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During Study Abroad Using Social Network Metrics

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A thesis submitted to the faculty of
Brigham Young University
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Master of Arts

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ABSTRACT

Predicting Speaking, Listening, and Reading Proficiency Gains
During Study Abroad Using Social Network Metrics

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Master of Arts

L2 proficiency gains during study abroad vary widely across individuals and programs, and much of the research in the study abroad literature attempts to identify the causes of this variance. Social network data has proven useful in explaining some of the variance in oral proficiency gains (Baker-Smemoe, Dewey, Bown, & Martinsen, 2014; Isabelli-García, 2006), and the current study builds on those findings by applying the same methodology to listening and reading proficiency in addition to speaking. Proficiency gains in listening, reading, and speaking were measured for 17 students from a US university studying abroad in Nanjing, China for one semester. Social network measures focused on interaction with native speakers (NS) were taken at the beginning, middle, and end of the study abroad program using the Study Abroad Social Interaction Questionnaire. Linear regression analyses showed that social network measures accounted for nearly 46% of the variance in listening gains, nearly 82% of the variance in reading gains, and nearly 46% of the variance in oral proficiency gains. These findings make a strong case for applying social network methods to understand listening and reading proficiency gains in study abroad.

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1   Introduction

For many years, the number of students enrolling in study abroad (SA) programs has continued to rise (Institute of International Education, n.d.), as has the demand for multilingual human capital in job markets (Damari et al., 2017). Many university students enroll in SA for the express purpose of developing or improving proficiency in a second language (L2), and even many who declare a different primary purpose often list L2 improvement as a secondary goal (Krzaklewska, 2008). Second language acquisition (SLA) research over the past two decades has largely disproved the prevalent misconception that SA experiences inevitably result in large L2 proficiency gains, and yet a clearer understanding of the impact of SA on L2 proficiency is slow in emerging (Llanes, 2011). A clear example of this slow progress is that research linking SA factors to L2 gains focuses almost exclusively on factors related to oral L2 production, such as general oral proficiency (e.g., Freed, 1995; Freed, Segalowitz & Dewey, 2004; Yager, 1998), pronunciation (e.g., Díaz-Campos, 2004; Lord, 2010), or spoken grammatical accuracy (e.g., Collentine, 2004; Duperron, 2006; Gunterman, 1995). Proficiency gains in reading and listening during SA are rarely tested, let alone linked to SA program variables.

One line of research examines student interactions with native speakers (NS) while on SA, including time spent interacting and social network factors such as number, intensity, and durability of relationships. Studies examining these interaction metrics, though few, have proved fruitful in accounting for some of the variance in oral proficiency outcomes (see for example Baker-Smemoe, Dewey, Bown, & Martinsen, 2014; Isabelli-García, 2006). The current study examines the relationship between social

network factors and proficiency gains for a group of American university students in a one-semester SA program in China. It seeks to determine to what extent social network metrics are predictive of proficiency gains in speaking, reading, and listening during the semester abroad. Studies typically address only one of these modes of communication, making this research more comprehensive than usual. The results are of interest to all SA stakeholders. They provide a basis for students, parents and other stakeholders to establish realistic expectations for language improvement, and provide SA program directors with insight into the impact of social interaction on speaking, reading, and listening skills. They also add to the sparse data on the impact of SA factors on reading and listening proficiency.

2   Review of Literature

2.1   SLA in SA Contexts

The common public perception of SA as a golden ticket to SLA, while inaccurate, is also not completely baseless. Many studies have shown a positive impact of SA on L2 ability in areas such as proficiency (Freed, 1995; Freed et al., 2004; Juan-Garau & Pérez-Vidal, 2007; Llanes, 2010; Segalowitz & Freed, 2004; Yager, 1998), fluency (Baker-Smemoe, Dewey, Bown, & Martinsen, 2014; Du, 2015; Kim, Dewey, Baker-Smemoe, Ring, Westover, & Eggett, 2015), vocabulary knowledge (Briggs, 2016; Dewey, 2004; Ife, Vives, & Meara, 2000; Llanes & Muñoz, 2009), grammatical accuracy (Collentine, 2004; Duperron, 2006; Gunterman, 1995; Howard, 2001, 2005, 2006), pronunciation (Díaz-Campos, 2004; Lord, 2010; Mora, 2008; Romanelli, Menegotto, & Smyth, 2015), and pragmatic abilities (Félix-Brasdefer & Hasler-Barker, 2015; Rasouli Khorshidi, 2013; Ren, 2013; Shively, 2008, 2013).

