Tracking Network Growth of Students with an Intellectual Disability (ID) in a Postsecondary Program and Understanding the Challenges, Expectations, and Realizations of Families with a Young Adult with an ID

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Abstract

A mixed-methods approach to Social Network Analysis was used to track the network growth of students with an Intellectual Disability in a postsecondary program from students' and parents' perspectives. Although there was an increase in network size and a shift from family-centered networks to more peer-centered networks, there was a decrease in density as participants formed distinct clusters in their networks. This difference indicates that network characteristics vary geographically based on opportunities available locally. This study revealed individual and programmatic implications for helping students develop their social networks to increase social capital and improve employment outcomes.

Keywords: social network analysis, postsecondary education, intellectual disability, self-determination, employment

Plain Language Summary

- We wanted to understand the relationships of young adults with an Intellectual Disability in our postsecondary program because some young adults with an ID have few social connections.
- We used a method called Social Network Analysis. We interviewed students in our program and their parents to figure out what each student's social relationships were like a year before they began the program, a year after the program, and at the end of the second/final year of the program.
- We found that our program's students first reported only a few relationships, mostly made up of family members. However, at the end of one year, they reported having more friends. The number of friends was more than family connections and sometimes replaced family connections. At the end of the second/final year, students continued to report many friends, although slightly fewer than those mentioned in the previous year.
- Overall, most of these friendships were developed in the program and through the program's help. Apart from these friendships, there were no new relationships outside the program because most students lacked opportunities

to get involved in other activities nearby. This could be a concern because students may go back to having a few long-term relationships without a program. This study encourages PSE programs to find ways to help students develop relationships outside the program. It also supports conversations with family members to understand the importance of social networks for these young adults. Finally, it urges colleges to provide more inclusive opportunities for students in a PSE program to develop new connections.

Studies of Social Network Analysis for People with an ID

The general ability to engage and build social networks is an essential but understudied benefit of postsecondary education. Building and maintaining social networks help students' social lives and academic success (Lombardi et al., 2016). Personal situation facilitators, described by Fichten et al. (2014) as the ability to maintain a peer network and high motivational levels in an educational environment, lead to less alienation of students in a PSE program and are seen as contributors to the academic success of those with disabilities. The analysis of the social networks of individuals with an ID who attend college is of interest, since college options are not an expected outcome for students with an ID. National statistics indicate large differences in enrollment rates in PSE programs among students without disabilities, those with disabilities, and those with an ID, with the latter having lower college admission rates (Grigal et al., 2014; Ross et al., 2013).

Previous Social Network Analysis (SNA) studies involving individuals with an ID were mostly conducted outside the realm of postsecondary education. Forester-Jones et al. (2006) found that adults with mild ID who lived in community-based residential services after 12 years of community care still lacked social inclusion and remained in small, highly dense networks made up mostly of service providers. In determining the similarities and differences between the networks of people with mild ID, people with autism spectrum disorders (ASD), and a reference group without an ID or ASD, van Asselt-Goverts et al. (2015) concluded that the former two groups had more restricted networks than the reference group. The Family Network Method-Intellectual Disability (FNM-ID), a social network instrument piloted by Giesbers et al. (2018), explored how individuals with mild ID defined their informal networks and promoted social inclusion in the absence of disability services. To date, the Eisenman et al. (2013) study remains the only one to be conducted within the context of postsecondary education.

Eisenman et al. (2013) piloted an SNA protocol and instruments to capture the relationships between young adults with an ID in a PSE program and various other individuals such as peers, family members, professional providers, and acquaintances, in sum, those with the potential to be possible connectors to employment opportunities. The study sought to depart from research focused on networks offering social-emotional support to networks positioning individuals with an ID for potential gainful employment.

Data averages over two time points of a single cohort showed that while the size of networks shrunk between both time points, the networks increased in density. Network size is defined by the number of individuals in a network, and density is defined as the number of ties in a network, expressed as a proportion of the total number possible (Borgatti et al., 2018). Network

composition revealed that networks that were previously dominated by family and caregivers at Time 1 were now predominantly composed of peers at Time 2. Participants also moved from their involvement in specialized activities to more integrated ones through their participation in the PSE program. Eisenman et al. (2013) emphasized that data averages alone were insufficient when trying to understand the social network of individuals with an ID, and an analysis of individual network characteristics was necessary as these could vary considerably between individuals.

This PSE program adopted the recommendation made by Eisenman et al. (2013) to include a longitudinal assessment of students' social networks to determine program effectiveness in developing their networks. A longitudinal assessment would allow the program to better understand the network structures of individuals with an ID who typically have limited options to develop essential skills for independent living and gainful employment and opportunities to expand their social networks beyond high school. Additionally, the limited use of social network analysis as a method to explore the network structures of students with an ID in postsecondary programs offers the possibility to expand on the literature base in this area from a research design perspective.

Higher Education Opportunity Act, 2008

The Higher Education Opportunity Act (2008) that initiated model demonstration projects called Transition and Postsecondary Programs for Students with Intellectual Disabilities (TPSID) has helped PSE programs grow nationally. Students with an ID who participated in approved Comprehensive Transition and Postsecondary Programs (CTPs) would also have access to financial aid through the Act. Both TPSID and CTP programs require students with an ID to access campus-based academics and social and career opportunities to help them achieve their personal goals and gainful employment (Think College, 2013).

