RESEARCH ARTICLE

The relationship between social network typology, L2 proficiency growth, and curriculum design in university study abroad

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Abstract

This study utilizes social network analysis to characterize a typology of study abroad sojourner experience, detailing the relationship of social experience types to second language (L2) proficiency growth and study abroad program design. In contrast with previous research, the study performs a quantitative analysis of structural and compositional network features to identify a typology of social networks. Participants were 30 L2 Spanish learners from five US-based semester-long university study abroad programs in Spain. Social network data were collected using a social network questionnaire, while L2 development was measured through an elicited imitation task. Results identify four prominent social network patterns, characterized by varying levels of Spanish language use, emotional proximity to contacts, frequency of interaction, contact status as program peer or host community member, and network cohesion. L2 proficiency development was significantly affected by these patterns, which were shaped by the contrasting curricular models of study abroad programs.

Introduction

It is frequently acknowledged in Second Language Acquisition (SLA) research that participation in study abroad does not act as a language learning cure-all, and that second language (L2) outcomes in this environment vary considerably (Isabelli-García et al., 2018; Jackson, 2017; Kinginger, 2009, 2011). Furthermore, it is increasingly acknowledged that the idea of a monolithic "study abroad context" is, as Coleman (2015) puts it, a "patent absurdity" (p. 37). In light of these observations, consensus has built around the recognition that study abroad must be understood largely as a social experience, and that any characterization of linguistic and intercultural development in such an environment should hinge on this fact (Kinginger, 2011).

Qualitative studies over the last two decades have shed light on the complexities of social experiences abroad, and, in particular, on the (in)ability of sojourners to develop social networks that are reflective of meaningful host community engagement (Cook,

2006; Iino, 2006; Isabelli-García, 2006; Kinginger, 2008). Additionally, recent quantitative work has utilized social network analysis to describe how L2 development may be influenced by specific aspects of social experience abroad (e.g., frequency of L2 use, emotional intensity of friendships) (Baker-Smemoe et al., 2014; Baten, 2020; McManus, 2019), as well as by the overall "strength" of sojourners' in-country L1 and/or L2 social networks (Kennedy Terry, 2017, 2022; Mitchell et al., 2017; Pozzi, 2021; Pozzi & Bayley, 2021). However, much less attention has been given to the analysis of *patterns* of social experience that might be observed by describing how various network variables (e.g., language use, network density, number and intensity of program- vs. host community–based relationships) work in concert to differentiate the experiences of distinct groups of sojourners (see, e.g., Gautier, 2019; Gautier & Chevrot, 2015; Hasegawa, 2019). The present study combines elements of previous research to link network typology to development in global L2 oral proficiency, as well as study abroad program design. For those interested in promoting language learning in study abroad, the ability to identify a typology (i.e., a classification of differentiated patterns) of sojourner social experiences —and to describe its relation to SLA—has a direct utility, as the patterns present in such a typology may exhibit a direct relationship to study abroad program design. A better understanding of these forces would improve practitioners' ability to design study abroad curricula that promote both language learning and host community engagement.

The present study characterizes the social network patterns exhibited by a group of 30 L2 Spanish learners of US-origin participating in five distinct semester-long study abroad programs in three cities in Spain. Moreover, it relates these patterns to learners' L2 proficiency outcomes—as measured using an elicited imitation task (EIT)—as well as to the nature of their respective study abroad curricula. The goal of the study is threefold. First, it seeks to characterize the nature of social experience in university study abroad by describing a typology of social networks in this environment. Second, the study seeks to describe the influence of such a typology on learners' L2 proficiency outcomes over the course of a sojourn abroad. Third, the study aims to connect this characterization of study abroad social experience and language learning to study abroad curriculum design. These goals are established in the interest of connecting a combined holistic and quantitative understanding of sojourner social experience to SLA research in study abroad, and to thereby inform curriculum design in this context that seeks to promote language learning and host community engagement.

Study Abroad SLA, Social Network Analysis, and Study Abroad Program Design

The field of "study abroad SLA" is young; in a meta-analysis of 66 studies analyzing L2 development in study abroad, Yang (2016) reports that nearly three-quarters (74%) of studies were published between 2006 and the time of writing. This "boom" is due to several factors. For one, it is reflective of a continued rise in student enrollment in study abroad programs (despite a shift away from language learning priorities; see Isabelli-García et al., 2018). Moreover, the study abroad context has proven to be a complex one, yielding linguistic outcomes for L2 learners that run counter to the popular belief— propagated by the study abroad industry (Kubota, 2016)—that it is a panacea for language learning (Kinginger, 2009).

Mirroring the broader social turn in SLA research emerging out of the mid-1990s (Block, 2007), more recent investigations into study abroad have highlighted issues of

learner identity and its role in sojourners' linguistic and intercultural development. This shift has shed light on many complexities of the study abroad experience, providing some explanation for the variation in L2 outcomes and social experience at the level of the individual and affirming the centrality of social processes to L2 development in study abroad (Isabelli-García et al., 2018; Taguchi & Collentine, 2018). At the most general level, this research has demonstrated that L2 gains and development in intercultural awareness are dependent on sojourners' opportunities to become meaningfully, socially engaged with their local host communities (Kinginger 2011).

Social Network Analysis, Host Community Integration, and Language Learning

Social network analysis describes the nature of social relationships and their effects on individual and group (network) behavior. A "social network" is simply a "set of social relations maintained by an individual" (Gautier 2019, p. 207), and can be characterized by a variety of indices. For instance, a relationship ("tie") between two individuals can be described according to its "strength," or the "combination of the amount of time, emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter 1973, p. 1361). Or an interpersonal relationship may be described according to its "multiplexity," whereby a more multiplex (contrasted with "uniplex") relationship is one in which the same individuals interact in a greater number of contexts (e.g., if residence and place of work are shared; Milroy, 1980). Indices of "cohesion" report on the degree of connectedness between network members (Borgatti et al., 2018). Social network analysis has been widely used in sociological research and was first adopted for linguistic analysis by Milroy (1980), who argued that in-group identity and solidarity pressure played an important role in the acceptance or rejection of novel community language features in Belfast.

Early adoptions of social network analysis to the area of study abroad SLA were qualitative in nature, using the concept of learner networks as an illustrative device to describe the varying degrees of sojourner social integration into the host community. In an analysis of US university students studying abroad in Argentina, Isabelli-García (2006) drew a connection between social network development, motivation, attitudes toward the host culture, and language learning outcomes; students who were more motivated and open to the host culture were observed to develop more integrated social networks with host community members, and ultimately to experience greater gains in Spanish oral proficiency. Similar results were reported by Trentman (2017) in an analysis of university students studying abroad in Egypt; the students displaying the greatest gains in fluency and sociolinguistic competence were those whose Arabic-dominant networks extended beyond program peers to nonprogram international contacts and local Egyptian peers and host family (HF) members. Trentman relates these "layers" of social interaction to the additive levels described by Coleman (2015) in the "concentric circles" model of study abroad social network development. Importantly, however, nearly all these high gainers nevertheless relied on social networks established by their study abroad program, through offerings such as HF placements and language partner exchanges.

Quantitative analyses connecting social network development and language learning in study abroad have most commonly taken one of two approaches. The first is to measure several social network variables, and to combine these measurements into a single score representing the degree to which sojourners have become socially integrated into the host community. These scores can then be correlated with language

learning outcomes. This has been one approach taken by the Languages and Social Networks Abroad—or "LANGSNAP"—project headed by Rosamond Mitchell, Nicole Tracy-Ventura, and Kevin McManus, analyzing the social network and language learning development of L2 French and Spanish learners spending an academic year abroad in France, Spain, and Mexico. In one study (Mitchell et al., 2017), the authors utilized (separate) L1 and L2 Social Network Indices (SNI), based on measurements of density and multiplexity, to account for sojourners' "degree of integration" (p. 140). L2 SNI scores displayed a significant positive correlation with gains in rate of speech, but not with gains in an elicited imitation task or in measures of error-free clauses (written and oral production). Taking a similar approach, other studies have reported a positive influence of social network "strength" scores on a learner's ability to participate in sociolinguistic variation in L2 French (Kennedy Terry, 2017, 2022) and L2 Spanish (Pozzi, 2021).

A second line of SLA study abroad research has examined the correlation between L2 development and specific, discrete aspects of sojourners' social networks. For example, Baker-Smemoe et al. (2014) analyzed the relationship between L2 oral proficiency development and several network measures—including size, durability (frequency of interaction), intensity (emotional proximity to contacts), density, dispersion (average number of social groups), and English-language speaking proficiency of contacts—for a group of 102 university students studying abroad in a variety of countries. The authors report that the "gainers" (students who improved at least one sublevel on the Oral Proficiency Interview) scored significantly higher than nongainers on measures of dispersion and intensity. While the study by Baker-Smemoe et al. (2014) focused exclusively on native speaker[1] (NS) host community contacts, others have analyzed learner networks based on language of interaction, regardless of contact nationality or first language status. For example, McManus (2019) reported a positive effect for durability of L2-using contacts on the development of L2 lexical complexity scores for a group of 29 French learners studying in France; students who spoke in French with their most frequent contacts—whether program peers or host community members—displayed higher gains in L2 lexical complexity. Similar findings have been reported in the context of ERASMUS students in Europe; Baten (2020) found that students who developed larger, as well as more intense networks of L2-using relationships displayed greater gains in self-perceived oral language ability.

