" as a cluster for (1) all participants and (2) only for early starter boys yielded nonsignificant results. As the GEE data showed, a point of saturation on the regression graph with six participants falling below, it was decided to run a second regression with GEE gaming less than 240 minutes of gaming a week (henceforth "GEE1 < 240"). Multiple regression analysis was used to examine if gaming GEE1 < 240, Starting age, and Gender significantly predicted PPVT. School was used as cluster in order to avoid type 1 errors (see Table 5).

Table 5  
Multiple Regression Analyses

	<i>t</i>	<i>p</i>	$\beta$	<i>F</i>	<i>df</i>	<i>p</i>	adj. <i>R</i> <sup>2</sup>
GEE1 gaming							
Overall model				193.2	3,4	0.000	.23
GEE1 < 240	6.81	0.002	10				
Starting grade	4.27	0.013	22				
Gender	-0.73	0.503	-3				
Constant	11.32	0.000	42				

Note. The dependent variable was test scores PPVT

As Table 5 shows, the results of the regression were significant and show that for every unit of gaming GEE1 < 240, there is a 10-point increase in PPVT scores.

## Discussion

Danish children's engagement in EE activities compares to that of children in similar countries (cf. Lindgren & Muñoz, 2013; Sundqvist & Sylvén, 2014). They engage in EE regularly; for girls the favorite activities are music, watching television, and gaming, whereas boys prefer gaming followed by watching television and listening to music. At that early age the engagement in other activities (reading, writing, talking, and other) is negligible (cf. Lindgren & Muñoz, 2013). This finding is not surprising as most children are probably still not able to engage fully in cognitively demanding activities in an L2 as they are still learning to do so in their first language, a point also raised in connection with subtitled television by d'Ydewalle and Van de Poel (1999). Danish children mirror Swedish ones (Sundqvist & Sylvén, 2014) in the time they devote to EE activities overall. As found in other studies (e.g., Sylvén & Sundqvist, 2012; Sundqvist & Sylvén, 2014), boys game significantly more than girls, five times as much in the current study.

The results show that gaming with both spoken and written English (GEE) is significantly related to vocabulary scores. That gaming may play a role in vocabulary learning is perhaps not surprising as the gamer is motivated to understand the input. since paying attention to the language in many cases will help him/her advance in the game, thus offering "a representative sample

of authentic input that is relevant to [the users'] needs" (Ellis, 2009, p. 4). Furthermore, this "sample" is repeated many times, which, according to usage-based theories of language acquisition, is of great importance for language learning (Ellis, 2009). Because GEE is engaged in extensively, the opportunities for repeated language input are potentially rich—bearing in mind that the input of the games in question may vary; that is, the GEE games category comprises games with various amounts of input ranging from games with little input (little text and close to no oral input) to games with dense input and output, such as rich in-game text (possibly written chats), and spoken dialogue (possibly spoken chats). Gee (2012, p. xii) notes that EE learning through gaming is different from traditional classroom learning not least because games put "performance before competence ... and experiences and actions before words and texts. This means players are learning by doing, and that they have images and experiences to give deep meaning to the words and texts they read later, in order to resource their play and learning."

The motivational factor of gaming is indisputable as gaming is engaged in purely for entertainment. In contrast, for participation in classroom activities, it has been found that learners may only be willing to participate in activities if they feel linguistically competent and thus motivated to do so (Dörnyei, 2009). This highlights the difference between being a user and being a learner.

Games offer varying affordances for learning depending on the users. Users are different and some might experience "a cognitive overload" (Reinders & Wattana, 2012, p. 182) when playing certain types of games whereas others will make affordances of the input—driven, among other factors, by their motivation (cf. Van Lier's [2004, p. 92] definition of affordances as "action in potential").

It is slightly intriguing that the association between games with both oral and written input (GEE) and PPVT scores is most pronounced for the early starter boys. A possible explanation is that for later starter boys this type of gaming is nearing a ceiling effect. One may assume that there is a natural limit to what games can offer at this stage, especially if the child keeps playing the same games or games with little input. This may also be why there is an association between games with only written English input and PPVT scores for the older boys, where one would expect that less input would give less effect. Perhaps they pay more attention to the language of the games they play and couple their gaming with walkthroughs of gameplay on YouTube as well as other clips, which are able to provide even more appropriate input (cf. the zone of proximal development, Vygotsky, 1978). The potential positive effect of using so-called affinity spaces has been highlighted by many, for instance, Gee (2013).