Background of this PSE Program

Located in the United States' Southeast region, this two-year non-residential certificate program is housed on the main campus of a midsize public university in a suburban area of a midsize city, with an undergraduate student population of 10,988. This PSE program was one of 25 programs that received funding under TPSID for 2015–2020. This program was also recently designated as a CTP. It is currently in its fourth year and has admitted four cohorts—one student in the first cohort, five students in the second cohort, four students in the third cohort, and nine students in the fourth cohort.

Additional requirements for this PSE program are that applicants have functional communication, reading, and math skills; function independently, without one-on-one assistance; are motivated to continue education and develop employment and independent living skills; and have a smartphone for calls, messaging, and emails. Students in the program attend both specialized and inclusive classes on campus. Students also participate in employment opportunities on and off campus to prepare them for post-program employment.

The Role of Peer Mentors as Social Support for Students with an ID

Peer mentors are a valuable component of the program as they provide social and academic support and encourage social skills development by modeling appropriate behaviors. The theoretical framework of social support in social network analysis stresses that this type of support can have a direct effect and a buffer effect (Cohen & Willis, 1985; McCarty et al., 2019; van Asselt-Goverts et al., 2015). Mentors directly influence students' behaviors by modeling appropriate social skills and buffer students' interactions with others by attenuating difficult or uncomfortable situations with other individuals. By providing this support, mentors help prepare students for future independent interactions. In this PSE program, the importance of mentors' social support to students who may not have had many opportunities to connect with individuals outside their usual social circle is crucial in contributing to students' increased confidence and sense of belonging. Mentors in this program also prepare students for future employment by scaffolding them during employment opportunities and promoting their self-determination and independence.

Volunteer mentors in this program outnumber paid mentors and fulfill more than just the role of support staff. Unlike program staff, who are limited in the amount of daily time they have with students as part of their regular job functions, mentors can invest their own time in students to help them develop their social skills and social networks. Mentors also use their campus community positions to encourage, coach, and facilitate students' assimilation in campus life to become "college insiders" (Culnane et al., 2016). By introducing students to their circles of friends and involving students in their social- recreational activities, mentors act as bridges to help their mentor partners develop new friendships and participate in various pursuits (Jones & Goble, 2012). These may include activities that students may have never tried before, such as Greek Life, different types of sports, or organizations.

Mentors also encourage their mentor partners to explore campus organizations that may interest them by accompanying them to meetings and events and even joining and participating in the organizations to support their mentor partners. By encouraging and co-participating with their mentor-partners in activities, mentors increase students' emotional security and promote their membership in the community (Castles, 1996). Friendships between mentors and their mentor-partners offer students meaningful relationship experiences that improve their well-being (Janney & Snell, 2006) and provide opportunities for them to discover their strengths and weaknesses through communication (Furnham & Brewin, 1990). Courtney and Morningstar (2020) argue that through the meaningful relationships or social support that peer mentors offer students, they help students expand their social networks, thus increasing students' social engagement and social capital opportunities.

Social Network Analysis in the Present PSE Program

As the only PSE program in this area at the time of this study, we were interested in observing what a program like this would mean to students with an ID and their families as they explored this program option. Our primary focus was to use a mixed-methods approach within an SNA design to (1) understand student networks in a postsecondary education program from their perspective and their parents/guardians' perspectives, as a way to observe and compare

consistencies across network representations; and (2) analyze changes in network growth longitudinally as a result of the program intervention.

Method

Participants

Students enrolled in this program from Cohort 1 and Cohort 2, and their parents/guardians, were invited to participate in this study. Six students and one of their parents, across both cohorts, provided social network data at three time points. Therefore, we used purposive sampling by including all students in Cohort 1 and 2 in the program (Johnson & Christensen, 2020). The first cohort of one student and parent completed interviews at Time 1 (T1), Time 2 (T2), and Time 3 (T3). The second cohort of six students and their parents completed interviews at T1, but only five students and their parents participated in interviews at T2, as one student left the program. At T3, the student and parent from Cohort 1 and the remaining five students and parents from Cohort 2 completed the SNA interview process. All student and parent pairs were matched with the same letters to represent participants in this study. For example, Student A and Parent A, Student B and Parent B, etc.

IQ tests required by the Individuals with Disabilities Education Act (IDEA) identified students with an ID before they could enter the PSE program. Additionally, 55% percent of students were diagnosed with Down Syndrome. Table 1 summarizes all student demographic information in Cohort 1 and Cohort 2 across T1, T2, and T3.

Table 2 summarizes all parent/guardian demographic information in Cohort 1 and Cohort 2 across T1, T2, and T3. Data on age was not collected from this group.

Measures

The instrument and protocol developed by Eisenman et al. (2013) were adopted with permission in the present study, although they were modified to include parents/guardians' perspectives on their student's social network. The adopted semi- structured interview protocol was changed to reflect this program’s specifics, such as its name and local activities and locations familiar to participants. A further modification included a beginning open-ended interview question at each stage of the SNA study (T1, T2, and T3) to facilitate qualitative responses on participants' expectations of the PSE program, experiences in the PSE program, and realizations gained from the PSE program experience, thus making this a mixed-methods study.