Social Networks and Study Abroad Program Design

The issue of host community access has long been addressed in the literature on study abroad. One consistent finding is that "students always have the default of spending time with their compatriots if their contacts with local people are not satisfactory" (Block, 2007, p. 871). More often than not, these studies report that contact with host community members is, in fact, not satisfactory, at least inasmuch as it is greatly limited in breadth and depth (Jackson, 2017; Kinginger, 2011). One factor that appears to exert an overarching influence on host community access is study abroad program design, which may work to misinform students and undermine language learning and inter-cultural development (Ogden, 2007). Study abroad programs frequently paint an

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[1]The author recognizes the complex nature of this term, as explored elsewhere (e.g., Firth & Wagner, 1997; Kramsch & Whiteside, 2007). However, given its relevance, and in the interest of clarity, it will be used in this article without further qualification.

idealized picture of language learning and interculturally "eye-opening" experiences through study abroad that is not substantiated by empirical research—what Kubota (2016) refers to as the "social imaginary" of study abroad. However, for US-based students studying abroad, it has long been documented that study abroad program structure often replicates students' home campus environment (Kline, 1998). Under this model, all aspects of sojourner experience are closely controlled by home universities, who act "*in loco parentis*, [and] are assigned responsibility for students' bodies and minds as they traverse the divide between adolescence and adulthood" (Kinginger, 2010, p. 219). Rather than seeking true social integration, the tendency of many American sojourner groups is more akin to a "short-term transfer of cohesive groups of … students to a different geographical base" (Coleman, 1997, p. 1, cited in Kinginger, 2010).

Program structure thus has consequences for sojourners' social development abroad. In an evaluative report on contemporary study abroad practice, Ogden (2007) outlines several ways in which—good intentions notwithstanding—a program's structure can work directly against its own explicitly stated goals. For example, pre-departure orientations, designed to introduce students to the program and each other, may serve to construct an in-program "bubble" dynamic that inhibits the formation of other (i.e., nonprogram) social connections after arrival. An analogous occurrence can be seen in group excursions: ostensibly an effort to foster intercultural integration, when such trips take the form of closely controlled tours they may provide little more than a "voyeuristic, framed experience with limited or no meaningful intercultural exchange" (Ogden 2007, p. 42).

Recent work has begun to utilize quantitative social network analysis to better understand program effects on sojourners' social experiences (Gautier, 2019; Gautier & Chevrot, 2015). In addition to analyzing the effect of social network variables independently (as in, e.g., Baker-Smemoe et al., 2014; Baten, 2020), or combined as an overall measure of network strength (Kennedy Terry, 2017, 2022; Mitchell et al., 2017; Pozzi, 2021), it is possible to identify patterns of social networks for subgroups of learners according to the varying degrees to which network characteristics are present at the same time. For example, as a complement to describing the effect of a single variable such as "intensity," combined effects may be observed for subgroups of learners exhibiting networks that simultaneously show varying levels of intensity, durability, L1/L2 language use, network density, and/or other measures.

Once described, network patterns may be shown to be associated with certain study abroad program types, in addition to other large-scale variables such as study location or country of sojourner origin. In a longitudinal social network analysis of 29 French language learners from the United States and China spending two semesters in France, Gautier (2019) identified five distinct network types developed by participants. These network types were defined according to both structural aspects (e.g., network density) as well as compositional ones (e.g., the presence of program peers vs. host community contacts), with certain network types being more common for either US or Chinese sojourners. In explaining this contrast, the author cites a combined effect of differing cultural outlooks on sociability, as well as contrasts in program structure. For example, while American students were housed mostly with local French host families, Chinese students stayed in university residence halls that were primarily populated with other Chinese peers, and which were most commonly located outside of town. As a result of this and other program characteristics, American students were reported to develop extensive networks of connections overall more frequently, relative to their Chinese counterparts.

Other recent work has taken a different approach to understand program influence on social network development, by performing "whole network analysis." Rather than describe patterns in sojourners' individual networks (alternately called "personal" or "egocentric" networks), whole network analysis seeks to characterize the social network exhibited by an entire group of sojourners at once. In one such example, Paradowski et al. (2021) performed a whole network analysis of a 4-week summer study abroad program taught in Warsaw, Poland, populated by students from various countries (N = 332, from two separate years of enrollment). The authors reported that certain structural network properties had significant effects on Polish language learning—as measured using entry and final grades and tests—for subgroups of learners within the group network. For example, a positive correlation was found between language learning progress and the number of individuals' outgoing Polish language interactions (Weighted Out-Degree Centrality), which the authors interpret as an indication of the importance of L2 production. Conversely, the authors report a negative language learning effect for Weighted In-Degree Centrality, a measure of in-group popularity.

In another whole network analysis, Hasegawa (2019) examined the contrasting networks exhibited by groups of learners enrolled in three different summer study abroad programs in Japan. The programs differed considerably in size, location, and structure, and consequently each program was observed to promote a distinct social network type. Perhaps the starkest example of this influence is reported for Program A, which is characterized as a "closed network" in which students tended to form dense social cliques with fellow program participants, struggling to break out of fixed program boundaries to meet local peers. While individual agency challenged this to a degree, such agency was mostly curtailed by structural program forces, as "the closed network type seems to have distinct control over the conduct of the people involved" (p. 63).

The Gap

Quantitative social network analysis has been increasingly employed in study abroad SLA research as a way to connect language learning processes to the social development—whether based on interactions with host community members or in relative isolation from them—that is widely recognized as central to understanding variable SLA outcomes in this environment. Many studies have elucidated the important role of individual social network indices on sojourners' L2 development in a variety of study abroad contexts (e.g., Baker-Smemoe et al., 2014; Baten, 2020; McManus, 2019), as well as the effect of overall social integration into the host community as measured using social network "strength" scores (e.g., Kennedy Terry, 2017, 2022; Mitchell et al., 2017; Pozzi, 2021). Other studies have characterized the social network development of entire groups (Hasegawa, 2019; Paradowski et al., 2021) and subgroups (Gautier, 2019) of learners. However, previous research has not yet made a connection, through quantitative analysis, between L2 development and a typology (i.e., a classification system) of social network patterns. Likewise, the question of how such social network patterns are promoted, discouraged, or otherwise influenced by different study abroad program designs has not been adequately addressed (but see Gautier, 2019; Hasegawa, 2019), nor has it been connected to language learning outcomes through quantitative analysis. The study reported in this article addresses this gap by detailing a typology of social networks in study abroad and its connection to L2 outcomes and program structure.

The Study

The study analyzed the social network and L2 Spanish proficiency development of 30 university students participating in five semester-long study abroad programs in three cities in Spain. A questionnaire was used to collect information on the structure and quality of participants' social networks, and a cluster analysis was performed to identify a typology of these networks. Spanish language proficiency was measured using EIT measuring global (oral) L2 proficiency. The following research questions guided the study:

> RQ1: What social network patterns are exhibited by students enrolled in US-based study abroad programs over the course of an academic semester in Spain?
> RQ2: What relationship exists between students' social network patterns and Spanish language proficiency outcomes?
> RQ3: What relationship exists between students' social network patterns and their programs of enrollment?

The Participants

Thirty undergraduate students volunteered for participation in this study, from various US-based colleges and universities. Each participant was enrolled in one of five study abroad programs in one of three cities in Spain (Madrid, Toledo, Sevilla) during the spring 2019 academic semester. Participants were 80% female (n = 24) and 20% male (n = 6), with ages ranging from 18 to 22. All participants were L2 learners of Spanish. Participants' previous enrollment in Spanish academic coursework varied, and the majority (83%; n = 25) reported being either Spanish majors (n = 13) or minors (n = 12).

The Study Abroad Programs

Each of the five programs was administered by either an American university or a US-based not-for-profit international education exchange organization (from here "independent providers"). The following descriptions (Table 1) are framed in terms of where programs fall on a general spectrum ranging from "direct enroll" in Spanish universities (whereby students are enrolled in coursework alongside mostly full-time host community-based students) to "island" program structures that seek to replicate the American university experience, in a self-contained context that is largely isolated from host country academic institutions (Norris & Dwyer, 2005).

Participants' living situations and site of coursework varied. The majority of participants reported living with a host family (n = 24; 80%) and taking academic coursework through a program-run study center (n = 20; 67%) (Table 2).

Data Collection

Data collection consisted of the administration of the Social Networks Abroad Questionnaire (SNAQ), a social network questionnaire designed by the author for this study, and an EIT. Data were collected at the beginning (T1) and end (T2) of participants' sojourns during the spring 2019 academic semester. As the start and end date of each

Table 1. Study abroad program descriptions

Variable	Description
Madrid Island	Six participants studied in Madrid in an "island" program administered through a small US liberal arts college. This program enrolls a total of approximately 30 students and administers all its coursework through a private study center. While students have the option of taking some direct enroll coursework at a local university, only one participant in the study did so. All coursework is in Spanish, and sojourners are required to live with host families.
Madrid Independent Provider	Four participants studied in Madrid through a large independent provider. Students enrolled in coursework entirely through a local university, which for all students consisted of a mixture of courses designed for visiting international students (frequently from countries other than the United States) and direct enroll coursework. All courses were conducted in Spanish.
Madrid International Institute	One participant was enrolled in a study abroad program facilitated by her home institution and run through an international study center. This center functioned in the same way as island program study centers: Program administration and coursework were run entirely by the study abroad program and were not directly affiliated with any host country university. Classes are offered in both Spanish and English.
Sevilla (independent provider)	Sixteen participants studied in Sevilla through a large independent provider. This program offers several enrollment tracks (e.g., liberal arts, business, global studies), which, along with students' personal preferences, determined the nature and location of their coursework (and, subsequently, the degree to which this program experience fit the "island" or "direct enroll" models). All coursework was conducted in Spanish.
Toledo (island)	Twelve participants studied in Toledo, in an island program affiliated with their US home university and administered through a Spanish international education institute. The institute operates independently of any Spanish university, contracting local professors to conduct coursework, in Spanish. Some (n = 4) participants from this program lived onsite, in program-run dormitories located in the same building as the students' classes.

program varied, data collection was administered during an approximately 12-week span for each group in accordance with their respective academic schedules, with the exact time elapsed between T1 and T2 ranging from 11.6 to 12.3 weeks. The EIT was administered to participants by the author in a quiet classroom setting. The social network portion of present analysis uses data collected from the T2 SNAQ.

