A Self-Accommodation Strategy for Students with Visual Impairments:

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A SELF-ACCOMMODATION STRATEGY FOR STUDENTS WITH VISUAL IMPAIRMENTS

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Abstract

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Classroom accommodations are a primary means of providing an appropriate education for students with disabilities. While there is value in student involvement in the accommodations process, the process continues to be teacher-driven, so we need to teach students to be strategic in selecting and utilizing their own accommodations. This problem holds true across disabilities, and students with visual impairments are no exception. The Student Self-Accommodation Strategy (SSA) was developed to support students with high-incidence disabilities in strategically selecting and utilizing their own accommodations. This study investigated SSA learning and performance for students with visual impairments and how learning the SSA impacted their classroom accommodation practices.

The learning experiences of four students with visual impairments were compared using comparative case studies (Cresswell, Plano Clark, Gutmann, & Hanson, 2003) within a sequential explanatory design (Hanson, Creswell, Plano Clark, Petska, & Creswell, 2008). Mixed methods data were collected before, during, and after strategy instruction pertaining to accommodations knowledge and practices, strategy learning and performance, metacognition and self-regulated learning, and student perceptions of the SSA.

Cross-case analysis revealed key findings regarding strategy instruction, strategy learning and performance, and metacognition and self-regulated learning. These key

findings have implications for educating students with visual impairments and future research on the SSA. Ultimately, this study indicates that the SSA is a valuable tool for strategically selecting and utilizing accommodations; however, characteristics of individual students and their learning environments have a considerable impact on the development of strategic thinking.

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Chapter 1: Introduction

Classroom accommodations are a primary means of providing an appropriate education. While there is value in student involvement in the accommodations process, the process continues to be teacher-driven, so we need to teach students to be strategic in selecting and utilizing their own accommodations. This problem holds true across disabilities, and students with visual impairments are no exception.

The current chapter will address the different aspects of this issue. It begins by presenting foundational information on visual impairments including types of impairments, definition of terms, prevalence, and the impact of visual impairments on learning. This is followed by discussions of educational settings and accommodations, broadly and as they pertain to students with visual impairments. Finally, a case is built for placing greater onus on students with visual impairments in the accommodations process as it relates to self-determination.

Visual Impairment

The term "visual impairment" refers to a collection of optical conditions of varying severity resulting in some degree of functional limitations (Spungin, 2002). An impairment can be attributed to reduced acuity and/or a restriction of the visual field (Corn & Lusk, 2010). Acuity describes the clarity of what is seen. It is typically documented as two numbers such as 20/100, which means that an individual with such acuity sees the same amount of detail when 20 feet away from an object as a person with typical vision would from a distance of 100 feet. Visual field refers to the area that can be seen while the eyes are focused on a particular point (Ward, 2010). A typical visual field

is 160º to 180º horizontally and 120º vertically. Restrictions in a visual field can occur peripherally and/or centrally (Schwartz, 2010). An individual with a peripheral field loss has an uninterrupted field of vision that does not extend the full 160º-180º or 120º. A central loss is characterized by interruptions or "blind spots" in the visual field. There is one exception to the assertion that visual impairments involve reduced acuity and/or field restrictions: cortical visual impairment. Cortical visual impairment is characterized by a neurological dysfunction that results in misinterpretation of visual images while the eyes and optic nerves function normally.

The gamut of visual impairments ranges in severity from low vision to functional blindness (Corn & Lusk, 2010). Individuals with low vision do not accomplish visual tasks with the same ease as a typically-sighted person even with the assistance of glasses or contact lenses; however, their visual functioning can be augmented by utilizing optical devices, environmental accommodations, and/or visual efficiency strategies. There is no consistently-agreed-upon definition for low vision; some take a more functional approach while others conceptualize it with clinical measures. Most states utilize a clinical definition to determine eligibility for educational services, but there exists variation in the minimum qualifying acuity and visual field across states. Regardless of the details of the definition, in order to qualify for services, the reduced acuity or visual field must hinder the student's education functioning in order to receive support services.

Functional blindness—a term not limited to the educational context—is often used in education to refer to a student who would benefit from braille instruction and other tactile or auditory learning media such as raised-line diagrams or talking calculators (Corn & Lusk, 2010). An individual with functional blindness may or may not have

usable vision. The determination of functional blindness is predicated on a student's ability to accomplish tasks rather than clinical measures such as acuity and visual field. For the purpose of this paper, the term "blindness" shall be synonymous with "functional blindness."

Another significant landmark on the visual impairment severity spectrum is legal blindness (Corn & Lusk, 2010). The definition for legal blindness was established by the American Medical Association in 1934, and it continues to be used for several purposes including eligibility determinations for social security disability benefits and enrollment in state schools for the blind. An individual is legally blind if his or her acuity is 20/200 or worse in the better eye with best possible correction or if his or her visual field is not greater than 20º. Legal blindness does not always indicate functional blindness; however, all individuals with functional blindness also qualify as legally blind.

Visual impairments are low-incidence disabilities, affecting approximately two out of every one thousand children (Nelson & Dimitrova, 1993; Wall & Corn, 2004). The American Printing House for the Blind (APH; 2016) maintains a census of children and students (birth—22 years old) who are legally blind. As of January 2015, APH reports 62,528 children and students in the United States who meet the definition of legal blindness. Of this number, approximately 31.5% are print readers, 8% read braille, 10.5% are auditory readers, 16% are pre-readers, and 33% are non-readers. A substantial majority are educated by their local school districts, while far fewer are educated at schools for the blind, through rehabilitation programs, or by programs specifically for students with multiple disabilities. Ascertaining a count of individuals with low vision is more difficult (Corn & Lusk, 2010). Wall and Corn (2004) found that in Texas, students

receiving educational services for low vision were about half the number of students who were legally blind. If this proportion holds true nationwide, an estimated 31,300 children and young adults have low vision.

Most children with visual impairments need specialized services to ensure that they mature into adults who can function at their greatest potential. Visual stimulation is the impetus for development and learning for most children (Huebner, Merk-Adam, Stryker, & Wolffe, 2004). It encourages children to explore their environments, which fosters motor and conceptual development (Hill, Rosen, Correa, & Langley, 1984). It provides information about a child's surroundings by which he or she builds language and cause-effect relationships. It is also a means to engage in social observation and interaction through which a child learns socially appropriate and inappropriate behaviors. Without visual information, children may not acquire such skills and knowledge incidentally. Qualified professionals such as teachers of students with visual impairments (TVIs) and certified orientation and mobility specialists provide experiences and training for children with visual impairments to accommodate for difficulties with learning and development.

Educational Settings

According to the Individuals with Disabilities Education Act (IDEA; 2004), students with disabilities must be educated in the least restrictive environment. Least restrictive environment means the physical place as close to the general education classroom as possible—including the general education classroom itself—where students can receive an appropriate education (Rozalski, Miller, & Stewart, 2011). While IDEA (2004) specifies that students with disabilities should be educated with their typically-

developing peers to the greatest extent possible with a preference for attending the same school they would attend without a disability, it also requires schools to offer a range of placement options to meet student needs. The continuum of placement options includes general education classes/inclusion, special classes (i.e., resource, self-contained), separate/specialized schools, and homebound or hospital-based instruction (Lewis & Allman, 2017).

In 2014, 88.9% of students receiving special education services for visual impairments spent some portion of the school day in a general education classroom with 66.3% spending at least 80% of the day there, 12.3% spending between 40% and 79% of the day in an inclusive classroom, and 10.3% there for less than 40% of the school day (U.S. Department of Education, 2016). Time not spent in the general education classroom was attributed to special education and related services. For the same year, 11.1% of students with visual impairments were educated in other educational settings, which could include specialized or residential schools, private schools, home or hospital, or correctional facilities.

Decisions regarding educational placement are made on an individual basis. While the majority of students with visual impairments are educated primarily in inclusive settings, TVIs and other professionals working with these students recognize the value in alternative placements for some students (Lewis & Allman, 2017).

> When determining the appropriate education placement and least restrictive environment, the IEP team must consider in what environment or environments the goals and objectives that have been identified for the student can best be met.

> This environment becomes, by definition, the least restrictive environment. (p. 296)

Factors that may contribute to this decision include severity of the disability, presence of additional disabilities, and availability of special education and related services professionals. Additionally, teams should consider the value of receiving an education with typically-developing peers as well as the importance of meaningful engagement with peers who have similar disabilities. According to IDEA (2004), educational placement must be considered annually for each student. For students with visual impairments, it is reasonable that their least restrictive environment might change over time as their needs and abilities change (Lewis & Allman, 2017). For example, a young student who is blind might not have sufficient access to a TVI in order to develop skills in braille and orientation and mobility. This student might attend a school for the blind for a few years, but once proficient in these skills, might enroll in her local school where the skills can be maintained by a TVI.

Inclusion

Teachers report that most students with visual impairments (blind and low vision) perform at or above grade level in inclusive general education classes; however, the same teachers indicate lower levels of effort, motivation, initiative, and engagement for these students compared to their peers (Bardin & Lewis, 2008). General education teachers often express hesitancy about including students with visual impairments in their classes (Ajuwon, Sarraj, Griffin-Shirley, Lechtenberger, & Zhou, 2015; Rule, Steffanich, Boody, and Peiffer, 2011). Because visual impairment is a low incidence disability, this may be attributed to teachers' lack of experience with individuals who are blind or have low

vision (Ajuwon et al., 2015). It might also be due to the misconception that students with visual impairments are not able to achieve academically at the same level as their typically-developing peers and the low expectations that result from this erroneous belief (Ajuwon et al., 2015; Bardin & Lewis, 2008).

Specialized Schools

The purpose of schools for the blind is to educate students with visual impairments in a setting in which the faculty are knowledgeable about the unique learning needs of these students. Instruction is designed, materials adapted, and curricula modified according to their individual needs, which allows students to engage in more meaningful learning than is often experienced in inclusive settings (Lewis & Allman, 2017). Schools for the blind not only offer courses in core content areas (e.g., math, English, history), they offer instruction in other important areas as well (e.g., functional skills, independent living, vocational preparation), which may occur during the regular school day or after school hours for residential students (Dahm, 2002; Lewis & Allman, 2017). While many perceive specialized schools as segregated settings, most schools involve students with visual impairments with typically-developing individuals by way of enrollment in classes at local schools (k-12 and post-secondary), participation in athletics, vocational training, and community-based learning.

The majority of specialized schools for students with visual impairments identify as "state schools," meaning that they are institutions operated by their respective state governments (McMahon, 2014). The others are private. The American Printing House for the Blind (2015) reports that 8.4% of students with visual impairments attend a school for the blind, or an estimated 4,264 students according to McMahon (2014). Approximately

36% of this number have a visual impairment with no additional disabilities, 42% have an additional disability of intellectual disability, and 22% have an additional disability that is not intellectual disability (McMahon, 2014). Nationwide, about half of the students enrolled in specialized schools for students with visual impairments participate in academic programs while the other half participate in life skills programs. Although the number of students enrolled in schools for the blind has remaining relatively consistent over time, the student body has shifted to include more students with additional disabilities.

Accommodations

Regardless of educational setting, IDEA expects schools to provide students with supplementary aids and services, which are defined as "aids, services and other supports that are provided in regular education classes, other education-related settings, and in extracurricular and nonacademic settings, to enable children with disabilities to be educated with nondisabled children to the maximum extent appropriate" (2004, Sec. 300.42). Supplementary aids and services are more commonly known as accommodations, modifications, and related services; they are selected for students on an individual basis according to the student's educational needs and level of functioning. The underlying etiologies of visual impairments result in a wide range of visual functioning necessitating accommodations in literacy media, technologies, print sizes, and lighting conditions, to name a few (Schwartz, 2010). For example, students with reduced acuity often benefit from enlarged print, whereas students with reduced peripheral fields tend to prefer smaller print so that more characters fit within their field

of vision. Accommodations respond to impairment etiologies and also to the context(s) in which they will be used.

The reason that accommodations are an integral component of a student's education program is that they are a primary means of providing an *appropriate* education (Lee, Wehmeyer, Soukup, & Palmer, 2010). Accommodations allow students with disabilities to access and advance in the general education curriculum whether they receive instruction in an inclusive setting or in a specialized setting. In addition to academic outcomes, accommodations increase student engagement, time on-task, and productivity. They can reduce problematic behaviors in students thereby lessening the amount of time that teachers focus on classroom management.