In the PPVT pretest, mentioned earlier, administered at the onset of English teaching, the later starters already scored significantly better than the early starters. This fact supports the importance of EE, as later starters' knowledge of English can only have been gained outside school and over more years compared with the early starters. Thus, even if the early starters game as much as the later starters, by the time of the posttest they could not have done so for as long. As for the gender differences, the girls do not game much, which explains the lack of a "gaming effect" for the girls. A question that begs an answer is of course why there is a pronounced association between the boys' scores and gaming, but they have more or less the same scores on the test as the girls. The later starter boys had significantly higher scores on the PPVT in the pretest than the girls, suggesting that, at that point, they seemed to gain more from activities in English outside school: presumably from engaging in more and relevant (for learning English) activities outside school than girls. It is also possible that girls have a different approach to the formalized learning space in school than boys, as found by, for example, Henry (2009), and as a consequence possibly gain more from this space. Research consistently suggests that girls outperform boys on most school subjects and in particular language subjects (Voyer & Voyer, 2014). Thus, in line with the argument put forth by Sundqvist and Sylvén (2012, pp. 201–202), one may suggest that if the boys did not engage as extensively as they do in EE (gaming), they would be lagging behind the girls already at this stage, but the fact that they do not suggests that they gain language competences from other sources than the girls. As mentioned previously, Lefever (2010) and Kuppens (2010) also reported better, in their cases, oral skills for preschool boys than girls.

## Limitations

The present study has a number of limitations, such as the relatively small number of participants. In addition, the broad GEE category (both English text and speech) also sets a limitation to interpretations, as the amount of input cannot readily be decided. Caution in interpreting the results is also advised given the subjective nature of the language diaries which are anchored in time and only elicit EE use for a specific week. However, the diary has some obvious advantages of which three are related to survey design (Converse & Presser, 1986, pp. 20–22): *bounded recall*, *limited reference period*, and *cues*. The activities in the diary are reported on a daily basis making the margin of error smaller, as the activity to be recalled is not very far removed in the distant past (bounded recall), the reference period is limited (one day), and concrete examples (cues) are provided to aid the recall, that is, each category has examples of the category in question. The diary was also used in the fall when it is cold and windy in Denmark, thus calling for indoor rather than outdoor

activities. It seems fair to assume that children who are drawn to EE activities were motivated to carry out such activities.

## Concluding Remarks

The study confirms that English language games may play an important role in language learning not only for teenagers and adults, but also for YELLs, and it, thereby, adds to the very scarce research on extramural language learning among this group of learners. Given the nature of the broad gaming category comprising games with both oral and written input of very different nature, it would be advised to take a closer look at the specific games in question to examine exactly what linguistic input/output is being offered. Further research of a qualitative nature on language use during gameplay is also recommended. For example, by using an ethnographic approach, a detailed picture of gameplay and the interaction evolving around this play may be obtained, preferably taking into account the use of affinity spaces. Future studies investigating effects of gaming on other language parameters than vocabulary for YELLs would also be interesting given the findings by Kuppens (2010) and Lefever (2010), where gaming may potentially be related to oral proficiency. In short, more research on early learners, gender, and gaming is needed.

## About the Author

Signe Hannibal Jensen is a PhD fellow at the University of Southern Denmark. Her research interests are SLA, in particular extramural English, and young learners.