Instruments

Social Networks Abroad Questionnaire

Data concerning participants' social networks were collected using the SNAQ (see Online Supplementary Materials), an online questionnaire designed by the author for the study. The measurements and design of the SNAQ were modeled off of questionnaires and social network data-collection procedures in previous studies, most notably Baker-Smemoe et al. (2014), Gautier and Chevrot (2015), and Mitchell et al. (2017). The SNAQ relies on retrospective reports made by participants to describe the nature of

Table 2. Living situation and site of coursework, by study abroad program

	Living situation			Site of coursework		
	Host family	Dorm/apt (program)	Dorm/apt (mix)	Program center	Host university	Both
Mad-Is (n = 6)	6	0	0	5	0	1
Mad-IP (n = 4)	2	0	2	0	3	1
Mad-II (n = 1)	1	0	0	1	0	0
Sevilla (n = 7)	7	0	0	3	4	0
Toledo (n = 12)	8	4	0	11	0	1
TOTAL (n = 30)	24	4	2	20	7	3

Note: Mad-Is = Madrid Island; Mad-IP = Madrid Independent Provider; Mad-II = Madrid International Institute; Dorm/apt (program) = dorm or apartment consisting only of students enrolled in the same study program; Dorm/apt (mix) = dorm or apartment consisting of students from participant's program in addition to at least one Spanish peer.

their social networks as they existed at the time of data collection. This approach was chosen over that of other studies (e.g., Gautier 2019) that have opted for the use of a combined logbook and qualitative participant interviews. Mixed logbook/interview approaches require a much greater time commitment from students (approximately 3–6 hours at each data-collection point; see ibid.), and still rely, in part, on participants' retrospective generalizations. For the present study, the reliability of participants' retrospective reports was aided by the fact that participants were asked only to report on the characteristics of their social networks at the time of data collection (T2; toward the end of their sojourn), and not in reference to their entire sojourn abroad from start to finish. Additionally, participants were not asked to provide specific estimations for questions regarding percentage of English/Spanish language use or frequency or interaction, and instead indicated general ranges (see the following text).

To describe the size, structure, and quality of participants' combined English- and Spanish-language social networks, the SNAQ elicited information on the following variables: size (total number of contacts), cohesion (degree of connectedness among contacts), context(s) of interaction (multiplexity), durability (frequency of contact with each individual in the network), intensity (emotional proximity), proportional language use, and contact nationality. In the first section of the questionnaire, participants were asked to list all of the individuals they could be said to have regular contact with, whether casual acquaintances or close friends, at the time of questionnaire completion. To aid in the accurate recollection of all contacts who fit these criteria, respondents were given several potential contexts of interaction: school/class, organized free time (e.g., clubs, volunteer work), unorganized free time, living situation, and "other." Respondents then grouped contacts together according to which individuals knew each other, and labeled each social group (e.g., "lunch group," "class project group"). Each contact could potentially belong to more than one group, and respondents were told this explicitly. Participants were also explicitly told that in-class contact should not be considered "regular," unless such classroom-based relationships (including, e.g., contact with professors) extended beyond the classroom on a regular basis.

Next, respondents were asked a series of questions pertaining to the characteristics of each individual identified, and of their relationship with those individuals. Frequency of contact ("durability") was measured for general frequency ("every day," "several times a week," "a couple of times a week," "a few times a month," "a couple times a month") and average duration of interaction ("a few minutes," "15–30 minutes," "1–

2 hours," "several hours or more"). Respondents then identified their level of emotional proximity to the individual ("intensity"), on a scale from one to eight, ranging from "mere acquaintanceship" ("1") to close friend/confidant ("8") (adopted from Baker-Smemoe et al., 2014). Respondents then reported their proportional language use in a typical interaction with the individual: "90–100% English" (coded as "1"); "About 75% English and 25% Spanish" (coded as "2"); "About 50% English and 50% Spanish" (coded as "3"); "About 75% Spanish and 25% English" (coded as "4"); "90–100% Spanish" (coded as "5"); and "other." Finally, the nationality of each contact was solicited: "American," "Spanish," "Other (native English-speaking)," "Other (native Spanish-speaking)," or "Other."

Elicited Imitation Task

An EIT was administered to participants at T1 and T2. The EIT is used to measure aural and global (oral) production skills (Bowden, 2016), and requires language users to listen to, and repeat, a series of utterances. EITs have been used to test L1 (e.g., Slobin & Welsch, 1973) and L2 (e.g., Naiman, 1974; Savignon, 1982) language ability, including in the context of study and residence abroad (e.g., Mitchell et al., 2017). The rationale is that to accurately reproduce each utterance speakers must both parse and comprehend the L2 input (Bley-Vroman & Chaudron, 1994). The internal and external validity of the EIT has been confirmed by several studies (e.g., Bowden, 2016; Park et al., 2020), and scores from the EIT have been found to display a high degree of correlation with the Spanish Simulated Oral Proficiency Interview (SOPI) (Bowden, 2016; Ortega, 2000).

The current study uses the version of the Spanish EIT developed by Ortega et al. (1999)[2] and used in other studies on L2 Spanish proficiency (Bowden, 2016; Mitchell et al., 2017; Ortega, 2000). The EIT contains 30 grammatically accurate, sentence-length items of increasing length in syllables. The EIT was administered individually to each participant by the author. Each item on the EIT was played once, with a 2-second pause given between the end of the utterance and the beginning of participant repetition (for the importance of pause length, see Bowden, 2016; Park et al., 2020). The EIT recording used to elicit participant responses was made by a male monolingual Spanish speaker from Spain.

Analysis

Social Network Analysis

The goal of the social network analysis was to inductively identify a typology of social networks. Five variables were chosen (Table 3), both on the basis of their potential effect on L2 development, as well as their conceptual relevance to the structural and compositional nature of sojourners' social networks. Variables representing relationships with NSs of Spanish were not limited to individuals reported to be of Spanish nationality, and instead represent all individuals reported to be NSs of Spanish. It should be noted that, with very few exceptions (n = 4 for all participant networks), these NS contacts were individuals whom the sojourners reported meeting outside of their programs of enrollment. It should also be noted that English/Spanish language use with these contacts is not specified in the definition of the variables as they are operationalized here (in the present analysis of the data), given the overwhelmingly Spanish-

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[2]Only one alteration was made to the original EIT: In item six, the word *manejar* ("to drive") was changed to *conducir* ("to drive") in accordance with common usage in Peninsular Spanish.

Table 3. Social network variables for cluster analysis

Variable	Description
Percent Spanish-dominant (HF max 2)[1]	Proportion of total network contacts with whom interactions were described as Spanish-dominant, defined as at least 50% Spanish language communication in a typical encounter.
NS contacts (HF max 2)	Total contacts in an individual's network who are NSs of Spanish.
Top 5 language	Average language use (1–5, see previous description of language use scale) with top five contacts in an individual's network, where "top" is defined as the combined durability and intensity scores of contacts.[2]
Top 5 NS	Total NS contacts in Top 5 contacts.
Dispersion	Total number of social groups in an individual's social network. There was no minimum number of connected individuals to be considered a group (i.e., minimum group membership = 1).

Note: HF = host family.
[1]The total number of NS contacts from the host family counted for the measure "Percent Spanish-Dominant (HF max 2)" was limited to two, to avoid distortion from a case of a small number of participants reporting unusually high numbers of host family members (giving the false impression of an extensive NS social network). No such limitation was made for the variable "Top 5 NS."
[2]Where there was a tie for fifth place for combined durability/intensity "top" ranking, the average language score was taken of these individuals and counted as a single score for Top 5 average language.

dominant nature of the relationships that participants reported maintaining with their NS contacts: The raw data collected through the SNAQ showed that, across all participants, average NS language use was 4.5 (out of 5), equivalent to between 75–100% Spanish language use in a typical interaction.

To group participants' social networks according to their similarity across the five social network variables, a cluster analysis was performed using the "hclust" function in R. Cluster analysis, which forms groups ("clusters") of individuals based on their similarity across a set of variables, has been used by previous studies on social networks (e.g., Gautier, 2019) and SLA (e.g., Winke & Gass, 2018). Strong theoretical reasons must exist for the choice of the predictor variables to be included in the cluster analysis (Crowther et al., 2020; Staples & Biber, 2015). In the present analysis, each variable was chosen on the basis of previous literature that has indicated its potential effect on social network development. For example, Baker-Smemoe et al. (2014) found that the variables dispersion and intensity (i.e., emotional proximity) were significantly correlated with L2 Spanish oral proficiency gains. In the present analysis, the variable "dispersion" is included, as well as two variables that take into account "intensity," combining this aspect with contact status as NS/NNS ("Top5 NS") and language use ("Top5 Language"). All three of these variables—Dispersion, Top5 NS, Top5 Language—also have theoretical precedent in the foundational applications of social network theory to linguistic analysis, as in Milroy (1980), who combined measures of density and multiplexity (i.e., overlapping contexts of interaction, a measure of durability) in her analysis of the social acceptance of novel language features in Belfast. Additionally, the importance of sojourners' development of relationships with NSs of the target language has been widely commented on in previous literature on SLA and social network analysis in study abroad (e.g., Coleman, 2015; Isabelli-García, 2006; Trentman, 2017), providing further theoretical justification for the inclusion of variables "NS Contacts" and "Top5 NS" in the present analysis. Likewise, with regard to the variable "Percent Spanish-dominant (HF max 2)," L2 language use is widely accepted a relevant predictor of L2 development, and has, in some cases, been found to correlate with SLA in study abroad (e.g., Hernández, 2010; McManus, 2019; Paradowski et al., 2021) (but see also, Baker-Smemoe et al., 2014; Segalowitz & Freed, 2004). Given that these predictor variables

were initially of different scale "lengths," all variables were standardized as *z* scores prior to conducting the cluster analysis in R.