For students with visual impairments, in particular, accommodations have been linked to increased learning and comprehension across settings (Abramo & Pierce, 2013; Jones, Minogue, Oppewal, Cook, & Broadwell, 2006; Wild, Hilson, & Farrand, 2013). They allow students in inclusive classrooms to participate in activities and assignments at the same time as their typically-developing peers (Cooper & Nichols, 2007; Farnsworth & Luckner, 2008; Zebehazy & Wilton, 2014c). And, they facilitate interactions with general education teachers (Cooper & Nichols, 2007; Farnsworth & Luckner, 2008; Rule et al., 2011).

Research indicates that accommodation practices are predominantly teacher-driven (Fletcher, Bos, & Johnson, 1999; Scanlon & Baker, 2012). Teachers indicate that they prefer whole-class accommodations, noting that they are easier to fit into their established teaching routines (Scanlon & Baker, 2012). In a study conducted by Schumm and Vaughn (1991), teachers viewed accommodations associated with the social and

emotional aspects of inclusion as most favorable while finding those that require adaptations of materials and instruction to be least desirable. Although these teachers rated most accommodations as desirable, very few were considered feasible to implement. That said, however, general educators report that teaching students with visual impairments is easier than anticipated when they use instructional accommodations (Rule et al., 2011).

For students with visual impairments, the role of teachers (general educators, special educators, and teachers of students with visual impairments) in the accommodations process is reasoned to be even larger. Many common accommodations are teacher-provided out of necessity, such as increased verbal information during instruction, tactile graphics, and extended time on exams. Additionally, accommodations for students with visual impairments often require direct instruction from a TVI to be utilized effectively. Instruction in braille and assistive technology devices are two key examples.

Self-Determination

While teachers may play a primary role in instruction, provision, and orchestration of accommodations, students are charged with establishing preferences in, advocating for, and utilizing accommodations. Students with visual impairments demonstrate task-specific accommodation preferences (D'Andrea, 2012; Lusk, 2012). This perspective from students is important, and their involvement in the accommodations process will likely provide a sense of agency (Scanlon & Baker, 2012). Bolt, Decker, Lloyd, and Morlock (2011) further encourage the active role of students in accommodations practices by demonstrating that many utilize the same accommodations

in high school and college; therefore, explicit instruction in self-advocacy and accommodations during high school promotes confidence and skill in requesting and implementing accommodations at the post-secondary level.

For students with visual impairments, this explicit instruction in self-advocacy is not simply a good idea, it is an expected part of their educational program. TVIs recognize that children with visual impairments need explicit instruction in many areas beyond academic subjects that sighted children learn incidentally. This concept was formalized by Hatlen in 1996 as the Expanded Core Curriculum, or ECC (Sapp & Hatlen, 2010). The ECC includes nine areas of instruction that are necessary for success in school, community, and employment. One of the nine areas is self-determination. Broadly, self-determination indicates an individual making his or her own decisions and/or acting on his or her own behalf (Agran, Hong, & Blankenship, 2007). Students with visual impairments engage in self-determination infrequently, with those who are blind engaging even less often than those with low vision (Robinson & Liebermann, 2004). Unlike their typically-developing peers, children with visual impairments do not experience increasing opportunities for self-determination as they mature into adolescence. This may be attributed to parents and teachers providing too much support or to limited skills in self-determination.

The value of self-determination within the field of visual impairments is widely accepted (Agran et al., 2007). Self-determination is associated with achievement in school (Agran et al., 2007), greater likelihood of employment (McDonnall & Crudden, 2009), and acceptance in the community (Sacks & Silberman, 1998). Sapp and Hatlen (2010) assert that development of self-determination for students with visual impairments

necessitates explicit instruction. Children must understand their abilities and disabilities, know the choices available to them in a given context, be able to advocate for or take advantage of such choices, and have the freedom to make their own choices.

Chapter 2: Review of the Literature

Chapter 1 addressed challenges with current accommodations practices and acknowledged the need for students to take more responsibility for their accommodations. Chapter 2 looks further at the existing research pertaining to accommodations and student involvement in the accommodations process, including previous research on the Student Self-Accommodations Strategy, which is the focus of the proposed study. Because metacognition and self-regulated learning have been implicated as essential components of effective strategy instruction, literature from these areas will also be addressed. This chapter culminates by presenting the purpose of the proposed study, describing how it extends previous research on the Student Self-Accommodations Strategy, and stating the research questions to be investigated.

Accommodations

Accommodations, as related to education, are changes in the way that teachers provide instruction and/or the way students participate in the learning process (Laprairie, Johnson, Rice, Adams, & Higgins, 2010; Polloway, Epstein, & Bursuck, 2003). Accommodations, however, do not alter the curriculum itself or the expectations on students. As Shaywitz and Shaywitz (1997 as cited in Polloway et al., 2003) articulated, "Accommodations don't produce success for students. Rather they act as a catalyst to allow effort and ability to show themselves" (p. 192). Students can receive instructional accommodations for day-to-day use in the classroom and accommodations specific to assessments (Scanlon & Baker, 2012). The purpose of accommodations is to allow students with disabilities to access and advance in the general education curriculum (Lee et al., 2010) and to participate meaningfully in assessments (Thurlow & Bolt, 2001).

Because accommodations are selected individually for students based on their needs, the options are innumerable. However, accommodations are often categorized by the aspect of an educational program that they address (e.g., Bolt et al., 2011; Silberman, Bruce, & Nelson, 2004). The American Foundation for the Blind (AFB; 2017) describes seven accommodation domains specific to students with visual impairments to account for their sensory differences. Because they take in limited or no visual information, students with visual impairments benefit from *instructional accommodations*, including hands-on or experiential learning, use of 3-dimensional models, and increasing verbal information. *Material accommodations* are directly related to students' learning media, whether visual, tactile, auditory, or a combination. In addition to braille, material accommodations could include the provision of large print, audio, or electronic formats in lieu of or in conjunction with regular print materials. Existing documents may be adapted to facilitate visual efficiency through highlighting, reducing clutter, or improving contrast, and manipulatives may be available for use in art or math. Commonly-used *assignment accommodations* are extended time or shortened assignments, use of verbal descriptions or 3-dimensional models instead of 2-dimensional depictions, and limiting the amount of copying a student is expected to complete. These accommodations allow students to effectively and efficiently meet the purposes of classroom assignments: to learn new information or to convey what they already know. *Testing accommodations*, like assignment accommodations, support students in demonstrating their knowledge. While a number of other accommodations may be used during testing, some are specific to testing itself such as extended time, alternative means of responding (e.g., dictation, manipulatives, answer in test booklet), and accommodations to facilitate accessibility of

computer-based exams. IDEA (2004) requires that IEP teams consider the need for *assistive technology accommodations* (AT) for all students receiving special education services, and there is certainly no shortage of options for students with visual impairments. They include low-tech (e.g., magnifiers. telescopes, braillewriters, independent living aids) and high-tech options (e.g., screen reading/magnifying software, electronic notetakers, embossers, talking calculators). Because of the priority placed on visual learning in most classrooms, students with visual impairments often need *environmental accommodations*. Preferential seating, lighting adjustments, and permission to move freely in the room for the purposes of visual efficiency can mitigate the challenge presented by this emphasis on visual input. Finally, the AFB acknowledges that students may need *other accommodations* in order to function more generally in the school. Examples include modified emergency procedures, orientation and mobility tools, and adaptive physical education equipment.

Research on accommodations for students with visual impairments speaks to how well accommodations for students with visual impairments achieve their intended purpose of providing access to and advancement in the curriculum (Lee et al., 2010) and meaningful participation in assessment (Thurlow & Bolt, 2001). While studies tend to relate to either curriculum or assessment, as a whole, the literature nonetheless offers broader perspectives related to purpose including the issues of implementation, the need to comprehensively meet students' needs, and student and teacher roles regarding accommodations.

First, research indicates that accommodations achieve their purpose when implemented appropriately, but implementation is a concern. Articles addressing

instructional accommodations demonstrate this tension. These accommodations increase learning, support performance, and encourage participation, but they are not often utilized in inclusive contexts (Abramo & Pierce, 2013; Jones et al., 2006; Rule et al., 2011; Wild et al., 2013). Material accommodations are essential for educational access, and with them, students develop literacy, acquire knowledge, and engage actively. However, materials are regularly not available when needed (Smith & Smothers, 2012; Zebehazy & Wilton, 2014c) and tend to contain errors (Herzberg, 2010; Herzberg & Rosenblum, 2014; Herzberg & Stough, 2009; Smith & Smothers, 2012; Zebehazy & Wilton, 2014b). Assistive technologies demonstrate inverse challenges with implementation in that they are drastically under-utilized (Kelly, 2009, 2011) but may be imposed on students during high-stakes testing without adequate support (Kamei-Hannan, 2008).

Second, assuming appropriate implementation, accommodations can only meet their purpose if they collectively address all of a student's educational needs. AFB's (2017) organization of accommodation domains is helpful because they represent common educational needs for students with visual impairments. A comprehensive consideration of all of the domains is key for appropriately supporting students in classrooms. Furthermore, not only are the domains interrelated—material accommodations can be provided through AT (e.g., an electronic braille notetaker), AT supports testing accommodations (e.g., screen magnification for a computer-based assessment)—they also fill one another's gaps. For example, sharing diagrams electronically to a student with a braille notetaker or one who is using screen reading software is not effective (AT accommodations), but having a 3-dimensional model and/or

explicit teacher description to convey the information from the diagram is (instructional accommodations).

Finally, teachers (TVIs, general educators, and special educators) and students both have a part to play for accommodations to accomplish their purpose. Teachers are primarily responsible for provision, orchestration, and instruction in accommodations. Examples of these functions include ordering audio books, arranging for a proctor to allow extra time for a test, and teaching a student to use screen reading software. Many factors can impede these responsibilities including lack of awareness and skill (Zhou et al., 2012) and insufficient time and resources (Herzbrg & Stough, 2009; Zebehazy & Wilton; 2014a). While teachers are typically prepared to perform these functions, through training or collaboration (Spungin & Ferrell, 2007), students are less likely to be explicitly informed of their roles: determining preferences, advocacy, and utilization of accommodations. Students are capable of these functions. They can express their preferences (D'Andrea, 2012; Lusk, 2012; Rosenblum & Herzberg, 2015), request accommodations when not initially provided (Rosenblum & Herzberg, 2015), and use their accommodations to access learning and assignments (Farnsworth & Luckner; 2008; Zebehazy & Wilton 2014c), even if they have to be resourceful with inadequate or inaccurate materials (Rosenblum & Herzberg, 2015). However, student preferences are not always shared or considered (Rosenblum & Herzberg, 2015; Zebehazy & Wilton, 2014c), students may prefer to skate by without advocating for accommodation needs (Rosenblum & Herzberg, 2015), and when accommodations are provided by teachers, students may still decline to use them (Rule et al., 2011). Because students tend toward

this passivity, it is important to explicitly discuss their responsibilities, teach self-advocacy, and ensure that they value their accommodations.

Student Involvement in the Accommodations Process

Accommodation practices currently tend to be teacher-driven (Fletcher et al., 1999; Scanlon & Baker, 2012). However, teachers often report feeling overwhelmed and unprepared in providing accommodations (Fletcher et al., 1999; Kozik, Cooney, Vinciguerra, Gradel, & Black, 2009). For example, TVIs tend to do most of the braille transcribing for their students (Herzberg, 2010; Herzberg & Stough, 2007), but while they received some pre-service training in the production of braille materials, most nonetheless report taking on these responsibilities insufficiently prepared (Herzberg & Stough. 2007). TVIs often share similar sentiments regarding AT. Considering the proliferation of available technologies for individuals with visual impairments, most believe that it is neither feasible nor practical to be competent in everything (Zhou et al., 2012). TVIs' competence with AT is heavily influenced by their current caseload needs in that they tend to be more knowledgeable about devices that their students use and less knowledgeable about devices that their students do not use (Ajuwon, Meeks, Griffin-Shirley, & Okungu, 2016; Kamei-Hannan, Howe, Herrera, & Erin, 2012; Zhou, Smith, Parker, & Griffin-Shirley, 2011). Conversely, however, TVI caseload sizes can negatively correlate with AT use by students (Johnstone, Thurlow, Altman, Timmons, & Kato, 2009).

