

Social skills as a predictor of postsecondary outcomes for individuals who are deaf

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Social skills function as a vehicle by which we negotiate important relationships and navigate the transition from childhood into the educational and professional experiences of early adulthood. Yet for individuals who are deaf, access to these opportunities may vary depending on their preferred language modality, family language use, and educational contexts. Drawing upon available data in the National Longitudinal Transition Survey 2 (NLTS2) and controlling for demographic covariates, we examine the predictive role of social skills in high school on postsecondary education, employment, independent living, and self-beliefs. Parents' ratings of social skills in their children who are deaf (from the first wave, when students were in high school) strongly positively predicted graduation from postsecondary settings up to ten years later, but did not predict employment or independent living outcomes.

Keywords: deaf, hard of hearing, postsecondary, social skills, transition, education

Social skills as a predictor of postsecondary outcomes for individuals who are deaf

An individual's psychosocial development plays an important role in how we form an identity, establish relationships, and interact with the world around us (Beauchamp & Anderson, 2010; Marcia, 2002). Social skills function as a vehicle by which we negotiate important relationships and navigate the transition from childhood into the educational and professional experiences of early adulthood, including for students with disabilities (Carter, Austin, & Trainor, 2012; McConnell, et al., 2013; Parker & Asher, 1987; Woodward & Fergusson, 2000). Yet for individuals who are deaf¹, access to these opportunities may vary depending on their preferred language modality, family language use, and educational contexts (Batten, Oakes, & Alexander, 2013; Luckner & Muir, 2001; Moeller, 2007). Previous research proposes that students who are deaf have weaker social skills than their hearing peers (Antia, Jones, Reed, & Kreimeyer, 2009; Antia, Sabers, & Stinson, 2007; Luckner, 2001; Luckner & Muir, 2001), but has yet to examine the potential relationship between social skill attainment during adolescence and later academic and employment outcomes for individuals who are deaf (Batten, et al., 2013).

Context of Social Skill Development for Youth who are Deaf

¹ Many different terminologies for individuals who are deaf, Deaf, or hard-of-hearing are used across the research literature. Studies that focus on the cultural, linguistic, and societal aspects of the Deaf community, including use of sign language, group membership, children of Deaf adults, etc., will identify participants as "Deaf", with a capital D (Padden & Humphries, 1988). Either in conjunction with the above or in contrast, other studies refer to an individual's "hearing loss" or as being "hearing-impaired", either in terms of decibel loss, a range of loss such as "moderate" or "profound", whether it is bilateral or in one ear, and in some cases, in terms of communication in their environment (e.g., has trouble hearing people on the telephone). Stemming from this audiological, medical perspective, "deaf" and "hard-of-hearing" are commonly used terms to describe study participants in a range of study contexts. Yet individual choices about communication modality and identities may vary not only between individuals, but also between different contexts and settings for an individual person (Stanley, Ridley, Harris, & Manthorpe, 2011). In this paper we refer to individuals who are deaf broadly as including all variations in identification and language use.

Social skill development for students with disabilities may be different from typically developing youth for a number of reasons, both directly and indirectly related to the disability itself. For students with disabilities that affect their cognitive or psychological functioning, there may be differences in how they perceive social situations and respond to the behaviors of others (Mrug, Molina, Hoza, Gerdes, Hinshaw, Hechtman, & Arnold, 2012). For students with disabilities that alter their access to a social context, such as those with physical or sensory disabilities, social skill development may follow a different trajectory due to differences in the exposure to a range of social situations and interactions with peers (Shogren, 2013). Studies of social skills of elementary students who are deaf and their hearing peers did not differ significantly (McCain & Antia, 2005), but students who are deaf with additional disabilities were rated significantly lower than the other two groups of students. The study of social skills in adolescence and their relationship with long term outcomes for students with disabilities has been studied both as a stand-alone construct and implied within an overall transition framework (see McConnell, et al., 2013 for review of non-academic behaviors related to transition outcomes). Many interventions focus on self-determination, including training in activities such as goal setting and problem solving, as well as knowledge of self and soft skills needed to effectively navigate social complex systems (Shogren, Lopez, Wehmeyer, Little & Pressgrove, 2006; Wehmeyer, Shogren, Palmer, Williams-Diehm, Little, & Boulton, 2012).