For the present analysis, agglomerative hierarchical cluster analysis was chosen because it is does not require the number of clusters in the output to be specified beforehand. Instead, the researcher identifies, inductively, the most conceptually and statistically appropriate number of clusters to use in post hoc analyses. This was necessary in the present study, in which the interest lies in inferring social network patterns from the results of the SNAQ (rather than prescribing a "correct" number of social network patterns a priori). Regarding the appropriateness of the number of participants involved in the cluster analysis, Crowther, Kim, Lee, Lim, and Loewen (2020) note that a range of advice exists for best practices. The numbers included in the present cluster analyses are in line with previous work adopting cluster analysis to study social network patterns in study abroad (Gautier, 2019). Furthermore, hierarchical clustering methods (cf., K-means clustering) are considered to be well suited to analyze smaller groups of participants (Crowther et al., 2020).

In addition to the raw number of participants involved, the reliability of cluster analysis depends on the "compactness" of clusters (i.e., dissimilarity from surrounding clusters, where a higher coefficient indicates greater dissimilarity), measured using the silhouette coefficient (Rousseeuw, 1987). In the present analysis, the resulting silhouette coefficient (distance = Euclidean distance) for the cluster analysis was above the minimum standards for appropriateness of cluster analysis (ibid.; Winke & Gass, 2018; see "Results" section).

Participants were not recruited on the basis of any minimum or maximum initial L2 proficiency. As such, and given present study's interest in relating gains in L2 proficiency to social network type (as observed through cluster analysis group membership), it was of interest to have as homogenous a group of initial L2 proficiency scores as possible for the cluster analysis (see Zalbidea et al., 2021 for a discussion of the effect of initial L2 proficiency on L2 proficiency development in study abroad). Therefore, it was necessary to decide whether to include all participants in a single cluster analysis, or else to divide sojourners into two subgroups of lower/higher L2 proficiency. Preliminary analysis yielded a weak to moderate negative correlation (Pearson $r = -0.43$) between T1 EIT score and change in EIT score from T1 to T2. After removing three outliers from this group, only a weak negative correlation (Pearson $r = -0.27$) was found between these two measures, with assumptions met for level of measurement, related pairs, absence of outliers, and linearity. The remaining participants (n = 27) were included in a single cluster analysis.

Scoring of EIT

The author scored EIT responses according to the five-point (0–4) scale used by Ortega (2000) (see Table 4 for abbreviated rating criteria). To validate the author's scoring, a subset (n = 10) of participants' tests was graded by an external evaluator trained on EIT scoring measures, yielding a 96% agreement with the corresponding original scoring. The complete EIT contains 30 items; however, the first item of the EIT was ultimately not included in the analysis due to issues relating to audio volume and participant preparedness. This resulted in a scoring range of zero to 116.

Results

L2 Proficiency Scores

Table 5 displays participants' EIT results, by program. Participants (across all programs) display an average increase of 17 (95% CI, 13.1 to 21.0). Paired t-tests reveal this

Table 4. Abbreviated EIT rating criteria (from Bowden, 2016)

Score	Criteria
4	Perfect repetition
3	Meaning preserved; use of synonyms or (grammatical or ungrammatical) changes in grammar that do not affect meaning
2	More than half of content is preserved; slight changes in content that make content inexact, incomplete, or ambiguous
1	Half or less of content repeated; important content is left out; meaning may be unrelated or opposed to stimulus
0	Silence, unintelligible content, or only one content word

Table 5. EIT results by program

Program	T1 Mean (SD)	T2 Mean (SD)	Diff. (SD)	Min Diff.	Max. Diff.
Mad-Is (n = 5)	65.4 (8.5)	85.2 (10.3)	19.8 (10.8)	10	36
Mad-IP (n = 4)	64.3 (5.3)	83.0 (7.8)	18.8 (3.0)	15	22
Mad-II (n = 1)	55	46	−9		
Sevilla (n = 6)	51.0 (16.6)	73.8 (17.0)	22.8 (12.2)	10	45
Toledo (n = 11)	55.5 (19.7)	69.8 (16.9)	14.3 (5.4)	5	27
TOTAL (n = 27)	57.6 (15.7)	74.6 (16.2)	17 (9.9)	−9	45

Note: SD = standard deviation; Mad-Is = Madrid Island; Mad-IP = Madrid Independent Provider; Mad-II = Madrid International Institute; Max. EIT score is 116.

average difference to be significant at p < 0.001, with a large effect size (Cohen's $d =$ 1.07). T1–T2 contrasts in proficiency scores also reveal individual variation; individual changes in scores range from −9 to +45.

Cluster Analysis of Social Network Variables

A cluster analysis was conducted to address RQ1 ("What social network patterns are exhibited by students enrolled in US-based study abroad programs over the course of a semester in Spain?"). Five social network variables were included in the cluster analysis: "percent Spanish-dominant (HF max 2)"; "NS contacts (HF max 2)"; "Top 5 language"; "Top 5 NS"; and "dispersion." The linkage method chosen for the present analysis is "average" linkage (distance = "Euclidean"). This method represents a compromise between two other common linkage methods, "single" and "complete" linkages, which run the risk of producing either a single large cluster group ("single" linkage) or else producing clusters in which similar objects are placed in different clusters through several levels of cluster output ("complete" linkage) (see Staples & Biber, 2015). "Average" linkage was also chosen over Ward's method, which has most frequently been chosen in SLA research (see Crowther et al., 2020), given that method's predisposition to produce similarly sized cluster groups (Staples & Biber, 2015), and given the interest of the present analysis in observing cluster formation on the sole basis of their similarity across all predictor variables.
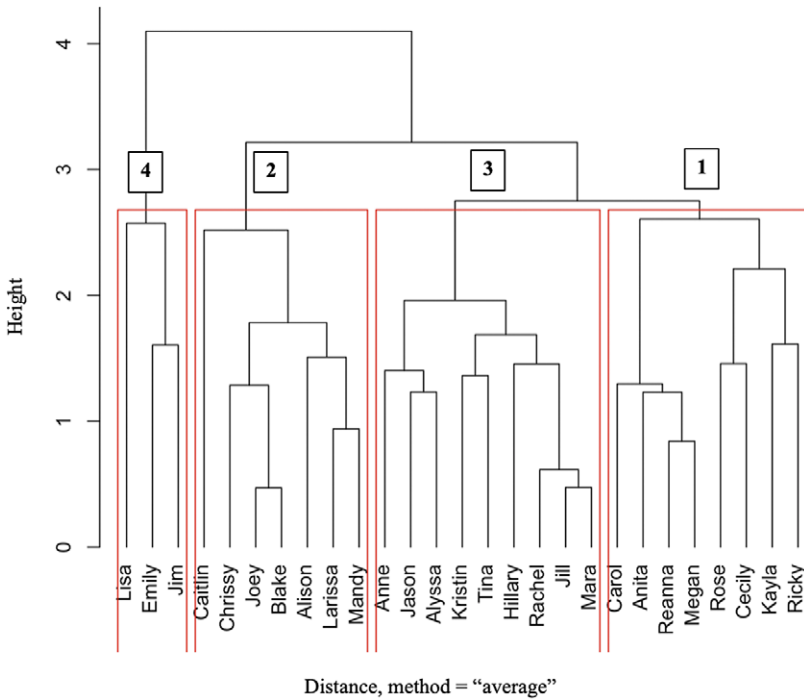
Figure 1. EIT cluster dendrogram.

Figure 1 displays the cluster dendrogram for this analysis, as well as the "cuts" representing the desired number of clusters chosen as the foci of the present analysis.[3] In the dendrogram, brackets connecting participants indicate varying degrees of similarity or "distance," according to the five social network variables in the analysis. For example, on the right side of the dendrogram, participants Ricky and Kayla are grouped in a pair, indicating that these two participants display similar attributes across network variables. Moving "up" the dendrogram, brackets indicate that Kayla and Ricky belong to another subgroup consisting of two additional participants (Cecily and Rose), with whom they also share network attributes (though, as indicated by the fact that the connection is made higher up the dendrogram, the similarity is slightly less strong than that displayed only by grouping Kayla and Ricky together). With each additional move "up" the dendrogram (referred to as a "cut"), cluster groups become simultaneously larger and less similar (i.e., greater "distance"), until arriving at a single "cluster" consisting of all participants in the analysis.

It was decided to make the "cut" at four clusters for statistical validity and conceptual appeal. This yielded an average silhouette value of 0.29, considered above the range of acceptability for analysis (Winke & Gass, 2018) and indicating a clear contrast between intra- and intercluster characteristics. To further verify the validity of this cluster solution, one-way ANOVAs were run to determine if the four clusters were significantly differentiated according to the mean scores of each of the five predictor variables

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[3]All participant and participant contact names are pseudonyms.

Table 6. Analysis of variance for four-cluster solution, by social network variable

Predictor variable	Analysis of variance
% Spanish-dominant	Assumptions were met for Independence, Normality of Errors, and Constant Error Variance (Levene's Test; $F[3,23] = 1.64$; $p = 0.21$). The one-way ANOVA revealed contrasts among clusters to be significant at $p < 0.001$ for the variable "% Spanish-dominant" ($F[3,23] = 14.5$, $p = 0.00002$).
NS Contacts	Assumptions were met for Independence, Normality of Errors, and Constant Error Variance (Levene's Test; $F[3, 23] = 0.77$; $p = 0.52$). The one-way ANOVA revealed contrasts among clusters to be significant at $p < 0.001$ for the variable "NS Contacts" ($F[3,23] = 14.9$, $p = 0.00001$).
Top5 Language	Assumptions were met for Independence, Normality of Errors, and Constant Error Variance (Levene's Test; $F[3,23] = 0.39$; $p = 0.76$). The one-way ANOVA revealed contrasts among clusters to be significant at $p < 0.001$ for the variable "Top5 Language" ($F[3,23] = 17.1$, $p = 0.000005$).
Top5 NS	Assumptions were met for Independence, Normality of Errors, and Constant Error Variance (Levene's Test; $F[3,23] = 0.59$; $p = 0.63$). The one-way ANOVA revealed contrasts among clusters to be significant at $p < 001$ for the variable "Top5 NS" ($F[3,23] = 18.1$, $p = 0.000003$).
Dispersion	Assumptions were met for Independence, Normality of Errors, and Constant Error Variance (Levene's Test; $F[3, 23] = 0.64$; $p = 0.60$). The one-way ANOVA revealed contrasts among clusters to be significant at $p < 0.01$ for the variable "Dispersion" ($F[3, 23] = 7.1$, $p = 0.001$).