Accommodation implementation is notably more difficult at the secondary level than the primary level. Teachers face large, academically-diverse classes and heavy teaching loads. They have insufficient time to plan for each class, especially considering

the staunch pacing demands and rigorous expectations for student proficiency (Kozik et al., 2009; Scanlon & Baker, 2012). Balancing individual needs with group needs is a challenge (Pui, 2017), which leads most teachers to favor whole-class accommodations that align with their established teaching practices (Scanlon & Baker, 2012).

Recognizing the challenges to teachers in providing accommodations further strengthens the case for student involvement in the process. It was discussed in the Introduction that students have preferences about accommodations, that they offer a unique and important perspective, and that learning to self-advocate for accommodations during high school is beneficial for the transition to college. Self-advocacy is key for students with disabilities because outcomes for these students are often less than desirable. The National Longitudinal Transition Study-2 indicated that only 31% participate in classes at the postsecondary level and approximately 75% live at home two years after graduating from high school (Levine & Wagner, 2005). However, Wehmeyer and Palmer (2003) asserted that self-advocacy skills improve outcomes for students in special education, noting that those with better skills are more likely to have a bank account, employment, and independent living arrangements. From an educational perspective, students who demonstrate self-advocacy skills are more participatory and successful in general education classes (Prater, Redman, Anderson, & Gibb, 2014). In addition, Test, Fowler, Wood, Brewer, and Eddy (2005) acknowledged that self-advocacy broadly empowers students with disabilities.

There are challenges, however, to participation in the accommodations process for students with visual impairments. Oftentimes, when accommodations are provided for students, they refuse to use them because they do not recognize the need for them or

because they draw unwanted attention to the student's visual impairment (Rule et al., 2011). If students are willing to utilize accommodations, they may not be aware of the most appropriate accommodations for themselves or for a given task. Erin, Hong, Schoch, and Kuo (2006) demonstrated that most braille-reading students prefer braille tests over oral tests, but testing in braille takes significantly more time to complete without yielding a difference in score as compared to oral administrations. Similarly, Lusk (2012) asserted the need to teach students to use a variety of magnification devices and to assess their proficiency with each device so that they can make an informed decision about their preferred device. Many students have preferred accommodations, but these preferences may not come to fruition. Students express a preference for previewing adapted graphics with a teacher, but only 38% and 56% of enlarged and tactile graphics users, respectively, report that previewing happens (Zebehazy & Wilton, 2014b). One reason for this is that students and teachers may have different understandings of how accommodations are actually being used. For example, companion studies indicated that most TVIs thought that students received adapted graphics at the same time their peers received non-adapted ones (Zebehazy & Wilton, 2014a), but only 44% of students using tactile graphics agreed (Zebehazy & Wilton, 2014b). Collectively, these challenges warrant the need to achieve buy-in from students about the value of accommodations, to explicitly teach them about their accommodations, to practice selecting the most appropriate accommodation for a given task, and to give them tools to advocate for those accommodations.

The Student Self-Accommodation Strategy

Classroom accommodations are a primary means of providing an appropriate education for students with visual impairments. While there is value in student involvement in accommodation practices, the process continues to be teacher-driven. The student self-accommodation strategy (SSA) was developed to support students with certain high-incidence disabilities (i.e., learning disabilities, communication impairments, attention-deficit/hyperactivity disorder, emotional behavioral disorders) in strategically selecting and utilizing their own accommodations. The SSA was originally known as IN CHARGE. IN CHARGE, as the name of the strategy implies, encouraged students to take charge and be responsible for their own learning by appropriately initiating and utilizing the accommodations that they are afforded in their IEPs. IN CHARGE also served as an acronym for the steps a student should take in order to effectively use their accommodations:

I. Inventory my accommodations. Students know the accommodations delineated in their IEPs, how they work, why they should be used, and in which situations they can be used. If an accommodation is tangible (e.g., calculator or laptop), the student is responsible for having the item in class.

N. Note the surroundings. This step focuses on being ready for class. Students should arrive on time, look for clues that indicate a need for an accommodation, and have necessary tools prepared for use.

C. Check for needed skills. For each class activity, a student should consider the skills that will be used (e.g., listening, writing, computing) and the expected outcome such as an essay.

H. Hunt for best accommodation. Students should consider their accommodation options for the needed skill, taking into account whether or not each accommodation is allowed in that class and if they have the necessary materials. An accommodation is then selected for use.

A. Activate my accommodation. The accommodation is put into effect at the appropriate time.

R. Readjust, if needed. If a student determines that an accommodation is not helpful or not being used correctly, he or she can modify or switch accommodations.

GE. Gauge effectiveness. When an activity is complete, students reflect on whether or not the accommodation worked well and had the desired effect. This reflection is intended to inform whether the accommodation should be used again under similar circumstances or another accommodation should be tried.

The SSA has been the focus of a few studies, most recently, a mixed methods comparative case study that illuminated how three students with high-incidence disabilities learned and applied IN CHARGE (Scanlon, Nannemann, Paisner-Roffman, in review). Findings demonstrated that the students learned the strategy on individual trajectories, largely influenced by their disability profiles. While they advanced at their own rates, the strategy was ultimately effective—albeit to varying degrees—in improving accommodation practices for each participant. Several implications were derived from the case studies. The first was a need for pre-teaching students the definition and purpose of accommodations in general and specifically about the participants' individual accommodations. Second, the SSA needed to be more accessible to students by simplifying the language involved in each step and by organizing them into a more

strategic process. Finally, strategy instruction needed to both be more sensitive to the learning needs of the students and in moving beyond a behavioral approach, needed to place more emphasis on individually-responsive supports including elements of metacognition (Flavell, 1979) and self-regulated learning (Zimmerman, 1986).

The need to not simply know a strategy but to be a strategic thinker (Paris, Lipson, & Wixson, 1983) is supported in the literature. Strategies serve to enable or enhance cognition, but those strategies need the oversight of metacognition to be activated, monitored, and refined (Flavell, 1979). Lienemann and Reid (2006) take a stronger stance, asserting that strategies cannot be effective unless their instruction is accompanied by the corresponding metacognitive knowledge necessary for implementation. Through the self-regulated learning approach to strategy instruction, students enhance strategy effectiveness by developing a better understanding of their strengths and weaknesses, by adapting existing strategies or conceiving new ones, and by diligently and continuously evaluating their performance (Pui, 2017). Paris and Winograd (1990) compare metacognitive learners to skilled craftsmen in that they do not just accumulate a variety of tools, they discerningly select the right tool for the job at hand. They use this metaphor to make the point that students have to know the purposes of the strategies or "tools" at their disposal and the contexts in which each should be employed, which are elements of metacognition and self-regulated learning.

Metacognition

Credit for the original definition of metacognition is attributed to Flavell (Brinck & Liljenfors, 2013; Tanner, 2012). Metacognition is the regulation and monitoring of cognitive processes (i.e., memory, comprehension, learning) based on beliefs or

knowledge about one's own or another's cognitive abilities, about how to cognitively approach a given task and the probability of a successful outcome for that task, and about strategies that could facilitate accomplishing a particular goal (Flavell. 1979). While Tanner argues that a consistent, concise definition of metacognition is unavailable in literature, many scholars agree that, at its core, metacognition is the management of cognition (Brinck & Liljenfors, 2013; Scott & Berman, 2013), or more simply, thinking about thinking (Paris et al., 1983; Scott & Berman, 2013).

Metacognition, which begins in early childhood and continues developing through adolescence (Brinck & Liljenfors, 2013), focuses on the individual (Paris & Winograd, 1990). *How do* I *learn best? How can* she *most effectively accomplish this assignment? Why is* he *struggling to understand this concept?* Metacognition can occur implicitly—that is, unintentionally or subconsciously—or it can be deliberate and conscious (Brinck & Liljenfors, 2013; Flavell, 1979). Implicit metacognition is often engaged by emotions and feelings, both positive (pride, accomplishment, confidence) and negative (frustration, boredom, anxiety), without consciously recognizing the reason for the emotion. Deliberate metacognition is more common in circumstances that prompt sustained, careful thinking; for a task that requires a particular kind of thinking; with new responsibilities or assignments; if each step in a process necessitates planning and reflection; in high-risk situations; and when emotions are high or the ability to reflect is low (Flavell, 1979).

Whether implicit or deliberate, metacognition can occur prior to, in the midst of, or after a cognitive endeavor (Flavell, 1979). Ahead of a task or learning experience, metacognition can help an individual anticipate how much and what kind of information

is necessary for success, a strategy that might be effective, and when and how to use the information or strategy (Brinck & Liljenfors, 2013). During an activity, metacognition can lead one to initiate, change, or abandon a particular way of thinking or resource. As Flavell states, "[T]he feeling that you are far from your goal…what you make of that feeling and what you do about it would undoubtedly be informed and guided by your metacognitive knowledge" (1979, p. 908). After a thoughtful endeavor, metacognition allows a person to judge their performance (Callender, Franco-Watkins, & Roberts, 2016; Scott & Berman, 2013). Whether successful or unsuccessful, this reflection contributes to his or her metacognitive knowledge available for future learning or activities (Flavell, 1979).

Metacognition is a large, multi-faceted concept. Many researchers have expanded upon or nuanced Flavell's conceptualization according to their specific areas of study (Tanner, 2012). For example, Scott and Berman (2013) describe three components of metacognition useful in considering domain specificity or generality: *Knowledge* of our own cognitive strengths and weaknesses and those of others. *Regulation*, which is the real-time monitoring of an individual's learning and thought processes. And *accuracy* in correctly predicting one's performance (e.g., Did I get that answer correct? How well am I doing on this project?). Paris et al. (1983) focus on metacognitive knowledge, particularly the kinds of knowledge that develop when a learner—of any topic—matures from a novice to an expert. They assert that there are three crucial types of knowledge: declarative, procedural, and conditional. Declarative knowledge (or knowing *that*) involves information about the expectations and objectives for a given task and one's ability to meet those expectations and objectives. This category of knowledge supports a

person in establishing his or her own goals as well as to modify a course of action when the circumstances around a task change. Procedural knowledge (knowing *how*) describes information related to executing a physical or cognitive process. This goes beyond simply knowing a procedure, rather it is higher order consideration of how to implement or carry out the procedure ascertained from explicit instruction or personal experience. Conditional knowledge (knowing *when* and *why*) relates to understanding the circumstances in which a procedure should be employed. It justifies the use of a particular physical or cognitive process and, like declarative knowledge, allows for course correction when the circumstances change. Conditional knowledge facilitates the use of declarative and procedural knowledge by matching them to a specific task or context.

Metacognitive abilities greatly influence learning and achievement. As Garner asserted, "To make an individual metacognitively aware is to ensure that the individual has learned how to learn" (as cited in Tanner, 2012, p. 114). Metacognition allows a student to understand his or her own thinking, which fosters active, independent learning as opposed to passively receiving instruction (Paris & Winograd, 1990). Not only do students better understand their own cognitive strengths and weaknesses, they develop a sense of their peers', which allows them to work cooperatively to support and accommodate for one another (Garb, 2000). These benefits are particularly valuable in light of the volume of material to be learned in school (Callender et al., 2016). Strong metacognition improves cognitive skills, facilitates shifts in conceptual understanding, and leads to greater academic achievement compared to students with weaker metacognitive skills (Tanner, 2012). Furthermore, metacognition promotes intellectual

curiosity, perseverance, creative approaches to learning, and strategic problem-solving (Paris & Winograd, 1990), while preventing an individual from continuing to employ unproductive approaches to learning and completing tasks (Tanner, 2012). However, when mistakes are made, students are able to recognize the learning opportunities they provide (Garb, 2000).