While research on L2 acquisition in SA contexts has grown dramatically since the late 1990's, such studies lag far behind the more well-established literature on SLA in classroom or uninstructed contexts. Beginning largely with Freed (1998), a relatively small subfield has developed with the aim of understanding the impact of SA on SLA, as well as the distinct SA program and individual factors that influence SLA outcomes for students. A key finding fueling this surge in research is that language outcomes vary dramatically among SA participants (Dufon & Churchill, 2004; Freed, 1995; Kinginger, 2009; Pérez-Vidal, 2014). This variance challenges the long-held assumption that a student who completes a SA program cannot help but acquire much language in such an immersive context. A significant amount of SA research in the past 20 years has sought

to determine which elements of the SA experience best predict L2 proficiency gains, and has focused primarily on oral proficiency.

Collectively, these studies examine a wide range of SA program and individual factors in connection with various measurements of L2 proficiency. SA factors such as program duration (Davidson, 2010), housing arrangements (Engle & Engle, 2004; Grimes-MacLellan, 2018), and curriculum (Vande Berg, Connor-Linton, & Paige, 2009) have unsurprisingly surfaced as predictors of L2 proficiency gains, as have individual factors such as initial proficiency, motivation, and gender (see Kinginger, 2011 for an overview of individual differences).

Most studies of SLA in SA examine only one or two program or individual factors and define proficiency as strictly oral. Baker-Smemoe et al. (2014) is one of the few studies to examine a variety of SA variables across multiple SA programs to determine which variables most significantly influence L2 gains. The authors collected data on personality, social networks, intercultural sensitivity, language use, gender, and age for more than 100 SA participants enrolled in six different countries. Social network measures (perceived English proficiency of learners' friends and change in network size over time) were the best predictors of L2 oral proficiency gains for participants across all six SA programs. These findings provide ample support for further investigation into the connection between social networks and L2 development in SA contexts.

2.2   *Listening and Reading Proficiency in SA*

Listening comprehension is a relatively under-researched area in SLA studies (Vandergrift, 2003, 2007), and SA is no exception. Very few studies examine the impact of SA experiences on listening comprehension or reading proficiency, as state-of-the-art

reviews of the area have regularly pointed out (Collentine, 2009, Isabelli-Garcia, Bown, Plews & Dewey, 2018; Llanes, 2011). Studies of listening comprehension have utilized tools ranging from self-assessment (e.g., Meara, 1994) to standardized tests (e.g., Tanaka & Ellis, 2003). Although limited, they have spanned the history of SA research and include research by Carroll (1967) in five target languages (French, Spanish, German, Russian and Italian) showing advantages for those who studied abroad, and more recent research in L2 Japanese (Huebner, 1995), Russian (Brecht et al., 1995), Spanish (Cubillos, Chieffo & Fan, 2008), French (Allen & Herron, 2003) and English (Tanaka & Ellis, 2003). Noticeably rare is research on Chinese SA. There is still much to be learned, in particular regarding contributors to listening comprehension development abroad.

Regarding reading development abroad, there are only a few studies that focus solely on reading, but several that include reading comprehension among other variables. Once again, Carroll's (1967) early study covered a five target languages and found that those who had studied abroad out-performed those who had not. Brecht, Davidson and Ginsberg (1995) found that learners studying Russian abroad made significant gains on two measures of reading comprehension. In a small-scale study, Huebner (1995) found that learners of Japanese abroad tended to out-gain learners on a standardized measure of reading comprehension. Dewey's (2004) Japanese learners reported developing greater confidence reading than at-home learners, but minimal differences were seen between the groups otherwise. Taillefer (2005) examined relationships between country of origin and reading comprehension results for learners of French and English abroad. She found that L1 background did predict reading comprehension and reading strategy use development abroad, and that strategy use varied

depending both on overall L2 competency and nation of origin. Finally, in an even more recent study involving learners of Chinese, Li (2014) evaluated the role of starting language level and found that intermediate and advanced L2 learners (second- and third-year learners) out-gained their counterparts at home in terms of reading strategy development, whereas beginning (first-year) students did not. Furthermore, intermediate learners showed greater development of reading proficiency than those at home at the same level, whereas no such differences were seen for beginning or advanced learners. The higher level of confidence for learners abroad seen in Dewey's (2004) study was not evident on self-assessments in Li's study. In short, the reading-SA research suggests learners abroad can make significant gains in reading, but it is still unclear how much gain can be made, how these gains compare to learners at home and what factors contribute most. The current study will elucidate the extent of gains in reading that can be made abroad and will add social network development as a predictor.

2.3   Social Networks in SLA

Social network research focuses on the formal and informal connections between members of a defined group, describing these connections using measurable characteristics such as network size, intensity (depth of relationships), durability (frequency of interactions), etc. For decades, social science research has documented the benefits to which individuals gain access via their social network. Social capital theory, championed most notably by Robert Putnam, suggests that, through close social networks, each member of the network gains access to tangible and intangible resources which would be unavailable without the social connections afforded by the network

(Putnam, 2001). Examples of these resources include emotional support, belonging, information, connections to other influential people, money, expertise, etc.