The instrument's protocol was also modified to include parents' perspectives on their adult students' social networks. Parents provided an additional perspective on students' social network ties to confirm the existence of relationships perceived by the students. Interviews with students and parents gathered data on students' social interactions in the year before students' enrollment in the program (T1), during the first year (T2), and the second/last year in the program (T3). Interviews for T1 were conducted before the start of the program. T2 interviews were conducted at the end of the first year in the program. Interviews at T3 were held at the end of the second/last year in the program. All interviews were audio-recorded except for two (a parent withdrew permission for audio recording for herself and the student at T3).

Activities were assessed based on location, frequency, purpose, and level of integration. Integration was coded as *Specialized* to denote those activities that were done only with others with similar disabilities, *Inclusive* to indicate those activities done with others without similar disabilities, and *Hybrid* to represent activities specially designed for specific students in the program. As this is an inclusive PSE program, students mostly attend inclusive classes with other college students and a few specialized courses. Mentors accompany students to inclusive classes, and some accompany those who need extra support to specialized classes as well. Further, the Hybrid category was not used, as there were no specially designed hybrid activities in this program during this study. All activities were recorded on a Network Activities Form. Per Eisenman et al. (2013), relationships were assessed based on related activity, gender, relation, the time known, level of help given or received, and closeness. All relationship information was recorded on a Network People Form. The interviewer gave verbal descriptions based on information derived from students' records to help students define and understand relationships or activities. Each interview took approximately one hour to complete.

Design

This study used a concurrent quantitative dominant mixed-methods design within a personal network research design (PNRD) to explore the characteristics of the social networks of students with an ID from their perspective and their parents' perspectives. A PNRD defines an ego's network from their perspective, giving it the name ego network analysis. The ego is the individual whose network is analyzed. In this case, the ego is each student in the program. All connections to the ego are known as alters. In an ego network analysis, the focus is on the ego's total personal network comprised of alters, that is, family, friends, coworkers, caregivers, or anyone an ego interacts with (McCarty et al., 2019). McCarty et al. (2019) state that the goal of PNRD is "to study the effects of the set of relationships that surround an individual, regardless of the context from which they are drawn." A limitation of PNRD is the inability to check the accuracy of the data reported by an ego. The mere identification of a tie or relationship may not necessarily mean that it is reciprocal (Halgin & Borgatti, 2012). The reciprocity of a relationship in terms of how close a person may or may not be to the ego is mostly an issue for young people with an ID as everyone is often considered a "friend" (Eisenman et al., 2013). For this reason, the perspectives of parents/guardians were included in this study to provide the researchers with the ability to better represent students' networks.

This mixed-methods design approach was able to generate meaningful research in the form of rich qualitative data that complemented quantitative data to provide greater context for analyzing and understanding network structures (Bolibar, 2015; Fröehlich, in press; Onwuegbuzie & Hitchcock, 2015). Quantitative information on student activities and qualitative data on the relationships developed through those activities was collected using data collection forms. A semi-structured interview protocol allowed for interviews to remain somewhat conversational and situational. Qualitative data gathered provided an emic perspective of families' challenges with a young adult with an ID, their expectations of a PSE program, and their realizations at the end of such a program. The emic or insider perspective allows for the "consideration of questions and issues" critical to the participants (Johnson & Christensen, 2020). A role-ordered matrix was used to sort data collected from participants. Data was coded for emotions that provided insights into participants' perspectives, values, attitudes, and beliefs representing their worldview (Miles et al., 2014). Using a general inductive approach as described by Thomas (2006), broad themes

were then derived that reflected participants' expectations of the PSE program, their experiences in the PSE program, and realizations at the end of the PSE program.

Parents were interviewed separately to identify people connected to their children's activities or those currently engaged. Interviews were conducted separately to prevent either party from influencing the other's responses. These interviews sometimes resulted in quantitative and qualitatively different ties between egos and alters due to students' and parents' varying perspectives. However, a comparison of networks ensured that the accuracy of each ego's network was better represented.

Procedure

All students and parents signed an informed consent form before each interview. All interviews began with explaining social network analysis, the concept of a social network, and why an SNA study was important for individuals with an ID. At T1, students and parents identified the student's activities a year before the program, as well as people within those activities associated with the students. Student application records were used to confirm that the data collected was within the timeframe of a year.

Two interviewers participated in the interview process at T1. One interviewer explained the nature of the research and asked all the questions while the other took notes. Only one interviewer was involved in subsequent interviews at T2 and T3, asking questions and taking notes. At T2, parents and students were asked to identify any new ties formed during the first year. Both groups were also reminded of T1 relations and asked if former ties still existed. At T3, both groups identified new ties and confirmed if T1 and T2 ties were still in existence.

Analyses

Networks were analyzed using SNA, commonly thought of as a quantitative method. However, as Fröehlich (in press) contends, it is increasingly used as a mixed-methods approach because of its ability to integrate qualitative and quantitative research to make it more meaningful.