Although much of the literature on social skill development for adolescents focuses on school interventions, families and community comprise a significant component of the developmental context for this domain (Shogren, 2013). Social skill development for students with disabilities will vary depending on their specific characteristics and social contexts. For students who are deaf, opportunities to interact with same-language family members and peers or

to observe others engage in social interactions may depend upon the accessibility of their home and school environments. A deaf child's family context is critically important to a discussion about the development of social skills. Because of the shared linguistic modality from early childhood, children who are deaf born to deaf parents have cognitive, linguistic, and social advantages compared to children who are deaf born to hearing parents (Hauser & Marschark, 2008). However, children who are deaf born to deaf parents make up less than five percent of the population (Hauser & Marschark, 2008; Mitchell & Karchmer, 2004). As a result, in most cases, children who are deaf are born to hearing parents who have little to no exposure to any formal sign language at home in their early years. The majority of children who are deaf are subject to a sensory-based language mismatch that can result in inefficient and ineffective communication as well as distortions in normal parent-child interaction patterns, potentially affecting communication surrounding transition issues (Bullis, Davis, Bull, & Johnson, 1997; Mohay, Milton, Hindmarsh, & Ganley, 1998).

In addition to families, local communities also play a major role in the overall social experience and development of individuals who are deaf. Schools for the deaf have a long and rich history in its role within the Deaf community, educating students who are deaf, and in how they serve as a greater social context for this low-incidence population (Mertens, 1989). Mertens found that students who are deaf educated in residential schools for the deaf report higher overall social satisfaction than their mainstreamed deaf peers, citing positive factors such as a teacher's use of sign language, participation in extracurricular activities, and social opportunities.

Although recent legislation such as the Individuals with Disabilities Education Improvement Act (2004) and a move towards greater inclusion of all students in mainstream settings has reduced the number of students enrolled at schools for the deaf, these institutions and their related

organizations remain an important focal point in the discussion about social contexts and the development of social skills for individuals who are deaf.

One potential reason for lower ratings of social experience of children who are deaf in mainstreamed settings may be the lack of acceptance from hearing peers (Stinson & Liu, 1999). In their survey of college students on a campus designed with the specific intention of integrating students who are deaf, Brown and Foster (1991) found that hearing students rated their deaf classmates as socially deficient. In another study, a social skills intervention on preschool and elementary aged deaf and hearing children was successful in increasing intergroup interaction, but failed to yield any change in the hearing children's social acceptance levels of their deaf peers (Antia, 1998). Others have found that in mainstreamed settings, acceptance of students who are deaf by their hearing peers varied by gender, with deaf boys being less accepted than deaf girls (Wolters, Knoors, Cillessen, & Verhoeven, 2011). Similarly, Wauters and Knoors (2008) found that, compared to their hearing peers, deaf elementary school children in a mainstreamed setting scored lower on ratings of prosocial behavior and higher on ratings of social withdrawal behavior. However, in contrast to the findings of Wolters et al. (2011), Wauters and Knoors (2008) found deaf and hearing children to be similar in peer acceptance and friendship patterns.

Social Skills and Postsecondary Outcomes for Youth who are Deaf

Students with disabilities face many challenges in transition into postsecondary education and employment (Test, Mazzotti, Mustian, Fowler, Kortering, & Kohler, 2009), including their own perception of their identity as an individual and the social supports available in their environment (Whitney-Thomas & Moloney, 2001). In an extension of Tinto's (1975) model for postsecondary success with students who are deaf, Stinson, Scherer, & Walter (1987) tested a

path-analysis model of these factors on outcomes for first year students who are deaf at the National Technical Institute of the Deaf, an institution with specific focus on serving individuals who are deaf. The results of their path-analysis model are intriguing. Three of the four hypothesized predictors of persistence were found to be significant: distance from home, involvement in college sponsored activities, and social satisfaction (Stinson et al., 1987). Relevant to the discussion in this analysis, social satisfaction was found to be positively related to persistence, such that those students who felt that there were sufficient social opportunities available to them were more likely to persist through their first year of college.

The Stinson, et al. (1987) study on social engagement and social satisfaction focuses on constructs related, but not equivalent to social skills. The availability of quantitative data regarding the utility of social skills in high school as a predictor of later postsecondary success for individuals who are deaf is, unfortunately, sparse (Bullis, et al., 1997). The few studies in the literature generally apply a qualitative approach. In their exploratory study of factors that promote resilience and lead to employment and social success for individuals who are deaf, Rogers, Muir, and Evenson (2003) interviewed three graduates from the same Midwestern community college. All respondents ranked social attachments (with an emphasis on familial attachments) as the most important aspect or experience in their lives. Additionally, each participant reported that establishing learning partnerships with their peers in the classroom setting was beneficial.