Milroy (1980) made a compelling case for applying social network research to sociolinguistic studies, and Isabelli Garcia (2006) first applied social network analysis to better understand SA language learning contexts. In terms of social capital, social connections provide SA students with resources that can be leveraged for language learning, such as opportunities to listen and speak the language, as well as access to broader social groups which amplify those resources. Social network analysis is a well suited lens through which to examine language learning in SA contexts since one of the primary benefits of studying abroad is increased social access to NS. Social interaction, by definition, includes the basic elements central to current theories of second language acquisition: input, output, and interaction (Gass, 2005; Krashen, 1985; Long, 1996; Swain, 1985). Accordingly, university students and faculty commonly assume that the interaction with NS available in SA experiences will directly and significantly improve students' language abilities.

Empirical studies linking L2 social interaction abroad to language learning have almost exclusively examined impact on oral proficiency, and have found mixed results. Though many have corroborated the positive correlation between increased social interaction and increased L2 proficiency (Baker-Smemoe et al., 2014; Baker-Smemoe, Cundick, Evans, Henrichsen, & Dewey, 2012; Freed, 1990; Mitchell, Tracy-Ventura & McManus, 2017; Spada 1986; Yager 1998), some notable exceptions exist (Magnan & Back, 2007; Martinsen, 2010; Mendelson, 2004). This study includes oral proficiency, but extends beyond the existing literature by examining the impact of social network

factors on the change in reading and listening proficiency over the course of the semester abroad. To better understand these relationships, the current study aims to answer the following research questions:

1. To what degree do social network measurements predict speaking, listening, and reading proficiency gains during a semester abroad in China?

2. Which social network measurements best predict these proficiency gains?

3   Methodology

3.1   Participants

Participants were 17 university students (13 male, 4 female) participating in a semester abroad program in Nanjing, China. Participants' average age at the beginning of the semester abroad was 22.53 years (SD = 1.81). Of the 17 students, 13 were native English speakers. Other native languages listed were Spanish (n=2), Mandarin (n=1), and Swedish (n=1). Participants were students at Brigham Young University, and all had received credit for at least four semesters of university Chinese classes prior to departure. Additionally, 11 of the students had previously participated in an 18-24 month immersive Mandarin missionary experience.

3.2   Materials

The following instruments were used to measure the variables in parentheses: the Oral Proficiency Interview-Computer (OPIc; spoken proficiency in Mandarin), the Adaptive Reading Test (ART; reading proficiency in Mandarin), the Adaptive Listening Test (ALT; listening comprehension in Mandarin), the Study Abroad Social Interaction Questionnaire (SASIQ; social networks). Participants also completed a demographic survey used to determine age, gender, previous language immersion experience, academic experience with Mandarin, and other relevant variables. Each of these instruments is described below.

3.2.1   OPIc

Pre and post-program oral proficiency were measured using the ACTFL OPIc. The OPIc delivers the questions of the in-person OPI via using an online avatar, and

scores range from Novice Low to Superior. Students completed the pre-program OPIc in the month preceding the SA program. They completed the post-program OPIc in the month directly following the end of the program. For purposes of statistical analysis, OPIc scores were converted to a numeric, 10 point scale (Meredith, 1990; Rifkin, 2005; Dewey et al. 2014).

3.2.2   ALT

Pre and post-program listening comprehension were measured using the Adaptive Listening Test (Cox & Clifford, 2014). The ALT is a web-based assessment developed at Brigham Young University in collaboration with ACTFL and with support from the Defense Language and National Security Education Office (DLNSEO). The ALT presents target language audio segments to participants, and asks them to answer questions based on the information in each segment. The assessment adapts based on a participant's ongoing performance. Scores follow the ACTFL OPI levels, ranging from Novice to Superior. As with the OPIc and ART, scores were converted to a numeric, 10-point scale for analysis.

3.2.3   ART

Pre and post-program reading proficiency were measured using the Adaptive Reading Test (Clifford & Cox, 2013). The web-based ART is a companion to the ALT, and was developed by the same team and collaborators. The ART presents reading passages to participants, and asks them to answer questions based on each passage. As an adaptive assessment, ongoing performance is used to determine future questions. Scores

follow the ACTFL OPI levels, ranging from Novice to Superior. As with the OPIc, scores were converted to a numeric, 10-point scale for analysis.