Table 7. Average (Standard Deviation) social network values by cluster

Cluster	% Span-dom	NS Contacts	Top 5 Lang.	Top 5 NS	Disp.
1 (n = 8) *English Language Bubble*	0.33 (0.26)	2.8 (1.8)	2.0 (0.6)	0.6 (0.5)	4.1 (1.7)
2 (n = 7) *Spanish Language Bubble*	0.92 (0.13)	1.7 (0.8)	3.7 (0.5)	0.8 (0.8)	3.3 (1.8)
3 (n = 9) *Compartmentalization*	0.36 (0.21)	3.0 (1.2)	3.0 (0.4)	2.3 (0.5)	5.4 (1.3)
4 (n = 3) *Host Community-Integrated*	0.76 (0.10)	7.7 (1.2)	3.5 (0.4)	2.7 (0.6)	8.7 (3.1)

in the analysis. As shown in Table 6, the clusters in the present analysis were significantly differentiated by each of the five predictor variables.

Each cluster represents a distinct social network type displayed by participants at T2. For ease of comprehension, these clusters have been given nicknames representative of their most salient qualities. Table 7 displays the average values of social network variables, by cluster.

Pairwise comparisons (Tukey's HSD for multiple comparisons) were run to identify which cluster groups differed significantly according to each predictor variable. Table 8 shows which between-cluster comparisons reached statistical significance at $p < 0.05$.

In the following text, descriptions are given for each of these network types. The relationship between each network type and their members' L2 Spanish development is provided in the following section.

Table 8. P-values for between-cluster contrasts (Tukey's HSD) by predictor variable.

|	% Span-dom	NS Contacts	Top 5 Lang.	Top 5 NS	Disp.
Eng. Bubble/Compart.	0.99	0.98	<0.01*	<0.00*	0.44
HC-Integrated/Compart.	0.03*	<0.00*	0.40	0.84	0.06
Span. Bubble/Compart.	< 0.00*	0.24	0.03*	<0.00*	0.11
HC-Integrated/Eng. Bubble	0.02*	<0.00*	<0.00*	<0.00*	0.01*
Span. Bubble/Eng. Bubble	< 0.00*	0.44	<0.00*	0.96	0.80
Span. Bubble/HC-Integrated	0.66	<0.00*	0.93	<0.00*	<0.01*

*p < 0.05.

English Language Bubble
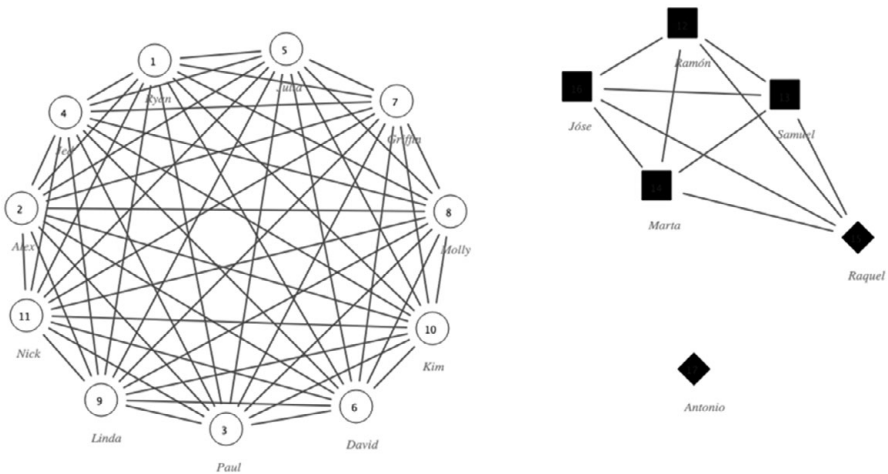
Figure 2. Social network graph, Anita (English Language Bubble; Toledo program).
Note: White circle = NNS, English-dominant communication; Black diamond = NS peer, Spanish-dominant communication; Black square = NS HF member, Spanish-dominant communication.

These networks are made up overwhelmingly of study abroad program peers, with English the primary language of communication with a clear majority of contacts (% Spanish-dominant is 33%). Very little Spanish (25%) is used in interaction with contacts with whom sojourners spend the most time and with whom sojourners feel emotionally closest ("Top 5 Lang" is 2.0, or 75% English use). Spanish NS contacts are all but absent from these sojourners' Top 5 contacts.

An example of an English Language Bubble network is given in Figure 2, which displays the social network graph of Anita (Toledo). In the graph, Anita is not represented; rather, only the individuals who Anita reported as regular contacts are shown. Each shape represents a different contact in Anita's network (see key), with lines ("ties") between them indicating which of those contacts knew each other.[4] In

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[4]All social network graphs were created using Social Network Visualizer (SocNetV) (Kalamaras, 2020). The numbers appearing within the nodes on these graphs (not visible for black nodes) are automatically generated by the program, and do not pertain to study data. Other text appearing in the graphs are pseudonym labels of contact-nodes.
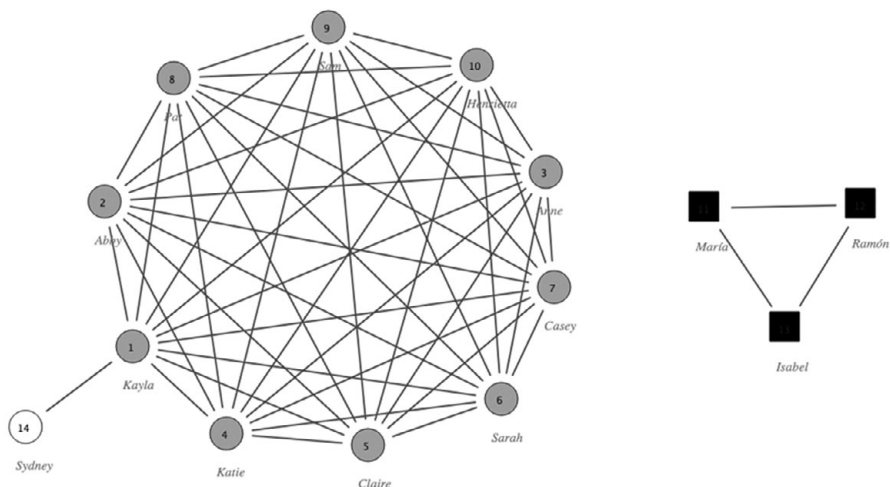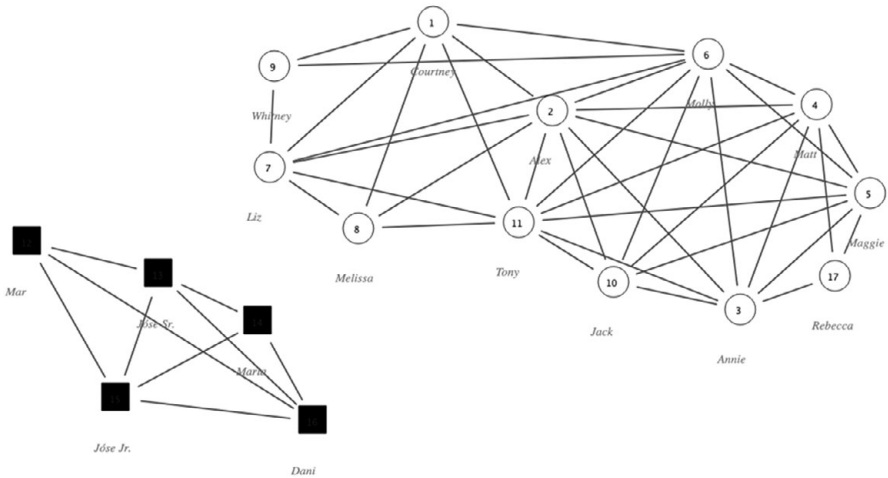
Figure 3. Social network graph, Chrissy (Spanish Language Bubble; Madrid Island program).
Note: White circle = NNS, English-dominant communication; Gray circle = NNS, Spanish-dominant communication; Black diamond = NS peer, Spanish-dominant communication; Black square = NS HF member, Spanish-dominant communication.

this way, the graph displays the makeup of each of Anita's social groups (by showing which of her contacts knew each other), as well as how many distinct social groups Anita maintained at T2. Anita maintained three cliques: a group of NNS program peers, shown as white circles; a host family, shown as black squares; and a NS peer (in Anita's case, a language partner), shown as a black diamond. As the graph also shows, and as was typical of English Language Bubble sojourners, these social groups were maintained independently of one another: Anita's dense group of NNS program peers did not have any connection to Anita's host family, nor did they come in contact with Anita's language partner (this is made evident by the lack of any connecting ties between these groups).