In a study of high school students, Luckner & Muir (2001) identified high-performing deaf adolescents who received the majority of their educational services in a mainstreamed classroom and used qualitative methods to gather data across multiple informants about factors that led to their academic success. Recurring themes amongst all classes of informants included

involvement in extracurricular activities and the importance of social skills and friendships. In a similar study, Luckner & Stewart (2003) interviewed 14 deaf adults deemed successful by peers and asked them questions pertaining to the reasons for their success. They also asked the interviewees to offer suggestions to children who are deaf that they thought would be beneficial to them in terms of becoming successful adults. Respondents emphasized the importance of learning through interacting with others -- noting that inclusion in family conversations, involvement in sports, organizations, church activities, and having intimate friendships -- were all important factors in their success. Previous qualitative data thus suggest the importance of social skill development within a cohesive model of successful transition for individuals who are deaf.

The Current Study

The purpose of this study was to investigate the relationship between social skills while in high school and later postsecondary outcomes for individuals who are deaf. This study utilized data from the National Longitudinal Transition Survey 2 (NLTS2), a large-scale, longitudinal study of transition experiences of students with disabilities, including students who are deaf or hard of hearing. The NLTS2 provides researchers with a rare opportunity to examine the role of personal and contextual factors on postsecondary outcomes during early adulthood (Newman et al., 2011). The current analysis occurred in two phases. The first was a validation of the measure of social skills for students who are deaf as it was used in the NLTS2. The second phase of this study examined the predictive relationship between social skills and postsecondary outcomes of education, employment, independent living, and self-beliefs for individuals who are deaf. The research question for this phase was as follows: To what extent did social skills (measured in high school by parents) predict postsecondary outcomes (education, employment, independent

living, and self-beliefs), controlling for other individual student characteristics (gender, socio-economic status, Woodcock-Johnson III scores, grades, additional disability, and age)?

Methods

Dataset

The U.S. Office of Special Education Programs and the Institute for Educational Sciences (IES) commissioned NLTS2 to further understand the life goals and accomplishments of disabled youth (Newman et al., 2011). This dataset consists of five separate waves, beginning in 2001, and continuing in 2003, 2005, 2007, and 2009. Youth in this study were between 13 and 16 years of age in December, 2000 and between 22 and 25 years of age at the end of the study. Mail surveys, computer-assisted telephonic interviews, and direct assessments were conducted to obtain data from students, their parents, and school staff. This study utilizes data from waves one, two, and five, which occurred in 2001, 2003, and 2009, from the same cohort.

As with many nationally representative surveys, NLTS2 used a sampling scheme that employed both stratification and weighting, strategies intended to improve generalizability and increase the precision of estimation. Stratification occurred first at the local education agency (LEA) level, then at the disability level within LEAs. Researchers stratified LEAs by enrollment size, district wealth, and region. Enrollment size had four possible levels. If an LEA had less than 1,600 students, it was rated as having a small enrollment. LEAs with between 1,600 and 4,600 students had medium enrollment. Finally, LEAs with between 4,700 and 15,000 students had large enrollment, and LEAs with more than 15,000 students had very large enrollment. District wealth was based on the Orshanky index (the percentage of students living below the poverty line; see Fisher, 1992). LEAs had “low” district wealth if 25 to 43 percent of the youth lived below the poverty line. They had “medium” district wealth if 14 to 24 percent of youth lived

below the poverty line. Otherwise, LEAs either had “very low” or “high” district wealth. The final stratification, region, was based on a grouping scheme (i.e., Northeast, Southeast, Midwest, and West) used by many Federal organizations, including the U.S. Department of Commerce, the U.S. Bureau of Economic Analysis, and the National Assessment of Educational Progress. This stratification is thus aligned with other large-scale datasets that relate to similar outcomes.

Study Variables

The first wave of NLTS2 provided data for all but one of the independent variables, covariates, and auxiliary variables (used for the missing data model). There was only one exception, namely, the Woodcock-Johnson III (WJ III) subtests, which were a part of the direct assessment in the second wave. All of the dependent variables in this analysis were from the final (fifth) wave of NLTS2. Independent variables included a parental rating of the student’s social skills, a family language context measure, and an interaction term of parent social skills and family language context. (The NLTS2 does not include extensive additional information about potentially relevant parent variables such as parent mental health or parenting style.) Covariates and auxiliary measures included measurements of demographic information and ability level. Finally, dependent variables measured employment, education, independent living, and self-beliefs outcomes. More detailed information on these measures is provided below.