Central to PNRD is an understanding of network size, network density, and network composition. Network size is simply the number of alters or people who are represented in an ego's network. Density is the number of ties an ego has in a network, expressed as a proportion of the total number possible (Borgatti et al., 2018). Eisenman et al. (2013) explain that this is the extent to which alters are connected, as an ego with 0 density has ties to each alter, but the alters themselves are not connected. An ego with a density closer to 100% might engage in activities shared among alters. Network composition is measured as the proportion of all ties made to alters of a particular type. Additionally, we used tie-churn analysis to study the longitudinal change in network growth in terms of the number of new ties, lost ties, and kept ties. Microsoft Excel and software programs for social network analysis, including E-Net (Borgatti, 2006), UCINet (Borgatti et al., 2002), and NetDraw (Borgatti, 2002), were used to store, organize, and manipulate data gathered from interviews.

Results

The results presented here are divided into three parts: quantitative SNA data, themes derived from qualitative analysis of interview data, and selected pictorial representations of egocentric network diagrams or sociograms, as examples of visual data of students' social networks from both perspectives.

Quantitative Data

In addressing our first research question, we analyze data in Table 3 and Table 4 to understand students' network size and density from their perspective and their parents' perspectives to make comparisons and observe consistencies between perspectives.

Students and parents were consistent in reporting smaller networks at T1 with an average of 5 members, as reported by students, seen in Table 3, and 7 members reported by parents, as seen in Table 4. Student D's outlier network from both perspectives was larger because of the student's involvement in numerous activities before joining the program. At T2, however, students and parents reported more extensive networks with an average of 17 members, as seen in Table 3 and 13 members, as shown in Table 4. This upward trend, while small, is consistent at T3 for students who reported an average of 18 members, as seen in Table 3, and parents who reported an average of 14 members, as seen in Table 4. However, when we analyze networks at an individual level, we observe that Parents A, B, C, and F report a shrinkage in network size between T2 and T3.

The observed density from both perspectives offered an interesting analysis. Density is defined by the number of connections an ego has in their network divided by the total possible connections a participant could have in a network. Borgatti et al. (2017) caution that density is best used comparatively and is context-dependent. In Table 3, lower average density scores were observed at T2 and T3 compared to T1, from the students' perspectives. We observed that students had very distinct clusters to which they belonged in the context of our program. Egos only did activities with alters in each cluster. As alters never crossed groups or clusters, the ego could not interact with a few alters from one cluster and others from another cluster in a different activity. However, in Table 4, we observe a slightly higher density average at T3 from parents' perspectives than T1 and T2. This observation is because of the reporting from Parent B, who appeared to be unfamiliar with Student B's network and only reported family ties, and from Parent F, who reported only of Student F's program ties. A higher density network simply means that everyone in the network is connected. While every effort is made to conduct interviews with the same parent or guardian who is most familiar with a student's network, this is not always possible and, therefore, the reason for Student B's smaller network representation from the parent's perspective at T3.

Group composition at T1 from the students' perspective showed that 26% of students' networks were composed of family members, while 61% of their networks were made up of peers. However, at T2, the percentage of family ties decreased to 9.3%, and peer ties increased to 77.4%. At T3, the percentage of family ties increased to 20%, and peer ties decreased to 63.2%. The reduction in peer ties at T3 was attributed to network stabilization, where students only reported relationships that they considered significant. A small percentage of authority figures was reported at T1 (4%). However, the percentage of authority ties at T2 and T3 increased by

12% and 15%. This increase was because of students' exposure to employers in employment and internship opportunities and faculty in the program.

In terms of group composition at T1 from the parents' perspective, we observed that two parents reported a Caregiver category composed of medical providers and home care support. However, their students did not note this category. At T1, parents said that 51% of their students' ties were composed of family members. This number is substantially reduced at T2 to 29% and stays about the same for T3. Parents also report a significant increase in peer ties from 19% at T1 to 58% in T2. Student and parent reporting in our PSE program are consistent with results from Eisenman et al. (2013) that also saw the replacement of family ties with peer ties at T2. Parent reports were consistent with their students, as they also noted a decrease in peer ties at T3 (52%) compared to T2 (58%). Again, this was attributed to parents' knowledge of their students' closest peer ties. Parents also observed an increase in ties with authority figures at T2 (10%) and T3 (15%) because of students' exposure to employment and internship opportunities.

In our second research question, we wanted to analyze network growth changes longitudinally due to the program intervention. We used the concept of tie-churn analysis as presented by Halgin and Borgatti (2012) to discuss this analysis. The number of ties lost, ties kept, and new ties formed offer a more realistic picture of network growth than merely subtracting the number of ties between two time points. For example, a network with ten ties at T1 and ten ties at T2 may not necessarily represent the same alters.

In comparing the tie-churn analysis from both perspectives, we observed that students developed an average of 15 new ties between T1 and T3, from their perspective, and an average of 11 new connections between T1 and T3, from their parents' perspective, exceeding the number of ties lost and ties kept. We observe that from both perspectives of students' networks, the program was influential in growing and evolving their networks.