While metacognition is beneficial for learners, students may not engage in metacognitive thinking or their metacognition may be inaccurate or insufficient (Flavell, 1979; Pintrich, 2002). Paris and Winograd (1990) extend their metaphor between metacognitive learners and skilled craftsmen by noting that craftsmen do not attain expertise on their own; rather, they work under the tutelage of a master craftsman to learn their trade, becoming self-sufficient over time. According to Vygotsky's Social Development Theory, socially-learned skills (those initiated and guided by others) will become internalized or self-directed over time (Brinck & Liljenfors, 2013), meaning that learners will not always have to rely on the expert to successfully engage in metacognition. Scholars agree that individuals can learn and improve metacognitive abilities (Brinck & Liljenfors, 2013; Callender et al., 2016; Paris & Winograd, 1990; Tanner, 2012). Teachers can foster metacognition in their students though explicit instruction (Tanner, 2012) and targeted feedback (Callender et al., 2016). They can discuss the role of metacognition and cognition on learning, teach problem-solving skills, and encourage self-monitoring (Paris & Winograd, 1990). Tanner (2012) recommends the following classroom-based practices for promoting metacognition: prompt students to consider their current understanding of and ways of thinking about a concept or task; offer opportunities for students to articulate confusion because without an invitation,

students risk embarrassment or ridicule from peers; encourage students to be cognizant of shifts in understanding and practice as learning and metacognition come from considering this before-and-after change; finally, expect students to document their own thinking for the purposes of monitoring and reflecting.

Self-Regulated Learning

Closely related to metacognition is the concept of self-regulated learning (SRL). SRL was originally defined by Zimmerman (Dent & Koenka, 2016). According to Zimmerman, SRL refers to "how students personally activate, alter, and sustain their learning practices in specific contexts" (1986, p. 307). Like metacognition, SRL is now conceptualized and defined in various ways (Dent & Koenka, 2016). Most scholars agree that it is an active process, that learning objectives are task-specific, and that learners engage in an iterative cycle of regulation. Zimmerman (1986) initially described fourteen components of SRL, which have boiled down to three core components: planning, self-monitoring, and self-control (Dent & Koenka, 2016; Paris & Winograd, 1990; Tanner, 2012). Planning is self-evident: learners make an action plan for a goal or task. Through self-monitoring, a student assesses if he or she is on track to accomplish the goal or task. If not on track, self-control allows him or her to readjust performance.

These components are noticeably similar to the application of metacognition. Metacognition and SRL can be difficult to distinguish. In fact, there is overlap in research and the terms are regularly used interchangeably (Tanner, 2012). One key distinction is that SRL—as its moniker indicates—relates to learning; whereas, metacognition applies to any task, which could include learning. There exists a discrepancy in the literature as to whether metacognition includes SRL or whether the converse is true. Proponents of the

former (e.g., Paris & Winograd 1990; Tanner, 2012) claim that SRL is metacognition enacted; it is how one orchestrates planning, self-monitoring, and self-control. Those advocating the latter (e.g., Pui, 2017; Dent & Koenka, 2016; Zimmerman, 1986) assert that metacognition is one of three elements that allows students to engage in SRL; the others are motivation and behavior. As Zimmerman (1986) articulates

> Metacognitively, self-regulated learners are persons who plan, organize, self-instruct, self-monitor, and self-evaluate at various stages during the learning process. Motivationally, self-regulated learners perceive themselves as competent, self-efficacious, and autonomous. Behaviorally, self-regulated learners select, structure, and create environments that optimize learning. (p. 308)

When discussing the overlap and distinction between the concepts of metacognition and SRL, a third concept, self-regulation, must be addressed as well. Self-regulation was first put forth by Bandura in 1977 (Dinsmore, Alexander, and Loughlin, 2008). It is the process of managing one's thoughts, behaviors, and emotions in light of their circumstances to achieve a goal (Legault & Inzlicht, 2013). Because of the strong similarities in definitions among self-regulation, metacognition, and SRL, more beneficial is to acknowledge that these three ideas prioritize different aspects of a closely-related process. Metacognition highlights cognition, self-regulation focuses on action, and SRL emphasizes the environment (Dinsmore et al., 2008). Specifically, Dinsmore and colleagues assert that the key environment for SRL is academic contexts, while Kaplan (2008) argues that this is a narrow characterization as SRL applies to any learning context, not simply academic. Because the SSA addresses thinking and learning in the

academic context, it certainly aligns more closely with metacognition and SRL than self-regulation.

SRL is strongly correlated with achievement (Dent & Koenka, 2016). Many studies demonstrate pre-post achievement growth and/or higher rates of achievement when compared to a control group for student who are taught SRL skills (see Bishara, 2016; Dent & Koenka, 2016; Hudesman et al., 2013). Zimmerman and Bandura (1994) found that SRL abilities are more strongly correlated with post-secondary GPA than are scores on college entrance exams. In addition to the academic advantages, when students become responsible for monitoring their own learning, they are more motivated, perceive themselves more positively, and demonstrate greater affect (Paris & Winograd, 1990).

Like metacognition, SRL abilities are teachable (Pui, 2017). Instructional approaches for SRL often capitalize on context-specific strategies as a foundation for promoting SRL (Graham & Harris, 1993). There are several models for fostering SRL (Hudesman et al., 2013); however, one of the most thoroughly-validated and implementable is Graham and Harris's Self-Regulated Strategy Development (SRSD) model (Lienemann & Reid, 2006). The SRSD model consists of six stages of instruction:

1. Develop Prerequisite Skills and Knowledge: The teacher supports the student in mastering skills and acquiring knowledge that the student needs to successfully utilize the target strategy.
2. Discuss the Strategy: The teacher describes the target strategy, including its intended purpose, anticipated benefits, and in what contexts it should be applied.
3. Model the Strategy: The teacher models using the strategy, intentionally "thinking aloud" the cognitive aspects of the strategy. The teacher also vocalizes his or her

"self-instructions" (or the regulatory thoughts surrounding strategy implementation), which could include recognizing the problem, making a plan, initiating the strategy, evaluating effectiveness, preventing mistakes, redirecting, and self-assuring. This stages makes explicit the *why* and *how* of the strategy as a whole and its individual steps.

4. Memorize the Strategy: The student memorizes the steps of the strategy, including a mnemonic, if applicable. Steps can be paraphrased as long as the rewording maintains the original meaning. Memorization allows the student to apply the strategy automatically and fluently, while maintaining their focus on the learning or task goal.
5. Support the Strategy: The student practices using the strategy, including self-instructions. The student and teacher continue to discuss strategy performance; how, when, and why to apply the strategy; and self-regulation practices. Stage 5 is characterized by fading teacher support and increasing student effectiveness and independence.
6. Independent Performance: The student utilizes the strategy and self-regulation skills independently in the appropriate learning environment(s). The teacher encourages and monitors these practices (Graham & Harris, 1993; Lienemann & Reid, 2006).

One of the keys of the SRSD model is that it allows—or rather, expects—that the stages respond to students' individual needs (Graham & Harris, 1993).

> [T]he strategies, self-regulation procedures, preskills, and other skills stressed during instruction are tailored to individual students' capabilities and based on a

> thorough understanding of the learner and the task…[T]he components, characteristics, and processes of instruction can be individualized, reordered, combined, or modified as necessary. (p. 172)

Furthermore, SRSD is intended to be a collaborative process in which students have a voice in instructional practices, goal-setting, and the strategy itself.

Connecting to Special Education

The individualized nature of metacognition and SRL—among other factors—makes these concepts particularly pertinent to special education, which emphasizes *individualized* instruction tailored to capitalize on *individual* strengths and address *unique* needs for students with disabilities. Developing metacognitive and SRL skills places a greater onus on students for their own learning (Paris & Winograd, 1990), which is valuable considering that teachers struggle with limited resources, insufficient training and professional development, and the challenge of balancing individual needs with group needs (Pui, 2017). Additionally, metacognition and SRL foster positive self-concepts, improve affect, and increase motivation—all of which can be struggles for students with disabilities (Paris & Winograd, 1990).

The bulk of literature relating metacognition or SRL to special education focuses on students with learning disabilities (e.g., Bishara, 2016; Graham & Harris, 1993; Lienemann & Reid, 2006; Pui, 2017; Richie, 2005; Walet, 2011), while only one article was found for students with visual impairments (i.e., Garb, 2000). Paris and Winograd (1990) assert that these practices are valuable for all students with disabilities because many of the instructional practices commonly found in general education classes are not suitable for them, which can be frustrating regardless of the particular disability.

Furthermore, they contend that instruction in metacognition connects students with disabilities to their typically-developing peers by "help[ing] students understand that all learning involves over-coming obstacles, confusion, and self-doubt" (p. 10).

Purpose

The present study capitalizes on SSA instruction as a vehicle to foster metacognition and self-regulated learning for the strategy. The SSA will be taught to students with visual impairments, and their application of the strategy will be supported in their classes. It extends the previous SSA research in the following ways.

- Modifications of the strategy: In line with implications from previous SSA research (Scanlon et al., in review), this iteration utilizes a version of the SSA that is simpler in language and procedure than IN CHARGE. The current version is presented in the Procedures section of Chapter 3. In order to maintain more accessible language, a mnemonic is not used. The early steps of IN CHARGE (i.e., inventory my accommodations, note the surroundings, check for needed skills) were removed from the strategy to reduce cognitive load but have been incorporated in pre-teaching. Additionally, the revised SSA makes explicit that the strategy can be initiated at the beginning of a task or at any other point.
- Emphasis on pre-teaching: The current study is more intentional to address foundational knowledge that is essential to successful SSA use. Topics that will be emphasized in pre-teaching include the definition of accommodations, who is eligible to receive accommodations, participating students' allowable accommodations, how context impacts learning and accommodation needs, correlating classroom tasks to effective accommodations, and the importance of

preparedness. Because exposure to information does not ensure that it is learned, students will be required to demonstrate knowledge in key areas of pre-teaching before advancing to the next stage of instruction.

- Change in instruction model: Previously, the SSA was taught using the Strategies Intervention Model (SIM; Deshler & Schumaker, 1998) with elements of the SRSD model (Graham & Harris, 1993) incorporated later in instruction. SIM utilizes an explicit, behavioral approach to instruction while SRSD—which grew out of SIM—is more sensitive to individual learning needs and intentionally fosters self-regulated learning. In the present study, only SRSD will be employed, and it will be used throughout instruction. SRSD meets the implications of previous SSA research indicating that strategy instruction needs to be sensitive to the unique learning styles of each participant while also emphasizing individually-responsive supports such as metacognition and SRL (Scanlon et al., in review).
- Novel population: While the SSA has traditionally been utilized with students with high-incidence disabilities, in this study it will be taught to students with visual impairments. This population is appropriate for SSA research because literature indicates that they may refuse accommodations (Rule et al., 2011), they may not know the most effective accommodations for themselves (Erin et al., 2006), and they may need objective information to support their preference decisions (Lusk, 2012). It is not reasonable to presume that effectiveness for students with other disabilities, such as learning disabilities, generalizes to students with visual impairments. Sensory differences will be accounted for by

individualizing the intervention but will not warrant further adaptation to the strategy itself.

- Different setting: The SSA was designed for and has previously been implemented with students enrolled in inclusive general education classes in public high schools. The reasoning behind this setting is that secondary-level general education teachers are insufficiently prepared and have inadequate time and resources to effectively support the accommodation needs of students with disabilities (Fletcher et al., 1999; Kozik et al. , 2009) and that students with high incidence disabilities may better generalize strategies if they are taught in the settings in which they are to be used (Hallahan & Kauffman, 1977; Sabornie, Evans, & Cullinan, 2006).

  The current iteration of SSA research will be conducted at a specialized school for students with visual impairments. Key differences between inclusive classrooms and schools for the blind impact accommodations use. The first is academic content will likely be modified, meaning that the concepts addressed in each core subject will be reduced in breadth (fewer concepts) and/or in depth (simplified concepts) and that pacing will be slower. Another difference is that the learning environment is designed to be suitable to students with visual impairments. This includes practices such as teachers avoiding writing on a board and resources such as readily-available braille embossers. Finally, classes are more likely to be taught by TVIs (Lewis & Allman, 2017). TVIs are more knowledgeable than general education teachers in appropriate accommodations for students with visual impairments, and they are trained in effective instructional approaches. How these

differences are anticipated to impact the present study is discussed with the research questions.

- Additional data sources: A number of data sources are being introduced in the present study, both to support instruction and to answer research questions. These data sources include the Activities List and Preferred Accommodations Chart, which are all intended to facilitate strategy instruction. The Checklist of Used Accommodations and SSA Use Write-Up have been added to answer research questions. A detailed description of each data source is provided in the Data Sources and Analysis section of Chapter 3.

The following research questions will be addressed in the current study; each is presented with hypothesized outcomes. The association between data sources and research questions is displayed in Table 1 at the end of the Data Sources and Analysis section in Chapter 3.