Spanish Language Bubble
Spanish is the primary language of communication with the overwhelming majority (92%) of contacts. Furthermore, the contacts in these networks are primarily NNS program peers (sojourners in the Spanish Language Bubble group reported an average of only 1.7 NSs of Spanish in their networks). These sojourners also use Spanish with their closest ("Top") contacts during the majority of time in a typical encounter (~50–70%). The vast majority of these sojourners' closest relationships are with study abroad program peers; on average, only 0.8 Spanish NS contacts appear in these sojourners' Top 5 contacts. These sojourners also tend to have relatively few social groups (i.e., low dispersion). Figure 3 displays a representative Spanish Language Bubble social network graph, for Chrissy. As is evident in Chrissy's graph, the *structure* of Spanish Language Bubble networks was similar to those of English Language Bubble sojourners; in both Chrissy's (Figure 3) and Anita's (Figure 2) graphs, three social groups are displayed (one of which, in each case, is the sojourner's host family), with the primary peer social group being a dense clique of NNS peers. The stark difference in Spanish language use is likewise made evident in these graphs; in Figure 3, gray circles (absent in Anita's English

Figure 4. Social network graph, Jill (Compartmentalization; Toledo program).
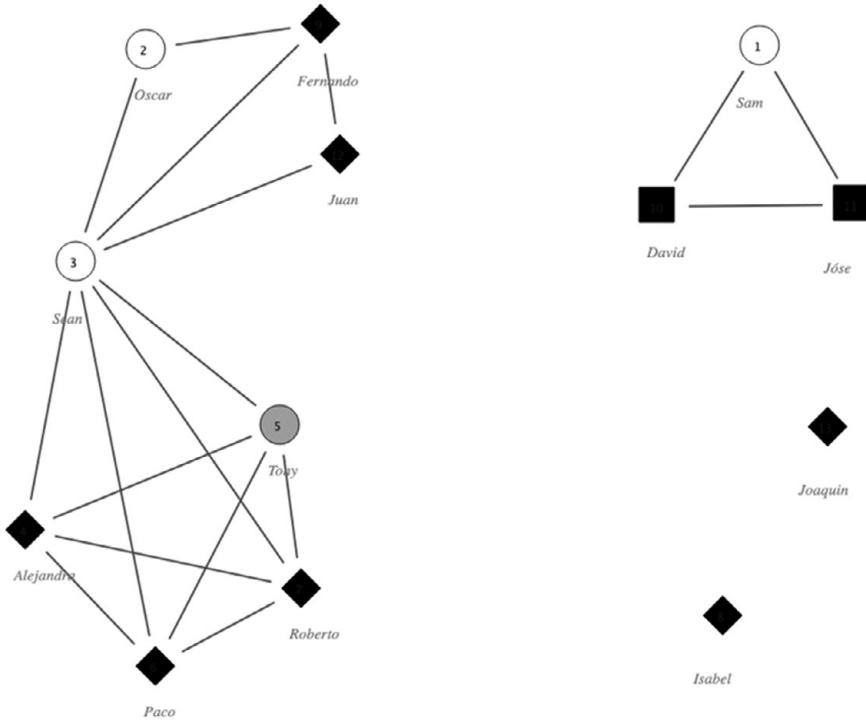*Note*: White circle = NNS, English-dominant communication; Black square = NS HF member, Spanish-dominant communication.

Language Bubble graph) represent NNS peers with whom Chrissy maintained majority Spanish communication.

Compartmentalization

This group is characterized by separate, "compartmentalized" Spanish and English language social contacts and cliques. English is the primary language of communication with most (64%) of contacts. However, both Spanish and English are used among these sojourners' closest ("Top 5") contacts (50% communication in each language). In contrast to English Language Bubble and Spanish Language Bubble groups, there is a high presence of Spanish NS contacts in these sojourners' Top 5 contacts (Top5 NS = 2.3). Figure 4 shows the social network graph of Jill, who developed a Compartmentalization social network (note that the factors distinguishing this group from English Language Bubble and Spanish Language Bubble networks—Top 5 contact characteristics—are not evident in the structural features shown).

Host Community-Integrated

Spanish is the primary language of communication with most contacts overall (76%), as well as with Top 5 contacts (Top 5 Lang = 3.5, ~50–75% Spanish language use in a typical encounter). There is a high presence of Spanish NSs (7.7 per network, nearly three times that of any other group). More than half (2.7) of contacts in these sojourners' Top 5 are Spanish NSs. Finally, these sojourners maintained a far greater number of social groups (dispersion) than all other clusters (8.7 groups per sojourner). Figure 5 displays the social network graph for Host Community–integrated sojourner Jim, who maintained high use of Spanish (77% of his relationships were Spanish-dominant) across six social groups. Note the integration of NS peers (represented as black diamonds) into all social groups.

Figure 5. Social network graph, Jim (Host Community-Integrated; Madrid Independent Provider program). *Note*: White circle = NNS, English-dominant communication; Gray circle = NNS, Spanish-dominant communication; Black diamond = NS peer, Spanish-dominant communication; Black square = NS HF member, Spanish-dominant communication.

Table 9. Average (standard deviation) EIT scores, by cluster group

	English Language Bubble (n = 8)	Spanish Language Bubble (n = 7)	Compart. (n = 9)	Host Community-Integrated (n = 3)
T1	56.4 (16.8)	59.7 (16.4)	56.6 (16.8)	59.3 (15.9)
T2	66.0 (15.9)	81.0 (14.4)	72.7 (17.0)	88.3 (3.2)
T1–T2 diff.	9.6 (8.7)	21.3 (8.3)	16.2 (5.1)	29.0 (13.9)

Relation of Social Networks to L2 Proficiency Development

The second research question of this study inquired after the relationship between students' social network patterns and their L2 proficiency outcomes. After establishing the typology of social networks through cluster analysis, between-cluster contrasts can be observed for L2 Spanish proficiency development as measured using the EIT. Table 9 displays the T1 and T2 EIT scores for each cluster, as well as the average T1–T2 contrast in EIT score for each group.

First, it can be observed that participants across all cluster groups displayed comparable T1 EIT scores; across all clusters, T1 EIT scores—out of a maximum score

of 116—range from 56.4 (English Language Bubble) to 59.7 (Spanish Language Bubble) (see Appendix for a full list of EIT results by participant). With respect to T1–T2 change, English Language Bubble sojourners exhibit the lowest average gains in Spanish proficiency scores from T1 to T2 (T1–T2 diff. = 9.6). In contrast, the Spanish Language Bubble cluster displays a notably higher average increases in EIT score (T1–T2 diff. = 21.3). Compartmentalization sojourners also display greater average increases in test scores from T1 to T2 in comparison with the English Language Bubble group (avg. diff. = 16.2). However, the largest average gains are by the Host Community-Integrated cluster (avg. diff. = 29.0).

A one-way ANOVA was run to determine if the between-cluster contrasts were significant for change in EIT score from T1 to T2. Assumptions were met for Independence, Normality of Errors, and Constant Error Variance (Levene's Test; $F[3,23] = 0.35$; p = 0.79). The ANOVA revealed contrasts among clusters to be significant at $p < 0.05$ for T1–T2 EIT difference ($F[1001, 1549] = 5.0$, p = 0.008). To determine the significance of individual between-cluster differences according to change in EIT score, Tukey's HSD test for multiple comparisons was performed. This analysis found that the mean value of the change in EIT score, from beginning to end of semester, was significantly different between Host Community-Integrated and English Language Bubble clusters (p = 0.01, 95% C.I. [4.0, 34.7]). Additionally, the contrast for mean change in EIT score approached significance between Spanish Language Bubble and English Language Bubble groups (p = 0.05, 95% C.I. [–0.1, 23.4]). No other between-group contrasts in EIT change were significant or approached significance (Table 10).

Effect sizes for group contrasts are shown in Table 11. Effect sizes range from medium to very large (following criteria recommended by Oswald & Plonsky, 2010), indicating that social network group membership exerts an influence on sojourners' L2 proficiency growth (or lack thereof).

Table 10. Tukey's HSD for multiple comparisons of cluster group contrasts in EIT change

	Diff.	Lower	Upper	p-value
Eng. Bubble/Compart.	–6.6	–17.6	4.4	0.37
HC-Integrated/Compart.	12.8	–2.4	28.0	0.12
Span. Bubble/Compart.	5.1	–6.4	16.5	0.61
HC-Integrated/Eng. Bubble	19.4	4.0	34.7	0.01*
Span. Bubble/Eng. Bubble	11.7	–0.1	23.4	0.05
Span. Bubble/HC-Integrated	–7.7	–23.4	8.0	0.53

Note: *indicates significant contrasts at p<0.05.

Table 11. Effect sizes for EIT cluster group contrasts

	T1–T2 EIT
English Language Bubble/Spanish Bubble	1.37
English Language Bubble/Compartmentalization	0.94
English Language Bubble/Host Community-Integrated	1.92
Spanish Language Bubble/Compartmentalization	0.77
Spanish Language Bubble/Host Community-Integrated	0.77
Compartmentalization/Host Community-Integrated	1.66

Note: Effect size = Hedge's *g*.

Table 12. Cluster membership by study abroad program

	Mad-Is.	Mad-IP	Mad-II	Sevilla	Toledo	Total
Eng. Bubble	2	0	1	2	3	8
Span. Bubble	3	0	0	0	4	7
Compart.	0	3	0	2	4	9
Host Com-int.	0	1	0	2	0	3
Total	5	4	1	6	11	27

Note: "Eng. Bubble" = English Language Bubble; "Span. Bubble" = Spanish Language Bubble; "Host Com-int." = Host Community-Integrated.

Relation of study abroad programs to social network cluster groups

Lastly, RQ3 inquired about the extent to which sojourners from each study abroad program were likely to belong to each of the groups identified in the cluster analysis. The distribution of each cluster's sojourners by study abroad program is displayed in Table 12.

Most notable from the distribution of study abroad programs among cluster groups is the absence of Host Community-Integrated social networks from certain programs. This social network pattern is not produced by the Madrid Island, Madrid International Institute, or Toledo programs. All four of these programs are "island-like" in nature. Conversely, the Spanish Language Bubble is made up exclusively of sojourners enrolled in these island programs.

Discussion

The first RQ of the study asked what social network patterns would be exhibited by sojourners throughout a semester abroad in Spain. Results indicate that patterns in social experience abroad can be quantitatively characterized according to their structure (e.g., dispersion) and composition (e.g., durability, intensity, proportional language use, and NS/NNS status). Concerning language use and intensity of personal relationships, in particular, clusters demonstrated considerable diversity. While some sojourners developed networks characterized by high levels of Spanish language communication with a core of NNS program peers (Spanish Language Bubble), others maintained English language networks with these same peers (English Language Bubble) or limited their Spanish language use to a small number of emotionally close relationships with host family members and language partners (Compartmentalization). Still others developed highly eclectic, disperse, Spanish language-dominant networks where close relationships were maintained with NS host community members and NNS program peers alike (Host Community-Integrated).

At the same time that social network patterns were notable for their compositional variety, they were also remarkable for their structural homogeneity. Three of the four observed social network patterns (English Language Bubble, Spanish Language Bubble, Compartmentalization) were centered around a small number of dense cliques made up of NNS program peers, in isolation of NS host community social groups which were smaller in size, fewer in number, and typically composed only of host families or language partners. These three patterns made up 89% (24 of 27) of all participant networks observed in this analysis.