3.2.4 SASIQ

Participants completed an adapted, 17-question version of the Study Abroad Social Interaction Questionnaire created by Dewey and colleagues (Dewey, Belnap, & Hillstrom, 2013; Dewey, Bown, & Eggett, 2012; Dewey, Ring, Gardner, & Belnap, 2013). The SASIQ is largely based on the Montréal Index of Linguistic Integration (Segalowitz & Ryder, 2006) and the General Social Survey (Burt, 1985). The questionnaire includes a name-generation portion in which participants list members of their social network. The remainder of the survey elicits information about each member of the network listed in order to capture measurements of network size, dispersion, density, durability, intensity, frequency of interaction, and Perceived English proficiency. Each of these variables is defined in Table 1.

Size	Number of native Mandarin speakers with whom the participant associates.
Dispersion	Number of social groups into which a participant categorizes associates based on how the associates are socially connected to one another (clubs, classes, teams, workplace, etc.)
Density	Mean size of each social group listed (see SN Dispersion).
Durability	Mean time spent with each associate.
Intensity	Mean perceived closeness of the relationship between the participant and a given associate.
Frequency of Mandarin Use	Mean percent of interaction time with each associate spent using Mandarin.
Frequency of English Use	Mean percent of interaction time with each associate spent using English.

Perceived English Proficiency	Mean perceived English proficiency of each associate. Rated by the participant on a 5-point Likert scale.

Table 1: Description of Social Network Variables

3.3   Procedures

Participants were recruited based on their enrollment in the 2017 Nanjing SA program offered at Brigham Young University. While participation in the study was optional, all students enrolled in the SA opted to participate in the study. One student discontinued enrollment in the SA program after several weeks, and was eliminated from the study.

All participants completed the OPI, ART, and ALT both directly preceding, and directly following the SA. Following methods used in other SA research involving ACTFL levels (e.g., Baker-Smemoe et al., 2014), scores were converted to numeric values on a 10-point scale based on the ACTFL levels and sub-levels: starting at 1 (Novice Low) and moving up one point for each sub-level though Advanced-High and then one more point for Superior (10). These numeric scores were then used to determine changes in proficiency over the course of the SA in oral, reading, and listening proficiency. They also served as the dependent variables.

Participants completed the SASIQ three times during the SA, the first after only two weeks abroad, the second approximately in the middle of the SA, and the third during the final week of the program. In each survey administration, participants were instructed to respond based on their activities during the previous month rather than on their cumulative experience during the SA. Therefore, data from the three survey

administrations represent participants' social network at the beginning, middle, and end of the SA experience.

4 Results

The research questions focused first on ascertaining the amount of variance in proficiency gain accounted for by SN metrics, and second on determining the best predictors of proficiency gains. A stepwise linear regression was employed to select a model for the predictive value of SN measurements on proficiency gain in listening, reading, and speaking. Gain scores were adjusted for pre-program proficiency. Pre and post-program proficiency measures for reading, listening, and oral proficiency, as well as proficiency gain scores, are given in Table 2.

	Pre-program mean	SD	Post-program mean	SD	Gain mean	SD
ALT	5.12	1.65	6.06	1.75	0.94	1.60
ART	4.94	2.51	6.71	2.66	1.76	1.86
OPI	5.82	1.51	6.71	1.26	0.88	0.78

Table 2: Pre and Post Descriptive Statistics for Listening, Reading, and Speaking

Measurements for each SN variable from the first, second, and third SASIQ administration were included separately, and are distinguished by the administration number following the variable (e.g. Intensity2, Durability3). Additionally, the average value of each SN measurement across the three SASIQ administrations was calculated for each participant for inclusion in the model. Due to the tendency of stepwise regressions to overfit the model, three random variables were generated and distributed as random normal. The appearance of any of these variables in the selection process signaled completion of the selection process. As a second guard against overfitting, only the first

three variables in the final models were considered viable. The analysis assumed equal variance, normal distribution, and independence between observations.

4.1 Listening Proficiency

Results from the stepwise analysis for ALT gain are given in Table 3. Coefficients are presented as units of language gain on the adapted 10-point ACTFL proficiency scale. Three SN variables were significant, and together accounted for nearly 46% of the variance. Frequency of English Use1 was the most significant predictor, $R^2 = .2666$, $F(1,15) = 73.01$, $p = .<.0001$. Average intensity of relationships, $R^2 = 0.1078$, $F(1,15) = 24.03$, $p = .0008$, and Frequency of English Use2, $R^2 = 0.0824$, $F(1,15) = 32.83$, $p = .0003$ were also significant predictors of ALT language gains, though Average Intensity and Frequency of English Use2 were negative predictors.