RQ1: Do students become more knowledgeable about accommodations, both in general and regarding their individual accommodations following strategy instruction and practice? Participating students are anticipated to develop recall and understanding of the definition of accommodations, who is eligible to receive accommodations and why, the accommodations that they are afforded by their respective IEPs and why, and how accommodation effectiveness or appropriateness can change based on context. Previous SSA research indicated that students' progress in this domain influenced strategic practice over time and that those with weak mastery at pretest took longer to acquire strategy proficiency (Scanlon et al., in review). The present study's intentional focus on these concepts during pre-teaching is expected to improve learning.

RQ2: Following instruction and practice, how well do students recall, comprehend, and perform the SSA? Existing SSA case studies demonstrate that all participants learned the SSA in these three ways but to varying degrees (Scanlon et al., in review). Variation in SSA learning is primarily attributable to the disability profiles of each participant. Similar trends are anticipated for the current study. If a participant has only a visual impairment, he or she expected to completely learn the strategy, as demonstrated by accurately recalling strategy procedures, comprehending why and how the strategy should help them, and performing the strategy both in simulation and in classroom practice. Additional disabilities are hypothesized to negatively impact strategy learning to an unknown degree because language impairments can hinder comprehension while emotional-behavioral disorders might reduce motivation to learn or apply the SSA.

RQ3: How do students' accommodation practices change by learning the SSA? Several aspects of accommodation practices will be measured over time: number of accommodation needs, who indicates that the student needs an accommodation (e.g., student, teacher), the ways the student indicates an accommodation need, who provides the accommodation, how well the student uses the accommodation, personal accommodation preferences, and frequency of use of each accommodation the student is afforded. For participating students at a school for the blind, some of these elements are anticipated to be strong before learning the SSA. Students at specialized schools are more likely than their counterparts in inclusive settings to use many accommodations (Johnstone et al., 2009; Kelly, 2009, 2011), and they are reasoned to use them effectively because their classroom teachers have the knowledge to support accommodations use (Lewis & Allman, 2017). Because of the high starting point, it is unlikely that

participants will increase or improve much, if at all, in these areas after learning the SSA. Similarly, preferred accommodations are expected to remain stable over the course of the study. Schools for the blind are thorough and intentional about assessing the individual needs of students, matching accommodations to those needs, and monitoring effectiveness (Dahm, 2002; McMahon, 2014). Conversely, because of the involvement and support of teachers, students are predicted to demonstrate low rates of indicating an accommodation need and even lower rates of active or explicit indications prior to learning the SSA. After learning the strategy, however, both of these domains are expected to increase. Student provision of accommodations is also expected to increase based on an intentional focus on the value of accommodations and the importance of preparedness, both of which can be challenges with adolescents (Rule et al., 2011; Scanlon et al., in review).

RQ4: What within-student factors and environmental factors influence students' recall, comprehension, and performance of the SSA and their accommodations practices? Changes in accommodation knowledge and practices are expected to vary within and across participants (Scanlon et al., in review). The same factors that influenced the variations in previous SSA research are hypothesized to explain changes in the present study. These factors include the students' strengths and weaknesses, learning environment, opinions of accommodations, SSA learning, and perceived SSA benefit.

RQ5: How do students' metacognition and self-regulated learning change following strategy instruction and practice? Metacognition and SRL can improve with instruction (Brinck & Liljenfors, 2013; Callender et al., 2016; Garb, 2000; Paris & Winograd, 1990; Pui, 2017; Tanner, 2012). Based on this trend demonstrated in

literature, elements of pre-teaching and the strategy itself are designed to foster metacognition and SRL. Consequently, both are expected to improve as students learn and practice the SSA. The Procedures section in the following chapter details how metacognition and SRL are embedded in the SSA and strategy instruction.

RQ6: How do students perceive the effectiveness of the SSA? Student value of a strategy influences their quality of learning and willingness to continue implementing the strategy. Existing literature on accommodation practices of students with visual impairments indicates that the student role in this process is not particularly effective. The SSA has been designed and refined with the intention of being a beneficial strategy that students can use to engage in accommodations practices more effectively. Furthermore, students in high school are preparing to transition into employment or higher education, both of which place the onus on students to advocate for accommodations and justify their necessity. For all of these reasons, participating students are anticipated to value the SSA and consider it an effective tool for selecting, utilizing, and advocating for accommodations.

Chapter 3: Methods

This study investigated how learning a modified version of the student self-accommodation strategy (SSA) impacts students with visual impairments' accommodation practices. The learning experiences of four students with visual impairments were compared using comparative case studies (Cresswell, Plano Clark, Gutmann, & Hanson, 2003) within a sequential explanatory design (Hanson, Creswell, Plano Clark, Petska, & Creswell, 2008). Participating students were taught the experimental SSA, and data were collected before, during, and after strategy instruction to document their learning and application of the strategy. Instruction occurred in three phases. Phase 1 focused on foundational knowledge such as understanding what accommodations are and who can receive them, and participants knowing the individual accommodations afforded to them according to his/her Individual Education Program (IEP). Phase 2 considered the contexts in which accommodations are used by facilitating the participants' preparedness for each class and teaching them to anticipate what will be expected of them in each class. Finally, Phase 3 taught the SSA using the self-regulated strategy development model (SRSD; Graham & Harris, 1993) described in Chapter 2.

Participants

The participants included 4 high school students with visual impairments. This number of student participants allowed for a deep, thorough investigation of each student's learning through triangulation of multiple data sources (Yin, 2014). The participants were recruited via criterion sampling (Patton, 2001) to ensure that they met the necessary inclusion criteria:

1. Participants must have a visual impairment—low vision or blindness—for which they receive special education services. The focus of this research is on students

with visual impairments because literature indicates that they tend to be passive recipients of accommodations or refuse to use accommodations. Furthermore, accommodations provided to them by teachers are often not well-implemented in that they are regularly not available when needed and/or they contain errors that impact student learning. Students were not excluded for having additional disabilities.

2. Participants must be enrolled in grades 9—12. There are two reasons for the focus on students in high school. The first is that accommodations are harder for teachers to implement at the secondary level due to large and diverse classes, limited planning/preparation time, and the rigorous expectations on pacing and achievement (Kozik et al., 2009; Scanlon & Baker, 2012). The second reason is to prepare students for the transition to post-secondary education. Many students utilize the same accommodations in high school and college; therefore, explicit instruction in self-advocacy and accommodations during high school promotes confidence and skill in requesting and implementing accommodations at the post-secondary level (Bolt et al., 2011).
3. Participants must participate in STEM and humanities classes. Participants should be enrolled in these core content classes because they provided different contexts for accommodation needs thereby allowing participants to practice and demonstrate self-regulated learning (SRL) across the core academic contexts.
4. Participants must have sufficient technology skills and access in order to complete data sources for this study.

5. Participants must have sufficient English language skills for learning and understanding the SSA, as judged by the referring program director.

Eligible students were identified by the director of the secondary program at specialized school for students with visual impairments, where the students were enrolled. All nominated students consented to participate (see Appendix A). While each participant was of legal age to provide consent her/himself, consent was sought and received from three parents out of consideration; consent from the fourth parent was not deemed necessary by the school but they did not provide a reason for this exception (see Appendix B).

Emily[1]

Emily is a white female, who was eighteen and in the 12th grade at the beginning of the study. She has Bardet-Biedl syndrome, which is an inherited disorder associated with retinal deterioration, obesity, intellectual or learning disabilities, and kidney abnormalities (National Institute of Health, 2018b). Emily's eye conditions, as a result of Bardet-Biedl syndrome, include retinal degeneration, reduced night vision, and hyperopic astigmatism (irregular curvature of the cornea or lens associated with farsightedness). She does not wear glasses, and her uncorrected acuities are 20/200 in the right eye, 20/150 in the left eye, and 20/100 when using the eyes together. Emily also demonstrates significant peripheral field restrictions. Emily's verbal comprehension is in the borderline range, perceptual reasoning is extremely low, and working memory is average.

[1] All names are pseudonyms

Evan

Evan, a white male, was twenty years old when the study began and in the 12th grade[2]. He is diagnosed with Norrie syndrome, an inherited condition that leads to visual impairment in males due to anomalous retinal development and can be associated with cataracts (National Institute of Health [NIH], 2018a). For Evan, Norrie syndrome has resulted in partial retinal detachment and aphakia (removal of the lens) in the right eye and total retinal detachment with the use of a prosthesis in the left eye; he has no light perception. Evan demonstrates average to above average abilities in verbal skills, working memory, and reasoning, with a weakness in quantitative reasoning.

Graham

Graham is a white male, who was nineteen years old in the 12th grade at the onset of the study. He has a visual impairment, autism spectrum disorder, attention-deficit/hyperactivity disorder, generalized anxiety disorder, obsessive compulsive disorder, and major depressive disorder. Graham's eye conditions include persistent hyperplastic primary vitreous (enlargement of the jelly-like substance that fills the eye, which leads to scarring, prevents translucence, and can cause additional eye conditions), associated septo-optic dysplasia (underdevelopment of the optic nerve and pituitary gland with abnormal development of the midline of the brain), associated retinal detachment, and microphthalmia (small eyes). Graham has no light perception, with inconsistent use of prosthetics. His verbal skills are in the low average-average range, working memory is

[2] Because students with disabilities are eligible for services under IDEA until the age of 22 years but grade progression does not extend past the 12th grade, participants are identified as 12th grade students for multiple school years.

average, short-term memory is excellent, and abstract and practical reasoning is low average.

James

James was eighteen years old and in the 12th grade at the beginning of the study. He identifies as a white male. James has diagnoses of retinopathy of prematurity, sensory processing issues, and low muscle tone. His retinopathy of prematurity (irregular growth of blood vessels in the retina due to premature birth) causes bilateral retinal detachment, fibrosis (scarring of connective tissue), and nystagmus (involuntary shaking of the eyes), which have resulted in total blindness. James exhibits high-average verbal abilities, extremely high auditory working memory, and weak quantitative reasoning. Table 1 summarizes the characteristics of each participating student.

Table 1. Summary of Participant Characteristics

Student	Gender	Age	Race	Diagnoses	Vision Status	Eye Conditions
Emily	Female	18	White	Bardet-Biedl syndrome	Low vision	Retinal degeneration Reduced night vision Hyperopic astigmatism
Evan	Male	20	White	Norrie syndrome	Blind	Retinal detachment Aphakia
Graham	Male	19	White	ASD ADHD Anxiety OCD Depression	Blind	PHPV Septo-optic dysplasia Retinal detachment Microphthalmia
James	Male	18	White	Sensory processing issues Hypotonia	Blind	ROP Retinal detachment Fibrosis Nystagmus

The participants received a $15 giftcard for participating in the study. They had the opportunity to increase that amount by completing the daily checklist of used

accommodations and weekly description of strategy usage (electronic surveys). They received an additional dollar ($1) for each of these surveys completed, with an additional $10 possible if all surveys were completed.

Teachers

Select teachers for each participating student also served as participants (Appendix C). Two STEM and two humanities teachers participated, representing one STEM and one humanities teachers for each participating student. Both of the STEM teachers taught math while one of the humanities teachers instructed English and the other taught history. Involving one STEM teacher and one humanities teacher per participating student was important because accommodations needs and use vary by curricular context. All four teachers are licensed TVIs, and three of the four hold additional degrees in areas other than special education. They ranged in teaching experience from 1.5 to 44 years, with a mean of approximately 17 years (see Table 2). Each teacher completed the Teacher Surveys and allowed the researcher to observe the participating students in their classes. Teacher participants received a $50 Visa giftcard (NB: hereafter, "participant" will refer to student participants).

Table 2. Teacher Characteristics

Content Area	Race	Gender	Years of Experience	Additional Degrees
Math	White	F	1.5	MBA
Math	White	M	7	Psychology
History	White	F	15	Museum Studies
English	White	F	44	--

Setting

Intervention and data collection occurred at a specialized school for students with visual impairments in the northeastern United States. Observations occurred in one STEM and one humanities class for each participant. This is the only aspect of the study that occurred during academic instruction, but it did not interfere with class routines or content taught. The participants completed two data sources at home after school hours. The strategy instruction and all other student data collection occurred in an otherwise unoccupied sensory room. These aspects of the study occurred during non-academic classes (e.g., study hall or an elective) as determined by the secondary program director in collaboration with each participant. Data forms were completed by teachers at their convenience.