T1 Qualitative Data: Exploring Family Expectations of the PSE Program

The qualitative data provided at T1 speaks to families' challenges in finding opportunities for their young people with an ID to develop relationships and socialize. These narratives from parents' perspectives explain why students' social networks appear small before starting the program. The limited opportunities to connect with others had a significant impact on students' social networks. Parents vocalized their desperation and their sense of relief with the availability of an option to help their children. However, students at T1 were not forthcoming in terms of their expectations and appeared uncertain and nervous during the interviews.

When Parent E heard about the concept of a social network, she took the opportunity to articulate the difficulties she faced with her student, particularly his lack of a social circle:

> He's only been with me, and he doesn't go out or do anything without me. I do want to break that, and that's what I am hoping this would do, that someone would call and say, "Hey, you want to go do this, you want to go do that?" I'm hoping that he

> will make some more friends … get out more. I think what he is going to learn here is what he needs.

Parents were also quick to associate the study of social networks with the development of their students' social skills and expressed their desire to see growth in this area. Parent B was also vocal about her frustration with the lack of support that she perceived from the school system:

> He needs someone to help him with social skills. I am grateful for this [program]. People need to know… I was out there, and a lot of people did not know what I was talking about. Let me tell you, the public school system, they really don't do them any justice. The ones who don't say anything, sit back, and just pass them on… all this stuff on no student left behind, but look at this, the students are left behind. I am just thankful that he will [now] be accepted.

In terms of their expectations of the program, parents stressed that they wanted the program to help their students develop a social life. Parent C commented that her student "loves to sit and play video games, and so it is so wonderful that he is now doing this, and it gets him out of the house." Elaborating on her student's small social circle, Parent D shared:

> She's been at home, but she is very social. With her being out of school so long [7 years], she's lost touch with them [friends] except for the ones she goes to church [every week]. Hopefully, [next year] it [her circle] will be broader. Then she can say that she went for this and that.

Pictorial Representations at T1

The visual representation of networks from both perspectives at T1 for Student E, as illustrated in Figures 1a and 1b, provides an example of what our students' networks looked like pre-program. The black square node in the network represents the ego or student. An ego is connected to alters who are represented by different node shapes to differentiate peers (circle), authority figures (diamond), family (triangle), caregivers (a square with a circle in the center), and group or incidental ties (upside-down triangle). Student E began the program with a small network that had the characteristics of a strongly bonded network, which is made up of close relationships among individuals who belong to the same social circle (McCarty et al., 2019). In the case of Student E, close friends formed this social circle. While parents sometimes identified a few more connections than students at T1, as illustrated in Figure 1b, this representation was also consistent with the characteristics of a bonded network.

T2 Qualitative Data: Experiences in a PSE Program

Qualitative data provided at T2 was more substantial from both perspectives. Parents were vocal about the growth they had observed in their students in terms of new relationships formed, the social skills developed, and changes in behavior. The opportunity to interact with various people and form relationships helped students build their confidence.

Attending college and experiencing college life is also a confidence booster for students with an ID who often lack significant experiences that give them a sense of accomplishment or belonging after they exit high school. This confidence is essential in helping students build their networks and is evident in the more extensive networks presented from both perspectives at T2 and their descriptions of their first-year experiences in the program.

Although there was a tendency for some students to fall back into their usual pattern of doing things, they were also now more open to stepping out of their comfort zone. Parent C noted that her student was more social and displayed greater confidence when interacting with others:

> He still wants to hang out in the playroom more than I want him to, but the other day I told him don't do that, so he got into the car, drove around, and went to some places. When I went to [a store] the other day, the guy [there] said, "[Student C] was in here the other day." I said, "Good!" I think he is now feeling a little more confident.

Parent B observed that Student B was now more social and outgoing:

> He and his brother would come here together [on Saturdays]. He loves coming to the gym. He also went to church with a couple of mentors. He had wanted to go to their College Night, so I'm sure that that would be something he'd be wanting to do often.

Unlike their quiet demeanor in T1, students were eager to talk about their first year in the program. Student C took on an observer perspective as he shared that he had "been getting to know [his] fellow friends and seeing how they treat other people." Student B was more expressive, sharing that he now felt acknowledged by others:

> I've been hanging out with friends and having the experience of taking classes. I've been working and playing basketball and taking different classes. Everyone I see asks me how I'm doing, how are my classes going. I had intramural basketball with C [a mentor] and with other guys. Every time they see me, they greet me.

The friendships developed with mentors in the program were particularly significant to some students. For Student D, who spent many years at home after graduating high school, these friendships made her feel happy and motivated. She shared:

> I love my mentors. I hang out with my friends and get to know them. Eat lunch. Come here for class. Me and C [mentor] are very close. N [mentor] is fun to be around. He is super! He helps me with my homework. O is also one of my mentors, and she motivates me to do my homework because there are some days that I don't want to do my homework, and she helps me with my homework.

Pictorial Representations at T2

Networks at T2 for all students were considerably larger in terms of size and composition from both perspectives. Clusters with circles around them represent ties in the program. As illustrated in Figures 2a and 2b, networks from Student E's perspective and the parent's perspective were significantly more extensive than those at T1. All students at T2 reported more extensive networks. Ties formed in the program made up a significant part of their networks. These networks were also larger than their parents' representations at T2 in most cases. Most parents represented their students' program ties as the most dominant in their student's network.