Independent Variables. For our independent variables we used a parent-rating of social skills, a parent-child sign language match variable, and an interaction between parent ratings and the sign language match variable.

First, parents filled out the social skills subscale of the Social Skills Rating System (SSRS) (Gresham & Elliott, 1990). Parents rated eleven questions, on a three-point scale, measuring how often their child exhibited different kinds of social competencies. These

questions represented three different social competency domains: assertion, self-control, and cooperation. In a broad sense, assertion measured “youth’s ability and willingness to become involved in social activities,” self-control measured “youth’s ability to cope with frustration and to deal with conflict,” and cooperation measured “youth’s ability to cooperate and stay on task” (Wagner, Cadwallader, & Marder, 2003). These ratings were positively related to youths’ frequency of interaction with their peers (Wagner, et al., 2003), providing support for these parents’ ratings and their important role in peer relationships. For this analysis, two items were omitted from this scale, namely, how often the child “keeps working at something until he or she is finished,” and how often the child “speaks in an appropriate tone at home.” The first was omitted because it doesn’t relate to social skills, per se, and the latter because it is not clear how this would apply to students who do not use oral speech for communication.

Secondly, a variable was created to account for the language context of the home. The “signing match” variable was set to one if the main language in the home was sign language and the child used sign language to communicate. It was also set to one if the main language in the home was not sign language and the child did not use sign language. Otherwise, this variable was set to zero indicating a mismatch between the family and child preferred language modality. Finally, we were interested to see if the effect of parent ratings of social skills depended on the linguistic context of the home. We therefore created an interaction term by multiplying the above two measures to use as an independent variable in the analysis.

Dependent Variables. All of the dependent variables were taken from the final wave of NLTS2. Our research team has used these dependent variables repeatedly, analyzing them from a variety of theoretical perspectives. There were seven dependent variables, which may be grouped into the larger categories of education, independent living, self-beliefs, and employment

outcomes. The two education outcomes were each binary in nature, describing whether the student attended postsecondary education and whether the student graduated from postsecondary education. One general life outcome was continuous, while the other was binary. The binary outcome, independent living, was set to one if, by 2009, the young adult had ever lived by themselves, with a spouse or roommate, or in any dormitory, including college dormitories. Five scaled questions were summed to create the continuous self-beliefs outcome. These five items included the youth's identification with the following statements: (a) you know how to get the information you need; (b) you can handle most things that come your way; (c) you are proud of who you are; (d) you feel useful and important; (e) and your life is full of interesting things to do.

Finally, employment outcomes included two continuous variables and one binary variable. The binary variable simply recorded whether the student had ever worked for pay by 2009. The youths' hourly wage was one of the continuous outcomes; it was set to missing if the youth had never been employed. The other continuous variable was a bit more complex. The job satisfaction score consists of seven questions that evaluate satisfaction with compensation, career advancement potential, and social aspects of work that the youth took on. Four binary questions were recorded as zeroes and ones, while three questions on a four-point scale were rescaled so that their minimum value was one-fourth and their maximum value was one.

Covariates and Auxiliary Variables. Covariates and auxiliary variables in this study included demographic information, measurements of achievement and ability level. All of the demographic data were drawn from the first wave of NLTS2 because that wave had the least amount of missing data. Demographic covariates included age, gender, presence of additional disabilities, and household income. Parents reported their household's yearly income to within \$5,000, as well as the presence of student additional disabilities -- if any other disabilities were

present, according to the parent, an indicator variable was set to one. Other demographic covariates were drawn from the cross-instrument dataset, which NLTS2 researchers created by synthesizing data from multiple sources. For this sample, there was no disagreement across sources regarding the student's age or gender.

Two measurements of achievement and ability level were also used as covariates. In the second wave of NLTS2, trained psychologists administered selected subtests of the research editions of the Woodcock-Johnson III measure, including the synonym-antonym subtest, passage comprehension, calculation, applied problems, social studies, and science. We created the first measurement covariate by generating an average of the non-missing subtests of this assessment. The second measurement covariate was an estimation of the student's typical grades, which was drawn from data that parents, the school program, and teachers gave for each student participant during wave one.