Data Sources and Analysis

Data sources included both quantitative and qualitative measures. With the exception of teacher-provided data, which are presented at the end of this list, each measure is described in the order in which it was initially collected. An overview of data sources is presented in Table 3, including each source's purpose (i.e., provide demographic information, support instruction, answer a research question), its type (i.e., primary, secondary and isolated, progressive, pre/post), and the method(s) of analysis to be used (secondary data, visual analysis of frequencies, thematic analysis, trends in scores, comparison of pre-/post- responses).

Table 3. Summary of Data Sources

Data Source	Purpose(s)	Type	Analysis Method(s)
Cumulative folder review	Demographic information RQ4	Secondary[3] --- Isolated	lists and means
Observations	RQ2 RQ3 RQ4	Primary --- Progressive	Visual analysis of frequencies Thematic analysis
Accommodation knowledge and skills interviews	RQ1 RQ2 RQ4 RQ5 RQ6	Primary --- Progressive	Trends in scores Thematic analysis
Teacher surveys	RQ3	Primary --- Pre/post	Comparison of pre-/post-responses
Junior Metacognitive Awareness Inventory	RQ5	Primary --- Pre/post	Comparison of pre-/post-responses
Activities list	Support instruction	Secondary --- Isolated	Content analysis
Preferred accommodations list	Support instruction	Secondary --- Isolated	Content analysis
Accommodation checklists	RQ3	Primary --- Progressive	Visual analysis of frequencies
SSA use write-ups	RQ2 RQ3 RQ4 RQ5	Primary --- Progressive	Thematic analysis
Social satisfaction survey	RQ2 RQ4 RQ6	Primary --- Isolated	Thematic analysis
Teacher demographic questionnaire	Demographic information	Secondary --- Isolated	lists and means
Teacher surveys	RQ3	Primary --- Pre/post	Comparison of pre-/post-responses

[3] As secondary data (Plano et al., 2008), demographic information, intervention materials, and surveys will provide data triangulation and complementarity (Onwuegbuzle & Teddlie, 2003), improving findings' credibility and ensuring reporting accuracy (Creswell, 2002; Yin, 2006).

Cumulative Folder Review

In the first week of the study, each participant's cumulative folder was reviewed for pre-determined demographic information: gender, age, race/ethnicity, grade, core-content grades from the semester prior to the study, diagnosed disabilities, IEP reporting categories, date of eye report, eye condition, acuity, field restrictions, and IEP-listed accommodations. A data collection form was created for this purpose (see Appendix D).

This information is used to describe each participant and to explain trends in learning and applying the strategy in line with previous SSA research. IEP accommodations were utilized during instruction in Phases 1-3 and to pre-populate options for individual accommodation checklists.

Observations

Each participant was observed three times each in one STEM and one humanities class during Baseline and four times each during Classroom Application and Ongoing Support. Emily and James were enrolled in the same Algebra I class and were observed simultaneously when both were present. The same was true for James and Graham in US History. Observations allowed for trace evidence of cognitive processes that are themselves unobservable, such as choosing between accommodation options (Lichtinger & Kaplan, 2015; Winnie, 2010). Furthermore, the observations provided an understanding of the core academic contexts in which the participants utilized the SSA.

Observations were recorded on a previously-employed observation protocol focused on the participants' accommodation practices (see Appendix E; Scanlon et al., in review). Information recorded for each participant included each class activity (e.g., practice problems, whole-class discussion); their expected roles (e.g., take notes, attend to

the board, answer questions); and for each apparent accommodation need, the reason (e.g., confusion), how the need was signaled (e.g., raised hand, appeared frustrated), the type of signal (i.e., "active" if there was an intentional cue from the participant or "passive" if it did not appear intentional), whether an accommodation(s) was provided and by whom, and consequences of the accommodation (e.g., resumed working, tried another accommodation). The protocol also included space for field notes. Observations focused on the four participants; the actions and activities of their classmates were only documented as field notes when the observer considered them to potentially impact a participant's accommodations needs and usage.

The frequency of accommodation needs, signal types, accommodation provisions, and accommodation providers over time were graphed and analyzed visually per participant (Horner et al., 2005). Types of tasks, consequences, and field notes were analyzed via open and axial coding (Strauss & Corbin, 1990) simultaneously with the accommodation knowledge and skills interviews and SSA use write-ups data.

Accommodation Knowledge and Skills Interviews

The accommodation knowledge and skills interview was designed to ascertain the participants' knowledge of accommodations and the SSA. It included four components. The first part addressed general understanding of accommodations and asked participants to define accommodations, explain why students receive accommodations, and state which students are eligible for them. The second section focused on each participant's individual accommodations. They were asked to list the accommodations they receive, indicate how often they receive accommodations in STEM and humanities, acknowledge the reason(s) they receive accommodations, and discuss how they feel about receiving

them. In the third component, questions about the SSA asked the four participants to name and explain the steps of the strategy, when and why it should be used, their ability to use and actual usage of the strategy, and aspects of the strategy that they found easy or difficult. Finally, a hypothetical scenario was shared with them to ascertain their ability to perform the SSA. These scenarios described a particular accommodation and a task for which that accommodation could be implemented (e.g., an accommodation of a place marker could be used when copying information out of a textbook). With that information, the participants were asked probing questions about how they would apply individual steps of the strategy.

The interview was conducted with each participant during Baseline, Phase 3 (referred to as Pretest), and Classroom Application and Ongoing Support (four times; referred to as Weeks 1-4). At Baseline, the interview was abbreviated to only address understanding of the concept of accommodations and familiarity with their individual accommodations (Appendix F). The Pretest and Week 4 interviews were identical to provide an opportunity for pre-post comparisons (Appendix G), but Weeks 1—3 varied in the hypothetical scenarios (Appendices H-J). Scenarios reflected relatable situations for students with visual impairments but did not utilize an actual accommodation afforded any participant on his or her IEP. The scenarios were reviewed by a panel of professors of special education, who determined them to be equivalent in complexity to each other. The participants were interviewed individually by the researcher in a quiet setting. The interviews were conducted verbally and audio-recorded, brief notes of the participants' responses and behaviors were also documented.

Two interview items were scored by tally: the number of IEP accommodations named and the number of strategy steps listed. Most of the remaining questions were rated as accurate, adequate, or inaccurate/no response; what constitutes an accurate, adequate, or inaccurate response was pre-determined and varied by question. More personal items (e.g., How do you feel about receiving accommodations? What is easy/hard about the SSA?) were not scored. All of the interview responses, scored and unscored, for each participant were analyzed for themes using open and axial coding in conjunction with observation notes and SSA use write-ups.

Junior Metacognitive Awareness Inventory

During Baseline and Week 4, the participants completed the *Junior Metacognitive Awareness Inventory*, a validated self-assessment of metacognitive and self-regulated learning skills (Appendix K; Sperling, Howard, Miller, & Murphy, 2002). The inventory utilizes a Likert-like scale with 18 self-report items describing declarative knowledge, procedural knowledge, conditional knowledge, and self-regulation. The *Junior Metacognitive Awareness Inventory* was completed verbally by each participant, their answers documented on a questionnaire form by the researcher. Changes in responses from Baseline to Week 4 were analyzed to describe changes in metacognition and SRL from before to after strategy instruction.

Activities List

During Phase 2, each participant compiled a list of the activities in which they typically engage in each core-content class (e.g., complete practice problems, take notes during lecture) to begin the process of aligning accommodations with task-specific expectations. For each activity, they discussed the following questions with the

researcher, "What should I do? How should I think? And, what is the product?" Additionally, the participants were guided to identify the tasks from the activities list that were *most* common for each class. For each of these major activities, they considered and noted their role, strengths, and skills to improve. Evan, Graham, and James wrote their lists on their braille notetakers while Emily typed hers on her laptop. All four e-mailed their lists to the researcher. Information from this list was used during strategy instruction in Phase 3 to describe and practice application of the SSA with the actual classroom tasks each participant encountered regularly. To the extent it relates to findings from the observations, interviews, or write-ups, it is also presented in conjunction with those findings.

Preferred Accommodations List

In the first week of Phase 3, the participants identified their preferred accommodations for each core-content class and how to obtain each accommodation. This information was collected to determine if changes in preferred accommodations occurred after learning and using the strategy. These accommodations and means of obtaining them were documented by the researcher. The lists were not formally analyzed, but they are reported with the findings from observations, interviews, and write-ups when relevant.

Accommodation Checklists

Each weekday throughout the Classroom Application and Ongoing Support stage, the participants electronically shared a list of the accommodations that they used that day with the researcher. An individualized list of accommodation options was pre-populated in an electronic form based on each one's IEP (Appendix L) so that they could check-off

the ones they used; an "Other" option was also available with a small text field to write in any accommodation used not already on the list. Additionally, the participants could check a box indicating that they did not attend school that day. A data collection platform that is accessible with speech output, screen magnification, and color contrast options was utilized to design the form and collect responses. Each participant's form was previewed with them at the end of Phase 3. They received an e-mail with the link to their form at designated times. Evan and Graham requested an e-mail at the beginning of each week, while Emily and James requested an e-mail each school day. Frequency data was collected from the accommodation checklists, both how many accommodations were used each day and how often each accommodation was used.

Submission of the accommodation checklists was not mandatory. Out of 39 school days included in Classroom Application and Ongoing Support, Emily submitted 28% of her checklists, Evan submitted 67%, Graham submitted 5%, and James submitted 100%.

SSA Use Write-Ups

The participants were asked to write briefly about one instance of classroom SSA use each week. This prompt and a text field were included in the electronic accommodation checklist form (see Appendix M) each Thursday. They were expected to include the class, the activity, what prompted them to apply the strategy, a description of their thoughts and actions as they applied each step, and the outcome of using the SSA. This structure was modeled for the participants during Phase 3. They were also asked to comment on the benefit or challenge of using the strategy in that instance. This exercise was intended to remind the participants to use the SSA in their classes, document strategy

performance, and identify benefits and/or challenges to using the strategy. These write-ups were analyzed for themes along with observation notes and interview responses for each participant.

Like the accommodation checklists, the write-ups were not mandatory. The participants had the opportunity to complete eight write-ups. Emily submitted two of the write-ups possible, Evan and Graham did not submit any, and James submitted all eight.

Social Validity Survey

All of the participants completed a social validity survey (Appendix N) verbally after finishing their Week 4 interviews. The survey used seven Likert scale-type items to ascertain the extent to which the SSA might benefit other students in special education, how beneficial they found it for themselves, and a self-assessment of how well they learned and used the strategy. Survey responses were reviewed for themes in addition to points that support or contradict observation, interview, and write-up findings and shared in conjunction to related findings.

Teacher Demographic Questionnaire

Each participating STEM and humanities teacher completed a demographic questionnaire (see Appendix O). Requested information included gender, age, race/ethnicity, degrees held, teacher licensure, years of teaching experience, prior experience working with individuals with visual impairments, and current course load. This information is used to describe the teachers involved in the study and the contexts in which the participants were observed.

Teacher Surveys

The one STEM and one humanities teacher per participant were asked to complete a pen-and-paper survey (see Appendix P), at Baseline and again during Week 4. The surveys addressed the participant's accommodation practices in the responding teacher's classes. Survey items were Likert scale-type, to address the extent to which each participant learns, achieves, and participates as well as how they handle challenges encountered in the class. Teacher participation allowed for triangulation of participant-reported data and observed trace evidence of SSA use (Creswell & Plano Clark, 2007). The teacher survey responses were not formally analyzed but are reported to illustrate and comment on the findings from observations, interviews, and write-ups to which they relate.

Methodology

This study utilized a comparative case study approach (Creswell et al., 2003) situated within a sequential explanatory design (Hanson et al., 2008). A sequential explanatory design allows for quantitative and qualitative data to be collected in concert throughout the study, but analysis of the data occurs sequentially. Quantitative data was analyzed first to determine changes in accommodations knowledge and practices, in strategy learning and performance, and in metacognition and SRL. Then qualitative data was analyzed to explain why those changes did or did not occur. Each participant was considered as an individual case because strategy instruction, learning, and application were expected to occur on unique trajectories, influenced by their individual disability and learning characteristics (Scanlon et al., in review). The individual cases were constructed by integrating findings from the analyses of quantitative and qualitative data

(Hanson et al., 2008). In line with comparative case study procedures (Creswell et al., 2003), the individual cases were then looked across for trends in accommodations practices, strategy learning and application, and implications.