T3 Qualitative Data: The Realizations Students and their Families Come Into at the End of a PSE Program

At the beginning of interviews at T3, students and parents were asked about their entire program experience. This question generated qualitative data that captured the significance of the program to the students and their families. A PSE program experience is instrumental in helping students with an ID grow in many ways, including confidence, maturity, independence, and self-determination. These factors directly impact students' networks in the long run as they use these skills to make new connections and explore new opportunities. Parents' observation of these growth areas is necessary as it increases their confidence in their students moving forward and their own ability to let go gradually (Miller et al., 2016).

The importance of the program to students was highlighted in Student A's comment as he reflected that the program had allowed him to make new friends, do different activities with them on campus, and learn new things. He happily recounted his Halloween party, where he could have all his friends from the program over at his house. He added that he would miss his mentors and other people in the program when he graduates.

Students were emotional at the thought of graduating and moving on from the program. Student E explained that the program had allowed him to engage in many educational and social activities. Reflecting on his program experience, he shared, "I feel sad and happy. I feel sad I will miss [PSE program]." However, he was also filled with a sense of pride at the thought of

graduating and making his mother happy, " I am happy for my mom … I saw her eyes. Her eyes crying [*sic*]. She loves me so much… I am gonna [*sic*] graduate." Student D was emotional as she reflected that the program had been a source of motivation for her and a good experience that she would "surely miss with a passion."

Parents at T3 were grateful for the significant growth they had observed in their students. Parent D shared that her student's former teacher had commented on how much the student had evolved. She elaborated:

> She was always pretty outgoing … and I probably held her back myself from worry, but her language skills have just evolved like she, she's got this. She's using these words, and it is expressive, and it is in the right context and content, so yeah… and her independence you know, she's always been pretty independent, but she's now like, "Mom, you cannot help me do that. I will do it by myself." Her work ethics, she really tried to do her very best, but now she's like, "Oh, I know I can do better than that."

Parent E took some time to detail her student's growth in independence and confidence:

> He seems to be a lot more independent than he was. He doesn't call for me to do as much. Where what I used to hear out of him was, "I can't, I can't, I can't," now he knows he can. I just don't know how I'll thank everybody for what they have done for him … the support they have given him, the love they have given him here, the confidence they have given him.

Parent B was especially grateful that his student was now more focused on what he wanted to achieve in life. He felt that the program had provided his student with structure and a sense of direction. Parent B shared that his student now has a job in a grocery store and wants to get an apartment:

> He is working toward it. That's some of the things I've noticed. His mindset has changed. When he first started this program, he would say, "I'm gonna [*sic*] play basketball. I'm gonna [*sic*] do this," whereas now, it's, "I just want to get an apartment." Practical things like that. He is a bagger at [grocery store], and you

> know, they watched an orientation film, and the CEO started as a bagger, so you know, he says, "If this guy is a bagger, then I can be a CEO!" He has definitely grown as a person. He really enjoyed the program. I think it has been a huge benefit for him.

With a renewed sense of hope, he shared that the growth he had observed in his student defied previous expectations, "I remember one time we saw a psychologist that told us that we would have to take care of him for the rest of his life, and I didn't believe that." Parent C's expression that the family and student had "loved the program" simply summed up what students and families felt about the program at T3.

Pictorial Representations at T3

Figures 3a and 3b provide the visual representation of Student E's network from both perspectives at T3. Student E's representation appears to be consistent with the representation at T2. While Parent E continued to report strong program ties, a strong bonded network of family ties was also reported at T3.

Discussion

This study aimed to better understand the social network of young adults with an ID in a PSE program. Students with an ID have limited networks because of the lack of opportunities to connect with people outside circles that are familiar to them. This limitation is debilitating in terms of social capital. McCarty et al. (2019) explain that the resources provided by individuals embedded in an individual's network can be used for expressive and instrumental purposes. In the case of those with an ID, having connections outside their usual boundaries helps them access information to opportunities such as employment. Coleman (1988) distinguishes between bonding and bridging ties, stating that the former offers social and emotional support to an ego while the latter provides access to information and opportunities to increase social capital.

Portrayal of students' networks from their perspectives and their parents' perspectives share some consistency, with both groups expressing small networks at the start of the program. After a year in the program, students formed connections with many individuals in the program and through the program. However, by the end of the second/final year, students reported smaller networks that reflected close friendships they had developed with a few peers and mentors who became established connections. Parents also reported smaller networks at T3 because of this reduced number of connections. Participants in our program exhibit strong bonding ties at T1, T2, and T3 with networks made up of social-emotional supports. Although the expansion of networks is noticeable, students exhibit clusters in their networks. While allowing students to grow their networks, the program became a replacement for previous bonded networks such as family networks.