## References

- Benson, P., & Chik, A. (2011). Towards a more naturalistic CALL: Video-gaming and language learning. *International Journal of Computer-assisted Language Learning*, 1(3), 1–13. <https://doi.org/10.4018/978-1-4666-1855-8.ch006>
- Benson, P., & Reinders, H. (Eds.). (2011). *Beyond the language classroom*. Basingstoke: Palgrave Macmillan. <https://doi.org/10.1057/9780230306790>
- Cheung, A., & Harrison, C. (1992). Microcomputer adventure games and second language acquisition: A study of Hong Kong tertiary students. In M. C. Pennington & V. Stevens (Eds.), *Computers in applied linguistics* (pp. 155–178). Clevedon: Multilingual Matters.
- Converse, J. M., & Presser, S. (1986). *Survey questions: Handcrafting the standardized questionnaire* (Vol. 63). London: Sage. <https://doi.org/10.4135/9781412986045>
- Dörnyei, Z. (2009). *The psychology of second language acquisition*. Oxford: Oxford University Press.
- Dunn, L. M., & Dunn, D. M. (2007). *PPVT-4: Peabody picture vocabulary test*. Minneapolis, MN: Pearson.

- d'Ydewalle, G., & Van de Poel, M. (1999). Incidental foreign-language acquisition by children watching subtitled television programs. *Journal of Psycholinguistic Research*, 28(3), 227–244. <https://doi.org/10.1023/A:1023202130625>
- EACEA. (2012). The European Higher Education Area in 2012: Bologna Process Implementation Report. Retrieved from: [www.ehea.info/uploads/\(1\)/bologna](http://www.ehea.info/uploads/(1)/bologna)
- EFEPI. (2015). The world's largest ranking of countries by English skills. Retrieved from <http://www.ef-danmark.dk/epi/>
- Ellis, N. C. (2009). Optimizing the input: Frequency and sampling in usage-based and form-focused learning. In M. H. Long & C. J. Doughty (Eds.), *The handbook of language teaching* (pp. 139–158). Oxford: John Wiley and Sons. <https://doi.org/10.1002/9781444315783.ch9>
- Gee, J. P. (2012). Foreword. In H. Reinders (Ed.), *Digital games in language learning and teaching* (pp. xii–xiv). Basingstoke: Palgrave Macmillan.
- Gee, J. P. (2013). *Good video games + good learning: Collected essays on video games, learning, and literacy* (2nd. ed.). New York, NY: Peter Lang.
- Gretlund, T. S., & Heiselberg, L. (2013). Tweens mellem spil og sociale medier. *Medieudviklingen*, 54–58. Retrieved from [http://www.dfi.dk/Boern\\_og\\_unge/Medieraadet/Nyheder-fra-Medieraadet/in-ternet\\_og\\_mobil/Spil-er-boerns-sociale-medier.aspx](http://www.dfi.dk/Boern_og_unge/Medieraadet/Nyheder-fra-Medieraadet/in-ternet_og_mobil/Spil-er-boerns-sociale-medier.aspx)
- Henry, A. (2009). Gender differences in compulsory school pupils' L2 self-concepts: A longitudinal study. *System*, 37, 177–193. <https://doi.org/10.1016/j.system.2008.11.003>
- Kuppens, A. H. (2010). Incidental foreign language acquisition from media exposure. *Learning, Media and Technology*, 35(1), 65–85. <https://doi.org/10.1080/17439880903561876>
- Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: The construct of task-induced involvement. *Applied Linguistics*, 22(1), 1–26. <https://doi.org/10.1093/applin/22.1.1>
- Lefever, S. C. (2010). *English skills of young learners in Iceland: "I started talking English when I was 4 years old. It just bang... just fall into me"*. Paper presented at the Menntakvika Conference, Reykjavik.
- Lindgren, E., & Muñoz, C. (2013). The influence of exposure, parents, and linguistic distance on young European learners' foreign language comprehension. *International Journal of Multilingualism*, 10(1), 105–129. <https://doi.org/10.1080/14790718.2012.679275>
- Marsh, A. P., & Tainio, L. (2009). Other-repetition as a resource for participation in the activity of playing a video game. *The Modern Language Journal*, 93(2), 153–169. <https://doi.org/10.1111/j.1540-4781.2009.00853.x>
- Mascheroni, G., & Ólafsson, K. (2014). *Net children go mobile: Risks and opportunities* (2nd ed.). Milan: Educatt.
- Miller, M., & Hegelheimer, V. (2006). The SIMs meet ESL: Incorporating authentic computer simulation games into the language classroom. *Interactive Technology and Smart Education*, 3(4), 311–328. <https://doi.org/10.1108/17415650680000070>
- Olsson, E. (2011). *Everything I read on the Internet is in English: On the Impact of extramu-*