Language learning in NNS networks

The second RQ of the study asked what relationship exists between students' social network patterns and their L2 Spanish proficiency outcomes. Results point to a strong relationship between social network patterns and L2 proficiency gains, building on previous research that has highlighted the positive influence of individual network indices such as intensity and dispersion (Baker-Smemoe et al., 2014), as well as network durability (McManus, 2019). Perhaps the most striking finding of the present study is the strong positive influence of L2 use with NNS contacts. Although the vast majority of sojourners maintained networks in which the clear locus of social activity was among NNS program peers, these groups (English Language Bubble, Spanish Language Bubble, Compartmentalization) were significantly differentiated by their L2 proficiency development. Large effect sizes (Hedge's *g*) make the contrast in proficiency growth between English Language Bubble and Spanish Language Bubble/Compartmentalization groups especially clear (see Table 11). Spanish Language Bubble students, whose L2 use was overwhelmingly maintained with NNS contacts, achieved average increases in EIT results that were more than double those of English Language Bubble students. Spanish Language Bubble sojourners, despite reporting an average of only 1.7 NS contacts in their social networks and only 0.8 NS contacts in their Top 5 contacts, maintained Spanish language-dominant communication with 92% of all contacts. For the majority of participants in the study, L2 proficiency development hinged not on relationships with NS host community members, but on the nature of language use in dense social cliques developed with NNS program peers.

The role of NNS program peers to facilitate L2 acquisition has been largely overlooked in previous study abroad SLA research, which, despite going to some length to debunk the "immersion myth" (Jackson, 2017), has traditionally assumed that L2 development in study abroad will occur primarily—if not exclusively—through relationships with host community NS contacts. Moreover, the limited research that has reported on L2 use with NNS peers has been quick to reinforce the notion that such interactions are problematic for language learners. In a language contact study of L2 French sojourners (N = 20) studying abroad in France, Magnan and Back (2007) reported that French use with NNS French contacts (i.e., program peers) was *negatively* correlated with improvement on the French ACTFL Oral Proficiency Interview (OPI). These authors propose that sojourners' inadequate L2 skills may have played a role in this trend.

The results of the present study paint a different picture not only with regard to the effect of L2 use with NNS contacts on L2 proficiency improvement, but also the ability of intermediate-level sojourners to develop meaningful social relationships—indeed, networks of relationships—using majority L2 use. Direct comparison to Magnan and Back's (2007) participants should be made with caution, as there exists an important contrast between the proficiency measures used in that study (OPI, a general assessment of unrehearsed oral production) and the present one (the EIT assesses global proficiency but does not prompt unrehearsed speech). Nevertheless, similar to Magnan and Back's study, the present participants nearly all fell somewhere in the ACTFL Intermediate range (see Bowden, 2016 for correlation of EIT scores to SOPI ratings), and some may have started with even lower overall proficiency. One student in the Toledo program, Blake (Spanish Language Bubble), obtained a T1 EIT score of 26 (below the Spanish Language Bubble group average of 59.7, and roughly equivalent to ACTFL Novice High or Intermediate Low; see ibid.), but nevertheless reported Spanish-dominant relationships with 100% of the contacts in his social network,

including Top 5 contacts. Living in the Toledo program dorms, Blake reported only one NS contact (a language partner), with all other contacts forming a single NNS social group in which all members knew each other. Blake both maintained majority L2 communication with this group and demonstrated an impressive gain on his EIT score by sojourn's end, with a T1–T2 difference of 27 (compare to Spanish Language Bubble group average of 21.3 and English Language Bubble 9.6).

There is little doubt that L2 communication in Spanish Language Bubble sojourners' dense NNS-dominant social cliques resulted in these participants receiving input that was—as Magnan and Back (2007) suggest—less grammatically accurate, lexically diverse, and pragmatically sophisticated in comparison to NS input; however, if any adverse effect resulted from these characteristics of NNS input, it appears to have been outweighed by the beneficial effect of other aspects of these sojourners' language use and social relationships. The fact that Spanish Language Bubble sojourners—who displayed significantly higher L2 gains than their English Language Bubble counter-parts—maintained majority Spanish language communication with a high proportion of their contacts suggests an influence of L2 time-on-task for proficiency development, even in cases where such L2 use is frequently used alongside the speaker's L1; Spanish Language Bubble sojourners reported speaking Spanish more than 50% of the time during typical interactions with a high proportion of their contacts, and for many of these sojourners L2 use was enacted alongside L1 use. This can be observed through cluster groups' average for "Top 5 language," a measure of average Spanish use in sojourners' most frequent and emotionally intense relationships; Spanish Language Bubble students reported frequent, but not exclusive, use of Spanish with Top 5 contacts, which overwhelmingly consisted of NNS program peers. This may have aided participants, even at the intermediate level, in their ability to use Spanish as the primary —if not always the exclusive—language in the development of complex, emotionally intense social relationships and group formation. Indeed, recent scholarship has highlighted the importance of translanguaging practices in such multilingual settings (e.g., Al Masaeed, 2020; Mori & Sanuth, 2018; Trentman, 2021).

The role and effect of NS networks

The role of NS contacts was central to the L2 development of Compartmentalization and Host Community-Integrated clusters. Compartmentalization students, despite sharing many characteristics with English Language Bubble sojourners (e.g., majority English language use), displayed increased proficiency gains, seemingly due to the maintenance of a small number of frequent and emotionally close relationships with NS contacts; a large effect size (Hedge's $g = 0.94$) differentiated Compartmentalization and English Language Bubble groups by change in EIT score from beginning to end of sojourn. This finding aligns with the frequent supposition—substantiated by results in studies such as Pozzi (2021)—that close relationships with NSs are beneficial to L2 development; however, it also highlights the limited effects of these relationships in cases where they are not part of a wider practice of L2-based social development outside of the program bubble. Rather than reflect an extensive integration into the host community, Compartmentalization students' relationships with NS Spanish speakers were typically limited to host family placements and language partner exchanges. For these students, L2 development was thanks in large part to the "sheer serendipity" (Coleman 2015, p. 37) of what happens during a stay abroad. This serendipity was a boon to Compartmentalization students' language learning (and, quite possibly, to
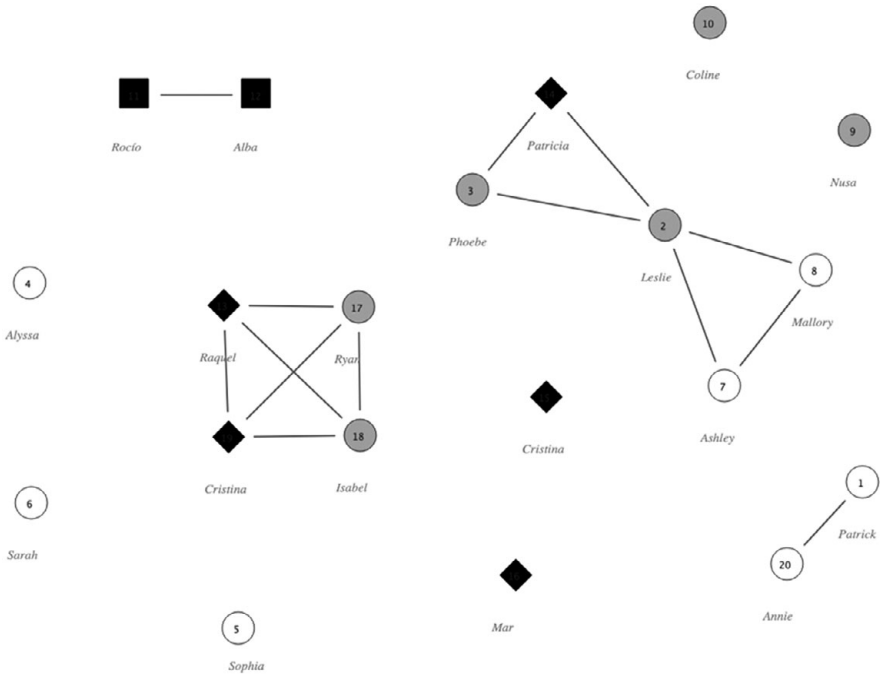
Figure 6. Social network graph, Lisa (Host Community-Integrated; Sevilla program).
Note: White circle = NNS, English-dominant communication; Gray circle = NNS, Spanish-dominant communication; Black diamond = NS peer, Spanish-dominant communication; Black square = NS HF member, Spanish-dominant communication.

their intercultural development; see, e.g., Shiri, 2015); however, it must also be noted that the overall nature of these students' social network development was quite similar to that of English Language Bubble sojourners, and appears to be a continued reflection of the study abroad practice typical of US-based programs which have "enjoined [sojourners] to avoid engagement with local host communities" (Kinginger 2010, p. 220).

Host Community-Integrated sojourners developed quite different relationships with NS host community contacts, evidenced by a high number of social cliques populated by NS and NNS contacts alike. These relationships did not simply arise out of successful host family placements or language partner arrangements (students across programs had equal access to these types of opportunities), nor were they the product of chance encounters in bars or cafés that blossomed into friendship or romance. Instead, they appear to have been facilitated by a much different aspect of the study abroad experience: academic coursework and, in particular, direct enroll coursework at local universities. All Host Community-Integrated sojourners took at least one direct enroll course. One, Lisa (Figure 6), reported regularly meeting with her Spanish university classmates outside of class to work on a project that spanned most of the semester. This group—Raquel, Cristina, Ryan, and Isabel—contained both Spanish classmates and US study abroad peers with whom communication was in Spanish. In another group, Lisa's acquaintance with a Spanish classmate, Patricia, resulted in

Patricia's incorporation into a free time group consisting of some of Lisa's closest (NNS) friends from her study abroad program.