Auxiliary variables in this study were entered into the missing data model (described below), but not the research model. Auxiliary variables were all demographic in nature, describing child's schooling, child's ethnicity, household characteristics, and information about the parent. Three of the auxiliary variables were related to the students' schooling. The first one was a created indicator variable that was equal to one if parents indicated that their child's school only served students with disabilities, or a "special school", the closest proxy available in the dataset for a student attending a school for the deaf. The second one was a binary variable indicated whether the student was suspended, expelled, or was subject to other serious disciplinary action. The third one was the student's typical number of absences per month, reported by the school program. Moreover, to correct for missingness due to ethnicity, a Caucasian dummy variable was created. There were two more auxiliary variables that both

discussed the child's household, namely, whether the parent or guardian was living with a partner, and the responding parent's highest education level achieved.

Missing Data Procedure

This study uses multiple imputation to deal with missing data. Rather than employing listwise deletion, missing values of the independent variable are predicted, using all the other variables in the dataset. To avoid inflating the type one error rate, this is done multiple times, and some degree of randomness is involved in generating the predictions. The appropriateness of this procedure depends on whether the data are missing at random (MAR). Formally, MAR states that after controlling for the other data in the model, the probability of missing a variable does not depend on its value (Allison, 2001; Graham, 2009). More practically speaking, MAR suggests that there is no response bias in the dataset after correcting for everything in the model. For most research, it is not possible to evaluate this assumption directly. However, one may add auxiliary variables to the missing data model that need not be added to the model of primary interest. Adding auxiliary variables makes the assumption of MAR more credible (Allison, 2001; Collins, Shafer, & Kim, 2001).

Table 1 reports the percentage of missing data for independent variables, covariates, and auxiliary variables. Parent-reported independent variables had almost no missing data. Covariates' missing data percentages ranged from zero percent to 30%, and auxiliary variables' missing data rates ranged from zero percent to 50%.

(Insert Table 1 Here)

Inclusion Criteria and Participants

There were two criteria that determined if youth were included in this study. Firstly, their parents had to either report that the youth was diagnosed with a hearing impairment or with

deafness (variable name: np1B1a_11). (We ensured that the students' primary disability, according to the district roster, was not a learning disability, since those students were quite heavily weighted to reflect the high prevalence of students with learning disabilities, nationally.) We decided not to delineate between different levels of hearing loss (as defined by the dataset) or identification of the student as deaf versus hearing impaired (again, as defined by the dataset) because of the great variability and inconsistency of the application of these labels. For example, students who are deaf or who have a cochlear implant may have greater receptive hearing than students who are considered hard of hearing and wear hearing aids. There is also little literature that substantiates hearing levels, specifically, as a predicting factor of outcomes for this population without also taking into consideration language modality, age of identification, early interventions, and access to a first language from birth. Alternative variables describing a participant's level functional communication (e.g., child communicates well most of the time) did not take into account the potential impact of the language modality of the members of the dyad, rendering those variables inappropriate for use with this population.

Second, for a student to be included in any particular analysis, they had to have data on the dependent variable. Multiple imputation should not be employed when the dependent variable is missing (Allison, 2001). For this study, dependent variables were collected in the final wave, so it was necessary that participants responded to the final wave of NLTS2. Overall, 610 students met both of these inclusion criteria.

Data Analysis Strategy

The independent variables were regressed to predict the four binary and three continuous outcomes. Logistic regression was used for binary outcomes, and ordinary least squares regression was used for continuous outcomes. In total, six ordinary least squares regressions and

eight logistic regressions were run. Only the p-values for the variables of interest are reported here, and test-wise type I error rates are set at 0.05. To account for clustering, stratification, and weighting in NLTS2, Taylor linearization estimated standard errors for the predictive models. For this analysis, we used the “survey” package in R for this functionality (Lumley, 2004). For the parent independent variables, the largest proportion of missing data was in the final wave, and so the weighting variable from the fifth wave was used.

Results

Descriptive Statistics

Descriptive statistics for independent variables, covariates, and auxiliary variables are provided in Table 2. First, we report demographic statistics. Overall, the sample for this analysis was fairly heterogeneous. Half (50%) of the students were female, 60% of them were Caucasian, and half (50%) of them had an additional disability. Additionally, there was a wide range of household incomes and parent education levels in the sample, with relatively even distribution across scale increments provided for both variables.

(Insert Table 2 here)

Ability covariates were also included in the analysis and descriptives for these variables are included in Table 3. For high school grades, about half of the students typically got mostly B’s or higher. The average score of the WJ III measure was 78.78 points, with a standard deviation of 19.78.

(Insert Table 3 here)

Finally, we report on family language use. Recall that the sign language match variable was set to one if both parents and children used sign language to communicate, or if neither

parents nor children used sign language to communicate. Overall, about 60% of households fit these criteria.