- ral English on Swedish 16-year-old pupils' writing proficiency* (Licentiate thesis). Gothenburg University.
- Rankin, Y., Gold, R., & Gooch, B. (2006). *3D role-playing games as language learning tools*. In E. Croller & L. Szirmay-Kalos (Eds.), *Proceedings of EuroGraphics 2006*, 25(3). New York, NY: ACM.
- Reinders, H., & Wattana, S. (2012). Talk to me! Games and students' willingness to communicate. In H. Reinders (Ed.), *Digital games in language learning and teaching* (pp. 156–188). Basingstoke: Palgrave Macmillan. [https://doi.org/10.1057/9781137005267\\_9](https://doi.org/10.1057/9781137005267_9)
- Sebba, M. (2010). Societal bilingualism. In R. Wodak, B. Johnstone, & B. E. Kerswill (Eds.), *The SAGE handbook of sociolinguistics* (pp. 445–459). London: Sage.
- Sockett, G. (2014). *The online informal learning of English*: Basingstoke: Palgrave Macmillan. <https://doi.org/10.1515/9783110378528-009>
- Sockett, G., & Kusyk, M. (2015). Online informal learning of English: Frequency effects in the uptake of chunks of language from participation in web-based activities. In T. Cadierno & S. W. Eskildsen (Eds.), *Usage-based perspectives on second language learning* (pp. 153–178). Berlin: De Gruyter Mouton. <https://doi.org/10.1515/9783110378528-009>
- Sundqvist, P. (2009). *Extramural English matters. Out-of-school English and its impact on Swedish ninth graders' oral proficiency and vocabulary* (Doctoral dissertation). Karlstad University.
- Sundqvist, P., & Sylvén, L. K. (2012). World of VocCraft: Computer games and Swedish learners' L2 English vocabulary. In H. Reinders (Ed.), *Digital games in language learning and teaching* (pp. 189–208). Basingstoke: Palgrave Macmillan. [https://doi.org/10.1057/9781137005267\\_10](https://doi.org/10.1057/9781137005267_10)
- Sundqvist, P., & Sylvén, L. K. (2014). Language-related computer use: Focus on young L2 English learners in Sweden. *ReCALL*, 26(01), 3–20. <https://doi.org/10.1017/S0958344013000232>
- Sundqvist, P., & Wikström, P. (2015). Out-of-school digital gameplay and in-school L2 English vocabulary outcomes. *System*, 51, 65–76. <https://doi.org/10.1016/j.system.2015.04.001>
- Sylvén, L. K., & Sundqvist, P. (2012). Gaming as extramural English L2 learning and L2 proficiency among young learners. *ReCALL*, 24(03), 302–321. doi:10.1017/SO95834401200016X
- Thorne, S. L. (2008). Transcultural communication in open Internet environments and massively multiplayer online games. In S. Magnan (Ed.), *Mediating discourse online* (pp. 305–327). Amsterdam: John Benjamins. <https://doi.org/10.1075/aals.3.17tho>
- Turgut, Y., & Irgin, P. (2009). Young learners' language learning via computer games. *Procedia-Social and Behavioral Sciences*, 1(1), 760–764. <https://doi.org/10.1016/j.sbspro.2009.01.135>
- Unsworth, S., Persson, L., Prins, T., & de Bot, K. (2014). An investigation of factors affecting early foreign language learning in the Netherlands. *Applied Linguistics*, 38(5), 1–24. <https://doi.org/10.1093/applin/amt052>

- Van Lier, L. (2004). *The ecology and semiotics of language learning: A sociocultural perspective*. Dordrecht: Kluwer Academic Publishers. <https://doi.org/10.1007/1-4020-7912-5>
- Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic achievement: A meta-analysis. *Psychological Bulletin*, *140*(4), 1174–1204. <https://doi.org/10.1037/a0036620>
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.