However, in terms of the program's goals, our SNA study showed that students learned essential social, self-determination, and independence skills by forming closer relationships with certain

people. Growth in these areas also resulted in a change in behavior regarding how they engaged in new opportunities and took on responsibilities. An observation of this growth was especially crucial for parents who have a tremendous influence on their students' social networks. A PSE program experience helps instill confidence in families as they observe the strides students make, to give their students space to assert their independence and expand their networks.

In comparison to the Eisenman et al. (2013) study, similar findings observed were a strongly bonded network that students exhibited before starting the program and a diminished family network size compared to a more extensive peer network after one year. On average, this was also a consistent observation between T2 and T3 from both perspectives in the present study. However, both studies depart from each other when the overall average size and density are observed. While Eisenman et al. (2013) found that on average, participants' networks shrunk in size but increased in density because there were individuals in their study who displayed denser networks from being connected to various other individuals, this was not the case in the present study.

On average, participants in this program consistently reported larger network sizes throughout, from both perspectives, even though a slight shrinkage in network size could be observed from a few parents' individual perspectives at T3. In terms of density, participants in this study displayed clusters in their network that were distinct from one another. While all alters within a cluster were connected, these connections never crossed clusters, resulting in lower density scores from both perspectives. Therefore, within each cluster, participants demonstrated higher density, but this was not the case when the network was analyzed as a whole.

The level of services and opportunities available to individuals in the Eisenman et al. (2013) study before and during the PSE program may have been more extensive, allowing some participants to develop a denser network. However, in this program's case, services and opportunities for individuals with an ID before the PSE program was lacking. This lacking was indicated by the challenges parents vocalized during the SNA interviews.

Furthermore, while this program provided opportunities for participants to connect with new people in the form of peer mentors, academic faculty, staff, and employers, these were solely within the program's context, and formed a significant, if not overwhelming, part of an individual's network. Other campus activities that students attended or participated in were often with individuals from the program, such as mentors and program peers. These individuals provided students with a sense of familiarity and confidence. On the upside, these familiar relationships were necessary for those who had gone a long time without many opportunities to develop meaningful relationships outside their usual social circles. The social and communication skills gained through these relationships were crucial in preparing students for future independent interactions. However, the formation of clusters in students' networks also revealed that our students were very dependent on the connections made in the PSE program. This dependency on program connections was mostly due to the limited opportunities they had locally to build their networks.

Implications of Using SNA Data for PSE Programs

Understanding the network structure of individuals with an ID can help program staff identify areas that need intervention, such as extensive support for students who have difficulty interacting with those outside their usual support circles. Students' and parents' emic perspectives also offer program staff information on what families expect of the PSE program and the challenges they faced before coming into the program, to help staff plan for outreach and transition activities locally. Understanding students' networks from both perspectives also enables program staff to find and connect students to local activities that they can participate in based on their interests outside the program, so they develop relationships independent of the PSE program.

Knowledge of students' circles from both perspectives also provides qualitative information on students' goals or lack thereof, which impacts future employment outcomes (Eisenman et al., 2013). Social circles that support students' career goals can help them advance toward those goals. The program can use this knowledge to define specific goals in each student's Individualized Education Plan (IEP) and help students develop the right connections that are in line with those goals.

Comparing the growth in students' social networks can also help program staff create the necessary buy-in with university stakeholders to provide more opportunities to students in the program to be a visible part of college life. Such opportunities would allow students in the program to have a complete college experience, such as on-campus housing and residential options. We believe that social network data can also influence college officials to play an active role in disability advocacy by creating more inclusive opportunities for these students.

Implications for Individuals with an ID and their Families

Extensive research on the concept of self-determination and independence reveals that these are important for individuals with an ID precisely because they have limited opportunities to make decisions and choices and assume control of their lives (Wehmeyer & Metzler, 1995). Eisenman (2007) also stresses the importance of individuals with an ID and their families to understand social relationships' influence on an individual's employment prospects. Therefore, program staff can use the visual representation of social network data in the form of sociograms to generate quality conversations with families on the importance of family support to network development. These conversations can also include the importance of allowing students to assert their choices and what families can do to develop their students' social networks.

Further Research

While participants in this study displayed growth in their network size, it is uncertain if they will continue to expand their network growth beyond the program because of the dependency on program connections that was obvious in their networks. Further, it is also uncertain what the quality of those networks will be in terms of composition and density. Given the uncertainties of future network growth, we propose extending this research to include a T4, which will involve SNA interviews with students and parents a year after students graduate. We also propose modifying the existing protocol to include a question regarding the source of introduction to

activities identified to ascertain self-determination and independence. We hope to use SNA as a method to inform us of the growth of self- determination and independence in young adults with an ID. We then plan to examine how a change in these areas affects their employment opportunities. An alter-tie matrix form will be included to help researchers verify connections between ties and determine if bridging ties, as ties that connect individuals to new opportunities exist in a network.

The implications of social network analysis research amongst students with an ID in different PSE programs abound and depend on each program's particular characteristics. This form of mixed-methods research can provide a wealth of information for PSE programs that can benefit young adults with an ID.

Limitations

This study was conducted with the first two cohorts in the program. We acknowledge that the experiences of these cohorts may be unique. Future cohorts may enter the program with other experiences, thereby providing the PSE program with different data.