Validation Phase

The SSRS was not normed on students who are deaf. However there are many unique factors that affect deaf youth's social skills and others' interpretations of their skills that may affect the validity of the use of this measure. Therefore, before utilizing the SSRS in our analysis, we verified the validity of the social skills measure used in the NLTS2, specifically looking at the deaf population in the sample. This validation phase included measurements of internal reliability, relationships between the social skills rating scales, and convergent and divergent validity for both of the teacher and parent rating scales.

Our first approach to validating the social skills measure for our targeted population of interest was to look at the measure of internal validity (Cronbach's alpha) for the parent ratings (Table 4). We disaggregated this by a measure of child language modality (uses sign language vs. does not) and educational setting (special school vs. not special school). It should be noted that the language modality measure here is not mutually exclusive with using other forms of language or communication, such as spoken English or another spoken language (i.e., the individual could use more than one modality). Findings on internal reliability were consistent across language and educational settings variables. The internal consistency for SSRS across groups was low to moderate for parent measure of social skills (alpha range from .60-.64).

We then explored the extent to which measures of social skills both diverged and converged on relevant constructs. For divergent validity for the parent scale, we looked at the correlations between the parent ratings and the language match variable ($r = .09, p < .01$) and school settings ($r = .04, p > .05$). These are appropriately low or non-significant relationships and

support the divergent validity of the parent rating of social skills. For convergent validity on the parent scales, we examined the correlations between parent ratings of social skills and the following variables: WJ III, socio-economic status (as measured by income & parent education), and whether the student had an additional disability. Convergent validity results are mixed with respect to what we would expect to find based on the literature. Parent measurement of social skills was not related to WJ III scores ($r = .07, p > .05$) only slightly positively related to socio-economic status ($r = .11, p < .001$ and $r = .09, p < .01$ for income and education variables, respectively) and was somewhat negatively related to additional disabilities ($r = -.17, p < .0001$).

Preliminary Analyses

Sensitivity studies for outliers did not indicate any inferential differences. Typically, for logistic regressions, Hosmer-Lemeshow tests evaluate the assumption of correct fit (Hosmer & Lemeshow, 2000). These tests are not available for survey data (Archer, Lemeshow, & Hosmer, 2007), but running them as if the data were unclustered yielded non-significant results for all four analyses. Preliminary analyses for ordinary least squares regressions also did not indicate any major violations of assumptions. Plots suggested that most residuals were normally distributed, with homogenous variance. The exception was for the regressions that had hourly wage as the dependent variable. Particularly, five individuals had salaries that were much higher than their peers, violating the assumption of homogeneity of variance. However, sensitivity studies showed that deleting these cases did not result in inferential differences.

Primary analysis

We then conducted regressions to answer our main research questions as to the predictive relationship between ratings of social skills and postsecondary outcomes for individuals who are deaf. Parent-related independent variables had a strong impact on postsecondary graduation.

Specifically, a one-standard deviation increase in parent ratings of social skills improved the odds of postsecondary graduation by 5.20 times ($OR = 5.20, t[100] = 2.48, p < 0.05$), a large effect (Ferguson, 2009). The 95% confidence interval for the odds ratio was bounded by 1.39 and 19.50. The parent rating of social skills did not have a statistically significant impact on any other dependent variables.

Discussion

The purpose of this study was to explore the potential predictive relationship between social skills in high school and postsecondary outcomes for individuals who are deaf. Although limited in scope across measured domains, the strength of the parent ratings of social skills was strong for the transition outcome of postsecondary education graduation. The dataset used for this analysis provides many opportunities to longitudinally examine a range of constructs that are known to impact transition and postsecondary outcomes for a low-incidence, diverse population. However, there are limitations to the study design and generalizability of these findings for individuals who are deaf, specifically. This discussion section addresses both the validation phase and research phase of this project and implications for both practitioners and researchers in the field.

Postsecondary Graduation

Of all the outcomes measured in this study for individuals who are deaf, only one outcome was significantly predicted by degree of social skills in high school: graduation from postsecondary education. This finding adds to related NLTS2 analyses looking at factors that predict postsecondary outcomes for students who are deaf, including self-determination, parental expectations, and literacy skills (Cawthon, Garberoglio, Caemmerer, Bond, & Wendel, 2014; Garberoglio, Cawthon, & Bond, 2014; Garberoglio, Schoffstall, Cawthon, Bond, & Ge, 2014).