Procedures

The study took place over 13 weeks. Following baseline, strategy instruction itself occurred in three phases, which was followed by eight weeks of classroom application with on-going support. Data collection began with the Baseline and concluded with "posttest" and social satisfaction measures at the end of Classroom Application and Ongoing Support. An overview of the procedures is presented in Table 4.

Table 4. Summary of Study Procedures

Stage	Weeks	Phase	Data
Baseline	1-3		Cum folder review Observations (x3) Interview Teacher surveys *JrMAI*
Strategy Instruction	4-5	Phase 1	
		Phase 2	Activities list
		Phase 3	Preferred accommodation list Interview
Classroom Application and Ongoing Support	6-13		Accommodation checklists (daily) SAP use write-up
		Week 1	Observations Interview Accommodation checklists (daily) SAP use write-up
			Accommodation checklists (daily) SAP use write-up
		Week 2	Observations Interview Accommodation checklists (daily) SAP use write-up
			Accommodation checklists (daily) SAP use write-up
		Week 3	Observations Interview Accommodation checklists (daily) SAP use write-up
			Accommodation checklists (daily) SAP use write-up
		Week 4	Observations Interviews Teacher surveys Social validity survey Accommodation checklists (daily) SAP use write-up *JrMAI*

Baseline

Prior to beginning strategy instruction, the researcher reviewed each participant's cumulative file for predetermined information, observed each participant three times in one STEM and one humanities class, and administered the abbreviated version of the

accommodations knowledge and skills interview and the *Junior Metacognitive Awareness Inventory*. Although the observations were intended to be completed in one week, inclement weather forced them to be conducted over three weeks. Teachers from those STEM and humanities classes were asked to complete surveys on each participant's accommodation practices.

Strategy Instruction

Phase 1: Foundational Knowledge. Phase 1 began within 7 days of Baseline. Strategy instruction began with Phase 1; it took each particpant two class periods to complete. In meetings with the researcher, the participants learned about accommodations: what they are, who is eligible to receive them, and why students receive them. In addition to this general knowledge of accommodations, they learned about the respective accommodations they are permitted according to their IEPs. They were guided to consider the purpose of each of her/his accommodations and how/if it could be implemented in each core-content class. Active learning and student agency were also discussed.

In order to advance to Phase 2, each participant had to define accommodations and describe the purpose of at least two of their accommodations, including how they should be implemented in each core-content class. Responses were expected to be accurate based on predetermined definitions they were taught during Phase 1 instruction. All of the participants accurately provided this information without the need for prompting or review.

Phase 1 served two purposes: it laid the groundwork to ensure that the participants were willing and able to use the SSA, which aligned with the first stage in the SRSD

model (Graham & Harris, 1993). Discussing the purpose of accommodations, generally and specific to each participant, encouraged them to recognize the benefits of educational accommodations and the value of using them appropriately. These elements were essential for the participants to "buy-in" to learning and applying a strategy focused on accommodations (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991). Additionally, the SSA could only be effective if the participants knew their accommodations and how to use them in different educational contexts. Because accommodations are a teacher-driven practice, students often lack this knowledge; it had to be made explicit.

Phase 2: Considering Context. Phase 2 occurred over three class periods for Evan and Graham, four for Emily, and five for James. The number of periods corresponded to how long it took for each participant to complete their activities lists. The first topic was preparation for class. The participants discussed reasons to get to class before the bell rings (e.g., I will be ready to start on time, I can "read the room," I can check that I have everything I need, I can touch base with the teacher, I can visit with my friends). They also listed the materials that they need to take to each class and explained their systems for remembering to bring the necessary materials. Next, the participants learned to "read the room" to anticipate accommodation needs. They were encouraged to ask themselves, when they arrive to a class, "How can I know what we are doing today, and how will I access that information?" Then, the participants engaged in an exercise related to class activities. First, for each core-content class, they listed the activities typically encountered (e.g., lecture, lab, group project, independent work) and discussed the following for each activity: What should I do (e.g., take-notes, discuss, write, read, calculate)? How should I think (e.g., problem-solve, draw on prior learning, critically

consider)? What is the product (e.g., notes, essay, completed worksheet)? Second, they identified the most common activities for each core-content class and documented their role(s) (responses to the "what should I do?" question), their strengths, and skills to improve for each.

In order to advance to Phase 3, the participants had to independently describe and give an example of how to read the room, explain deviations to classroom routines that impact arrival/preparation, and note one activity for each class, including their role, the expected thought process, the product, their strengths, and areas of improvement. All four participants were able to provide the requested information without the need for prompting or further instruction.

As with Phase 1, Phase 2 corresponded to Developing Prerequisite Skills and Knowledge in Graham and Harris's (1993) SRSD model. It was based on the fact that accommodations use does not happen in a vacuum. The participants were taught to be prepared to use their accommodations by bringing the tangible accommodations to class and by previewing class activities to anticipate accommodation needs. Phase 2 explicitly discussed that preparation for and activities in each class will differ. Additionally, Phase 2 fostered metacognition and self-regulated learning. When the participants asked themselves, "How can I know what we are doing today, and how will I access that information?" and "How should I think during this activity?," they were engaging in metacognition. Similarly, having them consider their roles, strengths, and areas of improvement during the intervention, including how to act on those, encouraged them to be mindful of these points in the classroom, which is part of self-regulated learning.

Phase 3: The Strategy. Phase 3 took place over three class periods for James and Emily, four for Graham, and five for Evan. Instruction in Phase 3 continued the SRSD model (Graham & Harris, 1993). During the early Phase 3 sessions, the participants discussed their preferred accommodations for each core-content class and how to obtain those accommodations, which was documented by the researcher. Then, they were introduced to and began to learn the strategy. The participants did not like the name Student Self-Accommodation Strategy nor SSA, so when Evan suggested that they call it the Student Accommodation Protocol—or SAP—the other participants agreed. Changes such as this are not only allowed, but encouraged by SRSD (Graham & Harris, 1993). Because this decision was made upon introduction of the strategy, all strategy learning took place under the new name. Consequently, the strategy will be referred to as the SAP for the duration of this dissertation. The SAP, presented graphically in Figure 1, has five steps: 1) Ask myself, "Do I need an accommodation?" (the participants were taught that the answer might be "no"). 2) Tell myself what I need and why (they were instructed in this step to think of two accommodation options to meet the need, select one, and think intentionally about why it is the better choice, or if only one accommodation is appropriate, students should explain to themselves why it is the appropriate choice). 3) State how I will get the help I need. 4) Get what I need. 5) Ask myself, "Am I doing this right? Is this working?" (the participants were instructed to consider their role and/or product for the activity in determining the answer; if they answered "no," they should try to course correct on their own or ask for help). The strategy was introduced to the participants with a split first step: 1a initiated the strategy at the beginning of an activity and 1b initiated it in the middle of an activity. Similarly to the title change, in line with

the SRSD model, the participants agreed that a split first step was too cumbersome for recall and that they already knew that an accommodation could be implemented at any point in an activity. They opted to condense the split first step into one step and learned the strategy this way. In addition to describing the SAP itself, the researcher and participants discussed the purpose and benefits of the strategy as well as when or where to use it (SRSD stage 2). Furthermore, the researcher modeled using the SAP by thinking aloud (SRSD stage 3).

During later sessions, the participants memorized the SAP steps, in line with stage 4 of SRSD, through repeated rehearsal with the researcher and independent practice from an electronic version of the SAP that was e-mailed to them. The participants also practiced strategy application (stage 5); the researcher presented each participant with scenarios based on their activities lists and preferred accommodations. As recommended by Graham and Harris, strategy application was initially heavily guided by the researcher, but this support faded over time. The knowledge and skills from Phases 1 and 2 were revisited over the course of Phase 3 by way of occasional review questions (e.g., What is the definition of accommodations?, What does it mean to read the room?). Phase 3 concluded with administering the accommodations knowledge and skills interview and previewing each participant's form for the accommodation checklist and SAP write-up.

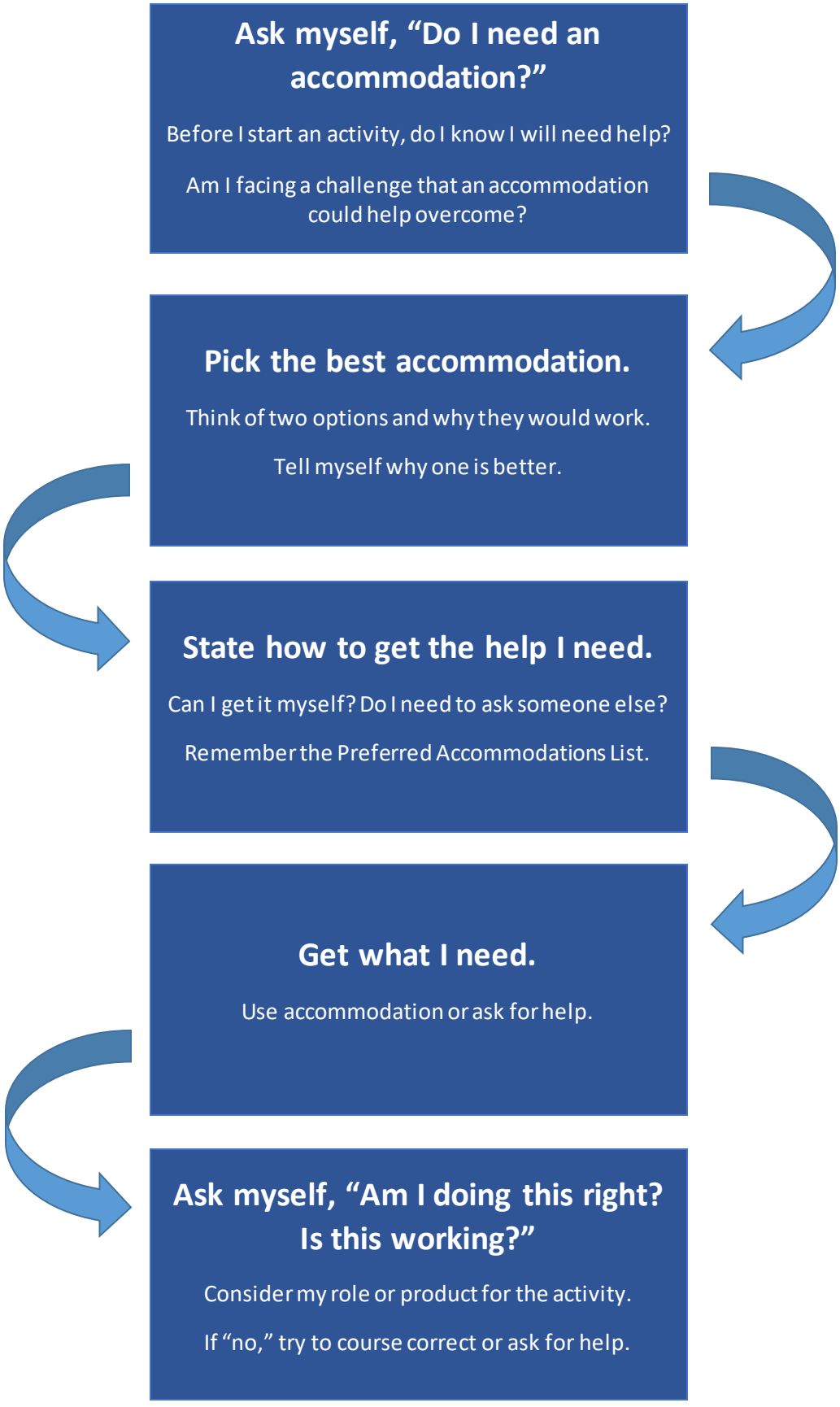
Phase 3 not only directly taught the SAP, it also reinforced and encouraged reflection on previous learning. The exercise focusing on preferred accommodations and how to acquire them continued to shift accommodations from a teacher-driven to a student-driven practice. Accommodations are selected in IEP meetings often without input from the student, and students are often not well-informed about them. Lists of

individual accommodations on an IEP may contain many more accommodations than the student will actually use. This was the case for all of the participants, so narrowing the list to preferred accommodations helps them build effectiveness with key ones. Additionally, the participants assumed a more active role in acquiring accommodations rather than being passive recipients. Phase 3 continued to incorporate elements of metacognition (e.g., step 3—state how to get the help I need) and self-regulation (e.g., in step 5—consider my role and/or the intended product).