Variable	R^2	β	SE	F value	P value
Intercept		2.78826	1.53246	3.31	.0989
Frequency of English Use1	0.2666	3.893	0.9682	73.01	<.0001
Average Intensity	0.1078	-2.5811	0.5266	24.03	.0008
Frequency of English Use2	0.0824	-3.5147	0.6134	32.83	.0003

Table 3: Results from the Stepwise Regression for ALT

4.2 Reading Proficiency

Results from the stepwise analysis for ART gain are given in Table 4. As with the analysis for the ALT, three SN variables were significant, accounting together for nearly 82% of the variance in reading gain scores. However, unlike the ALT, SN variables

tended to negatively predict proficiency gain. Size1, a negative predictor, R^2 = .4026, $F(1,17) = 64.15$, p = <.0001, was the most significant, accounting alone for 40% of the variance. However, Durability2 was also a highly significant negative predictor, R^2 = .3406, $F(1,17) = 33.04$, p = .0001, accounting for 34% of the variance. The only positive predictor was Average Frequency of Mandarin Use, though this contributed less overall to the model than the two negative predictors collectively.

Variable	R^2	β	SE	F value	P value
Intercept		8.770	2.334	14.12	.0032
Size1	0.4026	-0.4671	0.0583	64.15	<.0001
Durability2	0.3406	-1.1466	0.1995	33.04	.0001
Average Frequency of Mandarin Use	0.0750	1.0906	0.4401	6.14	.0307

Table 4: Results of Stepwise Regression for ART

4.3   Oral Proficiency

Results from the stepwise analysis for OPI gain are given in Table 4. Two SN variables were significant, accounting together for nearly 46% of the variance in speaking gain scores. Size1, R^2 = 0.2626, $F(1,15) = 59332$, p = <.0001, was a negative predictor and accounted for about 26% of the variance. Intensity2, R^2 = 0.1959, $F(1,15) = 30871$, p = <.0001, was a positive predictor and accounted for nearly 20% of speaking gain score variance.

Variable	R^2	β	SE	F value	P value
Intercept		12.053	0.076	25135	<.0001
Size1	0.2626	-0.3230	0.0014	59332	<.0001
Intensity2	0.1959	0.7126	0.0041	30871	<.0001

Table 5: Results form the Stepwise Regression for OPI

5   Discussion

5.1   SN Factors and Listening Proficiency Gains

Given that SN metrics have not previously been considered as predictors for SA listening proficiency gains, the amount of variance explained by these metrics is noteworthy. Yet since social interaction could make up the majority of listening experience a learner has while abroad, it is unsurprising that strong relationship exists between SN factors and gains in listening proficiency. Nevertheless, the most striking and counterintuitive finding here is that average intensity of relationships over the course of the study abroad negatively predicts listening proficiency gains. In each survey, participants reported the intensity of each relationship on a 5-point Likert scale, five being high. We see that, for a one point increase in average intensity ratings, listening gain scores drop about 2.5 levels. It is important to note, however, that the SASIQ captures only the participant's perception about the intensity of each relationship. Without corroboration from each member of the network, these values must be considered with the understanding that they may reveal as much about the quality of the participant's social awareness and judgment as about the actual strength of the relationship. In the absence of firmer quantitative, and exploratory qualitative data on these relationships, it is difficult to know how to interpret this finding.

The divergent predictive value of frequency of English use at times one and two is most significant, and also less expected. The impact of English use in at the beginning of the semester was such that for every one-point increase in participant responses on the first survey, listening scores rise by nearly four points over time. These four points are the equivalent of moving from Intermediate Low to Advanced Mid using the ACTFL

proficiency guidelines. What could explain this relationship? It is counterintuitive that students who spend a larger percent of their NS interaction time using L1 would show the greater L2 listening gains. However, other studies (e.g., Dewey, Bown, Eggett, 2013; Dewey, Belnap, & Hilstrom, 2013; Dewey, Ring, Gardner & Belnap, 2013) have suggested that learners can use English to build networks with locals and open windows for L2 interaction. For example, they might exchange English tutoring for tutoring in the target language; they might speak English with a person proficient in that language but then only the target language with the friends or family members of that person who do not speak English; they might participate in social activities with English-speaking friends where the target language is the main means of communication. In short, English can provide access to L2 social opportunities that might not otherwise be as readily accessible.

In contrast to the benefits reported for participants who spoke more English early on, the frequency of English use by the middle of the semester negatively predicted listening gains. Though the effect size as nearly the negative equivalent of the measurement from the first survey is surprising, it follows the hypothesis mentioned above that savvy participants use English frequently earlier on to establish strong networks, and by the middle of the semester they are reaping the benefits of increased access to NS and decreasing the frequency of English use since it is no longer strategically beneficial. In other words, these data suggest that interacting frequently in English with native Mandarin speakers early on, and then limiting that English interaction later on, may have some benefit in terms of L2 listening development. The fact that this single variable, frequency of English use, is a positive predictor at the outset

and a negative predictor only weeks later indicates the need to further assess the changing role of social interaction over time, as well as its dynamic contribution to language proficiency development.