This analysis looked at social skills as it singularly predicted outcomes after controlling for many other important factors that are known to have a relationship with long-term outcomes. The value of this analysis is thus in addressing possibilities in understanding where social skill development makes a unique and additional contribution to the postsecondary experience of individuals who are deaf. This analysis showed a strong predictive relationship between social skills in high school and graduation from postsecondary settings up to ten years later. These results represent a broad range of degree completion, including 2-year colleges, technical colleges, and 4-year colleges and universities. In addition to academic preparation, stronger social skills may have an additive effect to one's academic preparation. Postsecondary education settings often require the development of specific competencies to facilitate the navigation of an entirely new environment, particularly for individuals who are just completing the transition process from high school to postsecondary training (where applicable) and, later, into the workforce (Carter, Austin, & Trainor, 2012; Lindstrom, Kahn, & Lindsey, 2013; Murray & Doren, 2012). Students who have had specific training in how to advocate within this environment are likely to be more successful in obtaining needed accommodations (Cawthon & Leppo, 2013). Social skills may play an important role in how individuals who are deaf successfully advocate for their own communication needs, face pervasive attitudinal barriers about the capacity of deaf people to succeed, and generally transition away from a primarily academic-focused setting and into one that uses a broader range of a person's skills. Soft skills, third party entry skills, working with peers and understanding the complex dynamics in a larger, less structured settings can be challenging for many high school graduates, but particularly those that may not have extensive experience navigating the hearing world without significant supports.

For individuals who are deaf, there thus is an even greater demand for social skills because of the actions required to access the postsecondary environment.

Given the strength of the relationship between social skills and postsecondary graduation, it is curious that postsecondary enrollment and retention were not also explicitly tied to social skills, until we recognize that these analyses controlled for closer predictors of postsecondary attainment: WJ III scores and high school grades. These findings do not necessarily invalidate the importance of social skills and their role in academic achievement, or the validity of the scale in measuring social skills, but it does raise questions as to their significance above and beyond the variance that is captured by the co-occurring school outcomes already included in the analysis. The relationship between social skills and achievement is complex, however, and previous research suggests that when the effects of the two constructs are analyzed simultaneously across younger students' development, the effects of social skills on achievement are smaller and less consistent than the effects of achievement on social skills (Welsh, Parke, Widaman, & O'Neil, 2001). For the older students in this study, perhaps the combination of the relatively smaller effects of social skills in general and the large gap in time between measurements, ten years, contributed to the non-significant relationship between parents ratings of high school students' social skills and these other measures of educational attainment. This study did not focus on a path analysis between SSRS scores, high school attainment, and postsecondary outcomes, an important area of future research.

Limitations to the Study

Study design inevitably involves a series of compromises on what information to gather, and as such, investigating social skill development and its role during transition from secondary to postsecondary settings poses several methodological challenges. The first study design

challenge in this analysis is that NLTS2 was designed to capture experiences that were relevant to a diverse set of students, including students with wide range of primary and secondary disability labels, often without the advantage of peer ratings or student self-report on constructs such as social skills. The questions therefore were often appropriate for hearing students with disabilities, but posed challenges in interpretation and face validity when applied to deaf or students. For example, communication variables used for students with disabilities, as a whole, (e.g., asking a parent if their child communicates well) do not take into account the fact that a child who is deaf and their parent may have different primary language modalities, or that how well a child communicates depends as much on the language proficiency of the communicative partner as the child herself.

While these nuances about the quality of communication may not affect the utility of the NLTS2 communication variables in a hearing population, they take on great significance in measuring a deaf child's opportunity to both develop and demonstrate proficiency in the social skill domain. Unfortunately, the NLTS2 dataset does not give sufficient demographic information about the child, whether or not their family members are deaf, or other characteristics that are relevant to communication, a construct often included in measures of social skills. Without questions that are tailored to the language and communication modalities of both the child and his or her communicative partner (e.g., peer, classmate, sibling, or parent), standardized measures of social skill development alone create an incomplete picture of a child's social competence. Parents were asked to rate how often their children joined group activities, initiated conversations, easily made friends, and seemed confident in social situations. If there was a mismatch between parents' and children's communication modalities they may not be the best judge of their children's interactions with others due to limited understanding. Similarly, if

access to others with a shared communication modality is limited, opportunities to demonstrate their social skills will also be limited, and this may result in an underestimation of their skills by parents.