Host Community-Integrated sojourners displayed considerably higher L2 proficiency gains than other groups, as can be easily gleaned both descriptively (Table 9) and through the large effect sizes differentiating this group from all others in terms of EIT growth (Table 11). Furthermore, the distinct nature of their social networks was likely mirrored by an equally distinct quality of L2 input and interaction among age-peer contacts. This contrast may have resulted in L2 development not observable to the linguistic measures employed by the present analysis (e.g., pragmatic and sociolinguistic development; see Kennedy Terry, 2017; Shively, 2011).

Program structure, social networks, and host community engagement

Notwithstanding the potential influence of personal variables not measured here (e.g., motivation, intercultural competence), some indication emerges that the dichotomy between Host Community-Integrated social networks and all others can be traced to study abroad program characteristics. First, while Host Community-Integrated sojourners were a minority of all participants, they were disproportionately represented by certain programs. Only two of five study abroad programs produced Host Community-Integrated networks: from the Madrid Independent Provider program (n = 4), one-quarter (n = 1) of sojourners developed Host Community-Integrated networks; and from the Sevilla program (n = 6) one-third (n = 2) developed such networks. These programs were distinct for being both larger and more decentralized than island programs, which are by definition small in size and cohesive in structure (no island program produced a single Host Community-Integrated network). This program structure affected Host Community-Integrated sojourners' site of coursework, which took place primarily outside of program study centers. In contrast, sojourners in Island programs took coursework almost exclusively in their own privately run study abroad centers; only one student, each, from the Madrid Island and Toledo programs (both island programs) took a single course at a local host university. This reality is a defining characteristic of island programs (Norris & Dwyer, 2005), despite the fact that these programs typically *do* offer the opportunity of enrolling in coursework at local institutions (as was the case for the island programs in this study). To offer is not to encourage, and the design of island programs often inherently discourages direct enrollment practices, due to both their frequent physical isolation from local institutions (this was found to be a highly influential characteristic of the "Closed Network" program descried by Hasegawa, 2019) as well as the fact that these programs commonly make considerable economic investments in independently hiring local university professors to impart program coursework. On this last point, the island programs in the present study (Toledo, Madrid Island, and Madrid International Institute) offered full course loads through such independently hired instructors, meaning that students were under no obligation to take any coursework through local institutions to fulfill academic credit requirements. This is in contrast with the Sevilla and Madrid Independent Provider programs, where course offerings were either offered almost entirely through local institutions (Madrid Independent Provider) or else were split evenly between a private study center and a local university campus (Sevilla program).

It should be emphasized that these conclusions remain largely speculative in nature, as, due to the small size of some cluster groups, the present study was not able to

conduct inferential analyses to address RQ3. Nevertheless, these trends suggest that host community social integration may have as much to do with the underlying structure of the experience as it does with the amount of time spent abroad (see, e.g., Coleman, 2015). In Coleman's (2015) concentric circles model, social network development is an additive, longitudinal process by which sojourners increasingly interact and form relationships with local contacts. This process can be supported by "individual and institutional strategies" (p. 45), with the latter including activities such as work placements, language teaching assistantships, and language exchange partnerships. For the present participants, however, neither these isolated opportunities (characteristic of Compartmentalization networks) nor time spent abroad was the catalyst of integrated NS/NNS social network development. For Host Community-Integrated sojourners, integrated, host community-centric networks appeared to form because the fundamental structure of their programs of enrollment, from the outset of the sojourn, did not inherently promote a NNS peer-dominant network (the "inner" circle in Coleman's model). For programs interested in promoting L2 growth and host community-based relationships, this points to a need for structural reform to study abroad programming, for example through increases in the practice of direct enrollment and the broader development of partnerships between programs and host community universities. Outside of the realm of social network analysis, previous work has identified direct enroll coursework as a catalyst for host community immersion and "culture shock" in the context of US-based study abroad in Spain (Pastor Cesteros & Pandor, 2018). The form that such structural changes take will depend to a large extent on the study site, curricular goals, and learner profiles of the programs in question. However, independent of such program and sojourner idiosyncrasies, the findings of the current study indicate that many common "one-off" programmatic interventions—such as language partner placements, or the mere offering of coursework through local institutions—are not sufficient to put sojourners in a position to meaningfully integrate into the host community. Instead, programs seeking to facilitate more emotionally intense relationships between sojourners and host community members may benefit from connecting sojourners with extracurricular group-based activities in which—as is the case in the direct enroll academic setting—individual sojourners are in the minority relative to host community members and/or international peers (e.g., sports clubs, dance and art classes, or service learning groups). Such extracurricular activities—not widely available to the sojourners in the present study—have been shown to positively correlate with the development of host community-based peer friendship networks (Hendrickson, 2018).

No single structural adjustment can be guaranteed to bring about fundamental change to sojourner social network development or host community integration. Indeed, analogous challenges to network development have been reported in the European context for sojourners studying through the Erasmus program, which is generally considered to deviate from the popular "island" model of study abroad popular in US-based programs (for an overview, see Devlin, 2020). For example, in an analysis of Belgian Erasmus sojourners studying in Spain, Morena Bruna and Goethals (2020) report that students were "more attached than expected to their L1/international environment where they [used] their native language or English as a lingua Franca" (p. 62). While other studies have reported greater host community social integration for Erasmus students compared to what has generally been reported for their American counterparts (Baten, 2020), it is clear that structural change is not a panacea for the social network–related challenges highlighted in the present study and elsewhere. Programs may also aid students in their host community-based social

network development through pedagogical interventions, such as the series of task-based intercultural development modules piloted by Morena Bruna and Goethals. Despite the challenges cited by these authors (mentioned in the preceding text), they report a modest positive effect of the intercultural development intervention on social network development and self-perceived L2 gains.

Conclusion

The importance of host community engagement is increasingly highlighted by study abroad SLA research. It is likewise not lost on study abroad administration, as evidenced by programs' efforts to socially integrate students through host family placements, language partnerships, excursions, and the like (Coleman, 2015). Nevertheless, SLA research has struggled to describe the nature of sojourners' social experiences quantitatively and holistically. The study reported here has sought to answer the question of what happens in study abroad using quantitative social network analysis, and to identify the attendant implications for L2 linguistic development.

This report is being written amidst a pandemic that has caused unprecedented suspensions of study abroad programming, along with the loss of jobs and infrastructure of study abroad providers. While the long-term effects for study abroad are still unknown, recovery will require restructuring, and such restructuring must be predicated on a critical and empirically driven understanding of how to better engage sojourners with host communities. The present findings give an indication of how this might be done and are consonant with the economic imperative of the moment. Rather than continue to invest in "bubble" replications of home university academic and social services, these results indicate that programs would better serve students through greater collaboration with—and trust in—host university institutions. Future studies should pay close attention to this rapidly changing environment and, especially, to the nature of restructured programs as universities and independent providers attempt to bounce back from setbacks caused by the pandemic. With regard to program evaluation, such studies would do well to take incorporate a more quantitatively based evaluation of program attributes, as the present study was limited to a descriptive analysis of study abroad programs. Future studies may also expand on the present work to include additional network variables, such as measures of centrality that would highlight differing levels of influence exerted by individuals in a network (see, e.g., Gautier, 2019; Paradowski et al., 2021). Certain network variables could also be measured in more detail. For example, a notable limitation of the methodology adopted by the present study was its generalization of L1/L2 language choice in one-on-one interactions to language choice in group settings (which was not measured directly, as participants reported language use through discrete descriptions of network contacts).

Future studies may also take a wider range of linguistic features into account. The present study was limited in the scope of L2 linguistic development being measured; the EIT does not capture the kind of creative, spontaneous language use or interactional competences that are, arguably, most central to creating and maintaining personal social relationships in study abroad. Future studies should pay special attention to naturalistic language use, which may provide insight into areas such as sociolinguistic change (e.g., Gautier & Chevrot, 2015; Kennedy Terry, 2017; Trentman, 2017), interactional competence (e.g., Shively, 2015), and translanguaging practices (e.g., Al Masaeed, 2020; Mori & Sanuth, 2018; Trentman, 2021). Such work will contribute to the already increasing connection between empirical SLA research and study abroad curriculum design, to the ultimate benefit of sojourners and host community members alike.

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Appendix

Table A1. Individual Spanish EIT results by social network cluster

Participant	Program	T1 EIT	T2 EIT	T1–T2 Diff.	Social network cluster
Megan	Mad-II	55	46	–9	English Lang. Bubble
Carol	Toledo	77	82	5	English Lang. Bubble
Kayla	Mad-Is	60	70	10	English Lang. Bubble
Ricky	Mad-Is	79	90	11	English Lang. Bubble
Anita	Toledo	46	58	12	English Lang. Bubble
Cecily	Toledo	63	76	13	English Lang. Bubble
Reanna	Sevilla	36	50	14	English Lang. Bubble
Rose	Sevilla	35	56	21	English Lang. Bubble
Caitlin	Toledo	79	92	13	Spanish Lang. Bubble
Larissa	Toledo	65	80	15	Spanish Lang. Bubble
Joey	Toledo	60	76	16	Spanish Lang. Bubble
Mandy	Mad-Is	68	85	17	Spanish Lang. Bubble
Alison	Mad-Is	58	83	25	Spanish Lang. Bubble
Blake	Toledo	26	53	27	Spanish Lang. Bubble
Chrissy	Mad-Is	62	98	36	Spanish Lang. Bubble
Tina	Sevilla	72	82	10	Compartmentalization
Hillary	Toledo	48	59	11	Compartmentalization
Alyssa	Toledo	81	94	13	Compartmentalization
Mara	Toledo	31	44	13	Compartmentalization
Jason	Mad-IP	62	77	15	Compartmentalization
Kristin	Mad-IP	58	76	18	Compartmentalization
Jill	Toledo	35	54	19	Compartmentalization
Anne	Mad-IP	70	92	22	Compartmentalization
Rachel	Sevilla	52	77	25	Compartmentalization
Jim	Mad-IP	67	87	20	Host community-Integrated
Lisa	Sevilla	70	92	22	Host community-Integrated
Emily	Sevilla	41	86	45	Host community-Integrated