Additionally, these first cohorts consisted of students who lived with their families during their time in the program. As such, families were more familiar with their student's social network. However, this may not be the case with future cohorts, as some students may opt for living arrangements outside their family home. Students in the present study were also limited to fewer services offered in this state that contributed to their smaller networks. However, future cohorts may also consist of out-of-state students who may enter this program, having had additional support and opportunities to develop their social networks that participants in this present study lacked.

Therefore, a continuation of this study with future cohorts is necessary to understand students and their families' expectations as they explore a PSE option and their experiences and realizations during the program. This continuation would help the program to identify patterns, confirm existing findings, and analyze new results.

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Table 1

Demographic Information of Students in Cohort 1 and 2 Across T1, T2 and T3

Demographics	**T1 (*n*=7)**	**T2 (*n*=6)**	**T3 (*n*=6)**
Age (Average)	21.7	23.5	24.3
Gender			
Male	4	4	4
Female	3	2	2
Race			
Caucasian	6	5	5
African-American	1	1	1

Table 2

Demographic Information of Parents/Guardian of Students in Cohort 1 and Cohort 2 Across T1, T2, and T3

Demographics	**T1 (*n*=7)**	**T2 (*n*=6)**	**T3 (*n*=6)**
Gender			
Male	0	0	1
Female	7	6	5
Race			
Caucasian	6	5	5
African-American	1	1	1

Table 3

Size and Density of Students' Ego Networks Across T1, T2 and T3 from Students' Perspectives

Student	Size			Density		
	T1	T2	T3	T1	T2	T3
A	3	10	9	0.17	0.31	0.21
B	4	21	23	0.33	0.12	0.12
C	3	19	16	0.5	0.23	0.11
D	13	15	18	0.11	0.19	0.18
E	2	14	17	0.5	0.24	0.21
F	3	20	22	0.17	0.26	0.18
Mean	**4.67**	**16.5**	**17.5**	**0.3**	**0.23**	**0.17**

Table 4

Size and Density of Students' Ego Networks Across T1, T2 and T3 from Parents' Perspectives

Student	Size			Density		
	T1	T2	T3	T1	T2	T3
A	5	12	8	0.45	0.29	0.19
B	9	10	5	0.15	0.2	0.5
C	5	21	16	0.45	0.22	0.24
D	10	9	14	0.23	0.39	0.24
E	6	14	27	0.23	0.17	0.16
F	4	14	13	0	0.18	0.33
Mean	**6.5**	**13.3**	**13.8**	**0.25**	**0.24**	**0.27**

Figure 1a

Ego Network for Student E at T1 (Student E's Perspective)

Figure 1b

Ego Network for Student E at T1 (Parent E's Perspective)

Figure 2a

Ego Network of Student E at T2 (Student E's Perspective)

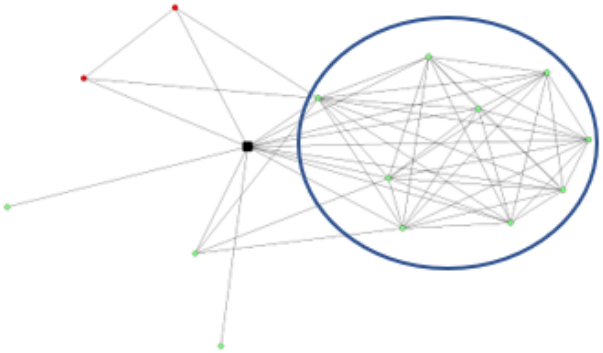

Figure 2b

Ego Network of Student E at T2 (Parent E's Perspective)

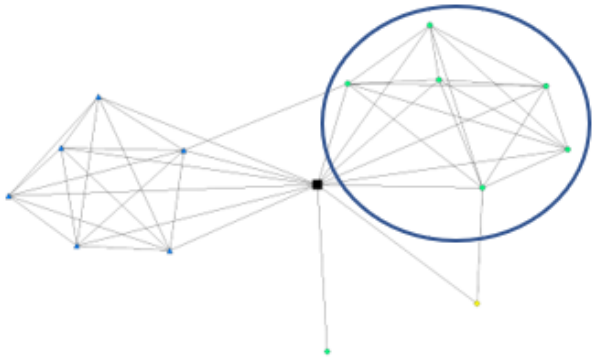

Figure 3a

Ego Network of Student E at T3 (Student E's Perspective)

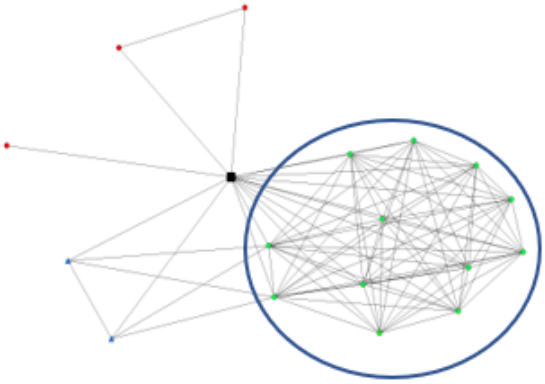

Figure 3b

Ego Network of Student E at T3 (Parent E's Perspective)