The parent SSRS ratings proved sensitive enough to detect strong effects of parent perspectives on student social skills on postsecondary graduation. Unfortunately, data collected from the teacher social skills ratings from the NLTS2 were not representative across both mainstreamed and special school settings and did not utilize the same scale (i.e., there was a very high rate of missing data from special school settings). Yet even if parents and teachers had used the same scale, it is not clear that they would have had the same ratings of the target child. There is very little information about the “who” behind the raters of a student’s social skills. Parents evidence base for measuring social skills is perhaps different than what teachers would use in their ratings. For example, there are academic functions and social dynamics that are very different within the school context than the more holistic approach of life outside the classroom. Classroom language use was not captured in the NLTS2, and neither was teacher experience. Previous research includes a study of teachers that worked in an inclusive classroom with access to both oral and sign language; these teachers also had many years of experience working with students who are deaf (McCain & Anita, 2005). Perhaps the greater understanding of deaf culture from these teachers influenced their ratings of student social skills (in comparison to the mainstream teacher from Wauters & Knoors, 2008). A representative sample from both parent and teacher ratings of social skills, along with comparable measures of the construct, would help to clarify this issue.

Implications

Although there are many limitations in using secondary data analyses, there are several findings from this study that can guide future research and practice. The NLTS2 is primarily a research tool, providing data across a representative sample of students including those from low-incidence populations such as individuals who are deaf. Unlike previous experimental or retrospective qualitative research, this study is longitudinal, following individuals as they transition from high school into postschool opportunities and context. As such, this dataset and this study, in particular, is not designed to draw inferences between the experiences of individuals who are deaf and those who are hearing. There is no appropriate control group within the NLTS2 for individuals who are deaf that does not assume a disability as a function of their inclusion in the study. While this may be seen as a limitation of the analysis, it does provide for a discussion that moves away from a deficit perspective or expectation of a “typical” experience.

A second issue related to research use of these findings is the absence of peer ratings of social skills within the included measures of NLTS2. Social skills are practiced in an individual’s social context, which includes, but is not limited to older adults. Inclusion of a measure of peer ratings is a nigh impossible task given the structure of the NLTS2, but it is still worth noting that this source of information about social skills, and how it may manifest years later with colleagues and peers, particularly in a work setting, remains as an important research question for the field. The role of peers in a deaf context, particularly within the socialization that occurs in deaf communities and academic and social structures, may be an important factor in how young individuals who are deaf develop their social skills.

These findings suggest that it may be helpful to monitor opportunities for social skill development for individuals who are deaf during high school. For students with disabilities, functioning in a variety of domains is typically reviewed on an annual (or tri-annual) basis

during IEP meetings. These meetings are intended to be collaborative and include discussions about students' progress and ways to best support them. Thus, students' social functioning may be an important topic for parents, professionals, and students who are deaf to regularly discuss; eliciting parents' observations of students' social skills related to both school and outside of school activities may be particularly beneficial. If students are experiencing social difficulties, providing them with opportunities to further develop these skills during high school (this may be an important IEP goal) may increase the likelihood that individuals who are deaf will later secure postsecondary education. Ensuring that students who are deaf have ample opportunities to advocate for their needs during these meetings is one possible avenue for developing these skills and this self-advocacy is also important for their success in the higher education and work environments. As students progress through high school the focus of these meetings shifts to planning for students' postsecondary transition, and thus social skills may be an important area of functioning for professionals to attend to ensure a successful transition.

The present findings also show that parents are in a unique position as stakeholders in their children's futures. The predictive power of parental ratings of social skills found in this study indicates that these ratings can provide a useful barometer in determining whether or not a child is a candidate for social skills based interventions. It is critical that parents navigate the communication options available to them and identify one that is best for their child as early as possible. In doing so it also is imperative that parents realize the likelihood that they will be learning a new language along with their child, an essential building block towards the child's future social skills. Efforts to increase parent-teacher communication on issues pertinent to student social skills could lead to earlier identification and interventions to support socially struggling youth and promote resilience and positive transitional outcomes.

Conclusion

This study emphasizes the importance of social skill development for students who are deaf while they are still in high school, even after considering academic and other demographic characteristics. From a developmental perspective, these findings suggest that attention should be paid to early factors that lead to social skills attainment during adolescence, such as language and communication strategies, experience across different social contexts, and role models in how to navigate complex social situations. Parents and teachers are both potential sources of information about a child's social skill development, each with different perspectives in context, range of social skills they see across groups of students, and knowledge of the child. Increased parent-teacher communication regarding students' social skills, particularly during the transition years, should influence intervention efforts and help strengthen social skills as a resource for future attainment.

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