5.2   SN Factors and Reading Proficiency Gains

The two most significant SN variables associated with reading proficiency, Size1 and Durability2, are unsurprising if we assume that reading proficiency in Mandarin grows principally as a result of reading practice and character memorization. If this assumption is accurate, it follows naturally that participants who have more NS friends (network size), and spend more of their time with those friends (network durability), are spending less time studying characters and reading in Chinese than participants with smaller networks and less social time. While this inference seems logical, a measurement of time spent reading or studying characters would be needed for corroboration. Additionally, while it may seem natural that extroversion would correlate positively with network size and durability, we also cannot assume that more introverted students with smaller networks and less interaction time are using their extra non-social hours for written language study. Again, we have no data regarding personality to assess connections with the variables we measured.

The third significant variable, average frequency of Mandarin use over SA, was a positive predictor in the model for reading development. The strength of this positive predictor is roughly equivalent to but slightly less than the strength of Durability2 as a negative predictor. In other words, using Mandarin frequently over time was only somewhat balanced out in a negative direction by amount of time specifically interacting in Mandarin with friends in this model. This suggests that social interaction might be less

beneficial than using the L2 for both social and non-social purposes, such as homework, reading, etc., which have a positive relationship with L2 reading development. Complex intercorrelations between the various measures of SNs, social interaction and L2 use make these findings difficult to interpret, in particular since two of the three measures that predict reading were taken at specific times during the SA experience (as opposed to being averages). The pattern of associating with lots of native speakers early on and then spending longer periods of time with fewer people has been seen in more effective language learners during SA (Baker-Smemoe et al., 2014; Hillstrom, 2011). It might be that the connection between more extensive use of Chinese and reading development is indicative of a similar pattern--more time with specific individuals contributing to L2 gains. However, more detailed analysis of individuals' experiences and of SN and L2 changes over time are necessary before conclusions can be drawn.

5.3   *SN Factors and Oral Proficiency Gains*

Network size at the beginning of the semester and average relationship intensity at the semester mid-point both predicted oral gains. Network size in the first survey negatively predicted oral gains over the course of the semester. Baker-Smemoe et. al. (2014) found that change in network size over time predicted overall oral proficiency gains, and suggested that successful participants may initially create large networks before narrowing down their contacts to focus more on intensity. While this theory does not seem to play out fully in the current study, we do see the increased importance of relationship intensity in the middle of the semester as a positive predictor of oral proficiency gains.

A program-specific feature of this SA experience may provide some insight into the negative predictive value of initial network size on oral gains. All participants were assigned a Mandarin-speaking "friend" or study partner during orientation. While participants varied in their use of this resource, it may be that those who created good relationships with their assigned friend benefitted in terms of oral gains, while finding it less necessary to create large initial networks. Thus they may have reported smaller network sizes since their social needs were being met by their assigned friend, who was also providing quality L2 interaction leading to oral gains.

Intensity has appeared in several studies as a predictor of oral gains. Dewey, Belnap and Hillstrom (2013) similarly found this relationship, posited that increased intensity not only allows for more personal and sustained linguistic interactions, but that it also potentially opens doors to other social connections that provide linguistic practice. These benefits may also spread beyond the participant with the original intense relationship, as was observed with this group of SA participants. One Chinese-born American SA participant connected with his biological parents in China during the study abroad, and formed a deep relationship with them, as well as with some Chinese NS cousins in Beijing. This Chinese-born participant had several roommates who also spent a large amount of time with his parents and cousins. These roommates reported that these interactions were more sustained and intense than most others.

One of the clear patterns emerging from the small body of research connecting SN factors to proficiency gains is that of the importance of relationship intensity, and the current study shows that this effect potentially holds for listening proficiency gains as well as oral gains. Intensity was the only SN variable to positively predict gains in two

different communicative domains. This study further adds by showing that the effect of intensity may be dynamic over time, since oral proficiency was only predicted by intensity as measured in the middle of the semester, and not at the beginning or end.

5.4   SN Measurements Over Time

These results provide insight into the dynamic nature of the contribution of SNs to SLA over time. Furthermore, although the detailed statistics for each of the SN variables at each of the three times are not reported here, it should be noted that these variables tended to change, thus suggesting SNs evolve and therefore are apt to contribute differently depending on the moment they are measured. Additional research is needed to track how networks evolve and contribute to SLA over time. In the current study, because each SN variable was represented by three discrete measurements taken at the beginning, middle, and end of the SA experience, we achieve a more granular view of how one's SN, as measured at a given moment, can predict proficiency gains. For example, while Frequency of English Use positively predicted ALT gains at the beginning of the semester, the opposite effect obtained by only a few weeks later at the midpoint of the SA. This requires us to ask what is unique about English use with NS associates specifically in the first two weeks of the program. It also suggests we ought to better understand how English use evolves over time and what other factors might become more influential, thus reversing its contribution in the middle of the semester, and erasing it completely by the final week of SA.

5.5   *Implications*

The current findings both advance the field of SA research and provide actionable information for SA program directors and participants. The large amount of reading and listening proficiency gain variance accounted for by social network factors clearly indicates the potential fruitfulness of further research in this area. In addition, it contributes to a broadening of how we define and measure proficiency gains in SA by including listening and reading, where reading in particular is not usually examined in connection with SA. In a recent review of SA research, Marijuan and Sanz (2018) affirm the general lack of research on listening proficiency gains during SA, and mentions of reading proficiency are conspicuously absent. The authors make a call for SA research to consider areas of L2 proficiency "that seem to be less likely to change in immersive contexts". This certainly includes reading proficiency.

While not a primary focus of this study, the dynamic contribution of SN factors to L2 gains implies that different SN factors may be more or less important at different stages of the SA experience. This line of research warrants further investigation, especially since it could prove applicable in program design. For example, in terms of listening gains, frequency of English at the beginning of the SA significantly predicted gains, while that same variable near the middle of the experience negatively predicted gains over the SA period. This could suggest that students benefit most in terms of listening gains by using English early on to establish firm social connections, and then by focusing on increasing Mandarin use with NS associates as the SA progresses.

Results on the relationships between SN factors and reading gains are informative to program designers and participants, and aid in the formation of realistic expectations

for reading proficiency growth given the program choices made. Data reported here suggests that programs emphasizing social interaction and network building should expect students to make smaller reading gains, and that a direct focus in terms of time allocated to reading study would be needed to facilitate reading growth. Replication and research across multiple languages is needed to know whether this relationship varies by target language.

5.6   Limitations

As is common with SA research, the sample size of the current study (n = 17) is quite small, which constrains the degree of possible generalization. Additionally, since only one SA program is represented, program factors cannot be controlled for in the analysis. Nevertheless, these results justify further examination of SN impact on multiple proficiencies in larger scale, multi-program studies.

The instrument for measuring oral proficiency is also potentially problematic, especially at higher levels. Jochum (2014) employed the OPIc to measure oral proficiency gains over a one semester Spanish SA, but this was experimental work and has not been reproduced with the Chinese OPIc. Given the propensity of the OPIc to be less precise in the upper levels, use of the traditional OPI would be preferable. However, use of the OPI may not completely resolve this concern, since researchers have noted some decrease in ability to capture gains made in the upper levels with the traditional OPI as well (Brecht, Davidson, & Ginsberg, 1995; Di Silvio, Donovan, & Malone, 2014; Freed, 1995, 1998; Llanes, 2011). Certainly all holistic measures such as the OPI or OPIc are, by design, broad stroke measurements that include many language components. For

this reason, they may be insufficiently sensitive to accurately capture the kinds of oral proficiency that may develop during a semester abroad. As Kinginger (2017) states, "In research involving standardized tests, such as the OPI, it is unclear that the measured abilities in fact correspond in every case to those that students have developed in study abroad settings."

6   Conclusion

This study examined social network factors as predictors of L2 listening, reading, and speaking gains during a one-semester Chinese study abroad experience. Results demonstrate that listening proficiency gains were highly predicted by frequency of speaking English with NS associates near the beginning and middle of the SA, and average intensity of relationships with NS associates over the course of the SA experience. Reading proficiency gains were highly predicted by social network size near the beginning (negative effect), average time spent with associates (network durability) near the middle (negative correlation), and average frequency of speaking Mandarin with NS associates across the semester as a whole (positive effect). Oral proficiency gains were negatively predicted by size at the beginning of the semester, and positively predicted by intensity of relationships in the middle. These results showcase the value of social network metrics as predictors of both oral and non-oral proficiency gains, the latter having been, to this point, underrepresented in the literature.

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Appendix A

Study Abroad Social Interaction Questionnaire (SASIQ)

Note: While the full version of the SASIQ used in this study included 20 spaces for listing acquaintances and giving information about them, this sample includes only five, as representing the entire survey here would be impractical.

Q11 Your Name (First and Last):

Q35 Email address:

Q3 In the boxes below, please write, from memory, the names of friends or acquaintances are native Chinese speakers and who fit the following descriptions in all respects:

- You at least occasionally spoke Chinese to them.

- You know them well enough to have spent at least some time socializing with them.

If you had more than twenty friends with whom you at least occasionally spoke Chinese, please simply list the twenty with whom you spoke Chinese most regularly. To help you think about people you could name, think about people you met at school, in the community, through internships, or people you lived with, as well as people you were introduced to through friends or others.

○   Person 1 (1) _____

○   Person 2 (2) _____

○   Person 3 (3) _____

○   Person 4 (4) _____

○   Person 5 (5) _____

Q5 2. Please use the drop-down menus to indicate how often you spoke Chinese with each individual (Chinese Use), how often you spoke English with them (English Use), and how well they spoke English (English Proficiency).

	Chinese Use	English Use	English Proficiency
Person 1 (x1)	▼ Very Often (1 ... Never (1)	▼ Very Often (1 ... Never (1)	▼ Very Well (1 ... Not At All (1)
Person 2 (x2)	▼ Very Often (1 ... Never (1)	▼ Very Often (1 ... Never (1)	▼ Very Well (1 ... Not At All (1)
Person 3 (x3)	▼ Very Often (1 ... Never (1)	▼ Very Often (1 ... Never (1)	▼ Very Well (1 ... Not At All (1)
Person 4 (x4)	▼ Very Often (1 ... Never (1)	▼ Very Often (1 ... Never (1)	▼ Very Well (1 ... Not At All (1)
Person 5 (x5)	▼ Very Often (1 ... Never (1)	▼ Very Often (1 ... Never (1)	▼ Very Well (1 ... Not At All (1)

Q65 2. Please fill in the fields to answer each question.

On average how many hours did you spend with this person per week? (Half hour should be represented as .5) (1)	What percentage of that time did you spend doing activities in Chinese? (reading, writing, speaking, listening to music, watching TV, etc.) (2)	What percentage of that time did you spend doing activities in English. (speaking, reading, writing, listening to music, watching TV etc.) (3)

Person 1 (x1)			
Person 2 (x2)			
Person 3 (x3)			
Person 4 (x4)			
Person 5 (x5)			

Q56

For each of the people in your list, please indicate the level of your friendship, ranging from mere acquaintance to very close friend/confidant. Note that in terms of communication, level of friendship ranges from engaging in occasional friendly exchanges (low on the scale) to sharing one's deepest feelings or asking for advice

regarding personal challenges (high on the scale). Refer to the diagram below to help interpret the range.

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)
Person 1 (x1)	○	○	○	○	○	○	○	○
Person 2 (x2)	○	○	○	○	○	○	○	○
Person 3 (x3)	○	○	○	○	○	○	○	○
Person 4 (x4)	○	○	○	○	○	○	○	○
Person 5 (x5)	○	○	○	○	○	○	○	○

Q48 There are four parts to this question (A-D).

Part A.

For this item you will help us identify which people know each other and how they know each other by grouping together the people you listed according to where they should know each other from (and possibly where you got to know them). For example, if three of the people are host family members, you would group them together by dragging their names to the "Host Family" box. If four of the people worked at your internship site and knew each other as a result, you would group them together by dragging their names to the "Group 1" box and then giving the box "Group 1" the label "Internship Site" in the blank below. Clubs, community organizations, etc. could also be used as group labels.

If people belong to more than one group, place them in their primary group (the group they are most tightly linked to).

After dragging people to their groups, please be sure to define each group in the text fields that follow (Part B) so we can understand how the people know each other. If you have more groups than there are boxes, please use the next question (Part C) to describe who these groups are and how they are made up (the people and the group names).

Roommates	Group 1	Group 2	Group 3	Group 4	Group 5
_____ Person 1 (x1)	_____ Person 1 (x1)	_____ Person 1 (x1)	_____ Person 1 (x1)	_____ Person 1 (x1)	_____ Person 1 (x1)
_____ Person 2 (x2)	_____ Person 2 (x2)	_____ Person 2 (x2)	_____ Person 2 (x2)	_____ Person 2 (x2)	_____ Person 2 (x2)
_____ Person 3 (x3)	_____ Person 3 (x3)	_____ Person 3 (x3)	_____ Person 3 (x3)	_____ Person 3 (x3)	_____ Person 3 (x3)
_____ Person 4 (x4)	_____ Person 4 (x4)	_____ Person 4 (x4)	_____ Person 4 (x4)	_____ Person 4 (x4)	_____ Person 4 (x4)
_____ Person 5 (x5)	_____ Person 5 (x5)	_____ Person 5 (x5)	_____ Person 5 (x5)	_____ Person 5 (x5)	_____ Person 5 (x5)

Q55 Part B

○ Label for Group 1 (1) _____

○ Label for Group 2 (2) _____

○ Label for Group 3 (3) _____

○   Label for Group 4 (4) _____

○   Label for Group 5 (5) _____

Q58 Part C

If there were more groups than six (Roommates plus 5 others), please list the groups and their members here.

Q61 Part D

If people belonged to more than one group, please list these people and their additional groups here. (Give each name with that person's additional group or groups.)