Classroom Application and Ongoing Support

Classroom application was the final stage of the intervention, which corresponded to the final step in SRSD of Independent Performance. After Phase 3, the participants set a goal of using the SAP twice in each core-content class every day. They were asked to submit a checklist of the accommodations used each school day throughout this stage of the study. Once a week, along with submitting their accommodations checklist, they were asked to briefly write about one experience of using the SAP during that week. The participants were instructed to state the class and context, their thought process in completing the SAP (which mirrored the way that the strategy was practiced in Phase 3), and benefits and/or challenges of using the SAP in that situation. Every two weeks over eight weeks (i.e., Weeks 1-4), the researcher observed the participants in one STEM and one humanities class each. Also, the participants and researcher met individually to complete a variation of the accommodations knowledge and skills interview and then to review and practice the SAP. After finishing the interview at Week 4, they completed the *Junior Metacognitive Awareness Inventory* again and the social validity survey. Also, the teachers repeated the survey on each participant's accommodation practices.

Figure 1. The Student Accommodation Protocol



Chapter 4: Findings

Findings are presented in cases for each participant. Each case documents a participant's accommodation and strategy practices as they relate to the purpose of the SAP. The organization within each case corresponds to the topics of the six research questions presented in Chapter 2: accommodations knowledge, strategy learning and performance, accommodation practices, influencing factors, metacognition and self-regulated learning, and strategy effectiveness. A cross-case analysis follows the individual cases.

Emily

Accommodations Knowledge

Emily's responses to interview items addressing accommodations knowledge indicate that she improved in some areas but not in all areas. Specifically, Emily never improved her understanding of the definition of accommodations. She always received a score of *inaccurate*, her definitions were all similar to her response on the Week 2 interview: "something someone with a disability gets." In contrast, Emily did develop a better understanding of the purpose of accommodations. At Baseline and Pretest, she acknowledged that accommodations support learning (*adequate*), and beginning in Week 1, she made connections between accommodations and disability-based needs (*accurate*). Emily knew, even during the Baseline interview, that individuals with disabilities were eligible to receive accommodations. Additionally, Emily increased her recall of her IEP accommodations. She could only name two accommodations at Baseline out of the thirty-four on her IEP, but she was able to list eleven on the Week 4 interview.

Strategy Learning and Performance

Strategy recall. Emily's ability to recall the SAP steps was highly discrepant. On the Pretest interview, shortly after memorizing the strategy, she was able to name all of the steps. However, during Weeks 1-3, she could not name any of the steps, nor would she attempt to do so. Her responses were something to the effect of "I honestly have no idea" (Week 3). At the end of the Week 3 interview, Emily admitted to having closed the e-mail account to which the strategy had been e-mailed for her to practice, and she asked that the steps be sent to her new e-mail so that she could review them. This was beneficial because Emily named 4 of the 5 steps on the Week 4 interview. This indicates that Emily needs review of the strategy to maintain recall. On the social satisfaction survey, Emily expressed that the SAP was *not easy but not hard* to learn and that she learned it *fairly well.*

Comprehension. On a general level, Emily understood that the SAP would help her advance educationally. More specifically, she focused on the strategy to support troubleshooting rather than initial selection and use of accommodations. When asked, "What does it mean to be strategic in using your accommodations?," Emily's answer at Week 4 echoed her previous responses: "Going outside the lines, if one [accommodation] does not work, try another." She never made reference to being strategic in selecting or using accommodations.

Performance. Emily's ability to perform the SAP varied across the steps of the strategy and across interviews. When given an open prompt to apply the SAP to a hypothetical scenario, "what would you do in this situation?",, she did not attempt a response at Pretest, Week 3, or Week 4, stating each time "I have no idea". On the Week

1 and 2 interviews, her answers were *adequate* but not *accurate* because she focused on troubleshooting if the hypothetical accommodation did not work rather than on the process of selecting an accommodation for the hypothetical task. For example, at Week 2, Emily was told that one of her accommodations is to use a camera to take pictures of board work that can be magnified or transcribed later. Her response to applying the SAP was

> we will try to take the pictures on your camera if you can, but if I cannot then ask someone else to take one like on their phone and then have them send it to you. Then you can blow it up on your device.

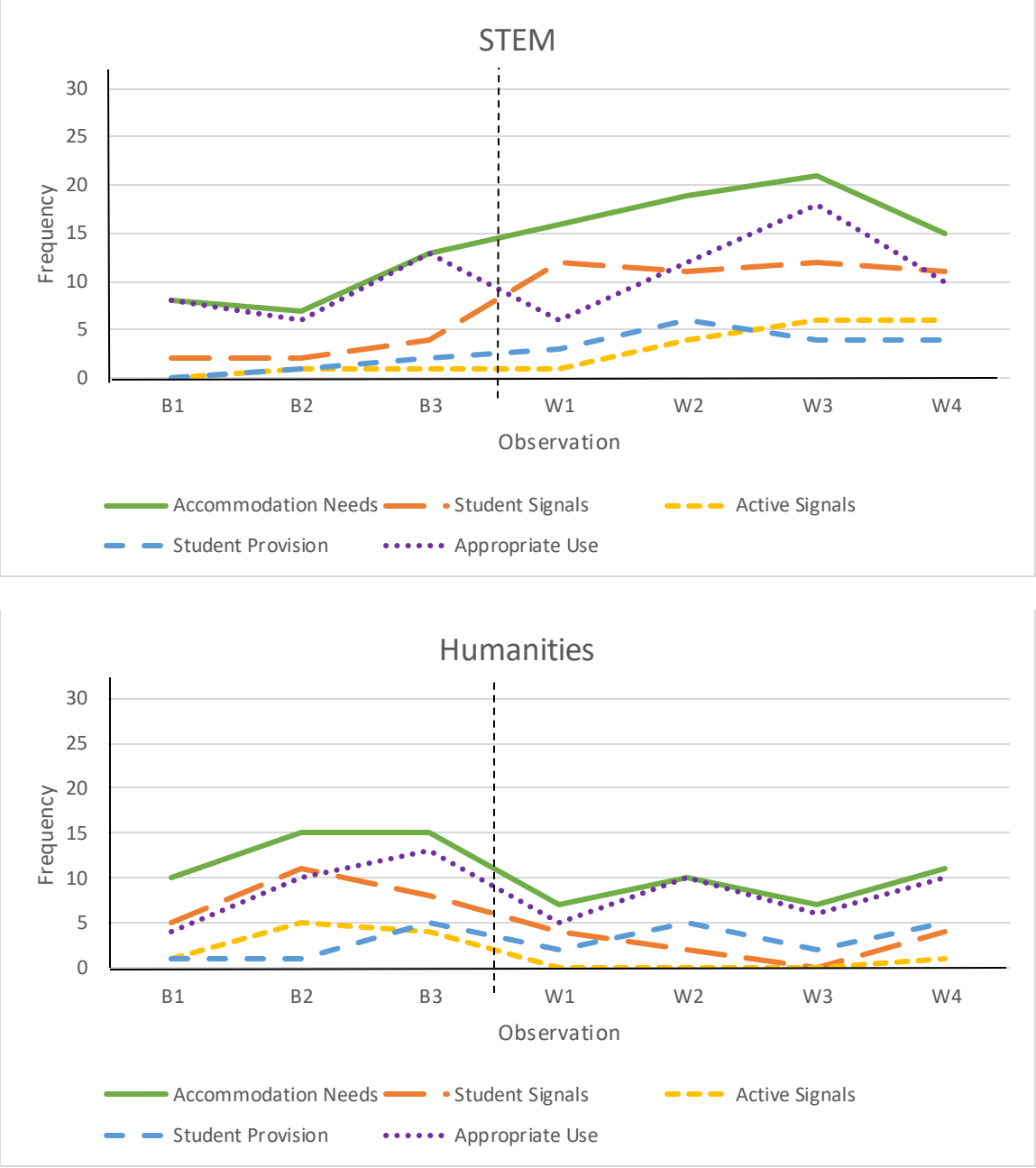
In this example, Emily did not consider if an accommodation was needed for the task (step 1) nor did she think of accommodation options to select the most appropriate one (step 2) before implementing an accommodation.

Emily's performance in determining if an accommodation was needed (step 1) for a given activity also varied. She gave two *accurate* answers that explicitly linked the need for the accommodation to its stated purpose (Pretest, Week 4). Most of her responses, however, were *adequate* due to making non-specific references to context dependence and/or inquiring of others when information had been provided so that she could make the decision herself (Pretest, Week 1(x2), Weeks 2-3). Emily also provided three *inaccurate* answers that did not take into account the purpose of the accommodation (Weeks 2-4). When asked to think of multiple accommodation options (step 2), Emily struggled to come up with more than one idea. Emily did excell in troubleshooting (step 5). On each interview, one of the items asked the participant what he or she would do if they forgot the accommodation that they needed. Emily's responses were consistently

accurate. For example, at Pretest, if Emily forgot the headphones she needed to listen to descriptive audio for a film, her suggested solution was to "maybe watch the video another time and not do it in class, and if [I] have other homework for different classes, [I] could do it then." In contrast, Emily demonstrated poor performance with evaluating the effectiveness of a chosen accommodation (step 5). Her responses to these items were always rated *inaccurate* for insisting on asking her teacher rather than making the determination herself. Field notes during strategy instruction also indicated that this was a challenge for Emily. She tended to be unsure of how to tell if an accommodation was working and would often say something to the effect of "I usually do well with this, so it works." Emily self-reported that she could perform the strategy *fairly well* on all interviews except Week 2, when she asserted that she could perform it *extremely well*.

Trace evidence from observations and the SAP write-ups indicate that Emily attempted to apply the strategy, to some extent, in her classes. Figure 2 presents observation data that indicate trace evidence of strategy application in Emily's STEM and humanities classes: the number of accommodation needs, the number of times that Emily signaled an accommodation need, the number of active student signals, the number of accommodations that Emily provided, and the number of accommodations that she used appropriately.

Figure 2. Trace evidence of classroom application, Emily



Emily demonstrated an increase in student signals from Baseline to Classroom Application and Ongoing Support in STEM but a decrease in humanities. In STEM, active signaling relative to student signals took an initial drop after strategy instruction but climbed steadily through Weeks 3 and 4, which both had higher rates of active

signaling than Emily demonstrated in Baseline. When she signaled in humanities, however, the proportion of active signals decreased after strategy instruction, with no active signals evident in Weeks 1 through 3. These trends indicate that when Emily signaled, she was becoming more proactive in seeking accommodations in STEM but less proactive in humanities. Emily never provided many of her own accommodations in STEM, but her rates of provision during Classroom Application and Ongoing Support were higher than the rates observed during Baseline. Not only did Emily become more proactive in requesting accommodations in STEM, she also demonstrated an increased ability to provide her own accommodations. Although her provision was variable in humanities, her rate relative to the number of accommodation needs was within the range of Baseline for Weeks 1 and 3 and notably higher in Weeks 2 and 4. In Week 4, Emily provided more than half of her accommodations in humanities. Thus, while she did not become more explicit in requesting accommodations, Emily did take more responsibility for providing her own accommodations after learning the SAP.

With the exception of Week 1, Emily used at least 80% of her STEM accommodations appropriately; however, her rate of appropriate use relative to her number of accommodation needs was lower at all points after strategy instruction than before. Conversely, she experienced an increase in appropriate use in humanities during Classroom Application and Ongoing Support, with Weeks 2 and 3 showing 100% appropriate use. Overall, Emily used her accommodations well, but instances of inappropriate use were associated with emotional and behavioral dysregulation.

Emily's self-reports of strategy application corroborate observed trace evidence that she was using the SAP to some extent in her classes. She reported on the social

satisfaction survey that she used the SAP in her classes *most of the time*. On two of the interviews (Weeks 2 and 4), Emily described using the strategy in her physics class. When she was prompted to or realized that she needed to take notes, she used her laptop to do so, and she was able to justify why taking notes on her laptop was a valuable practice. Similarly, Emily submitted three SAP use write-ups, and while none of them documented full explanations of the strategy steps, they did demonstrate advocacy, preparedness, and independent use of accommodations. The write-ups also recounted a greater variety of accommodations used than the interviews, including her iPhone, the calculator on her iPhone, breaks, and the laptop.

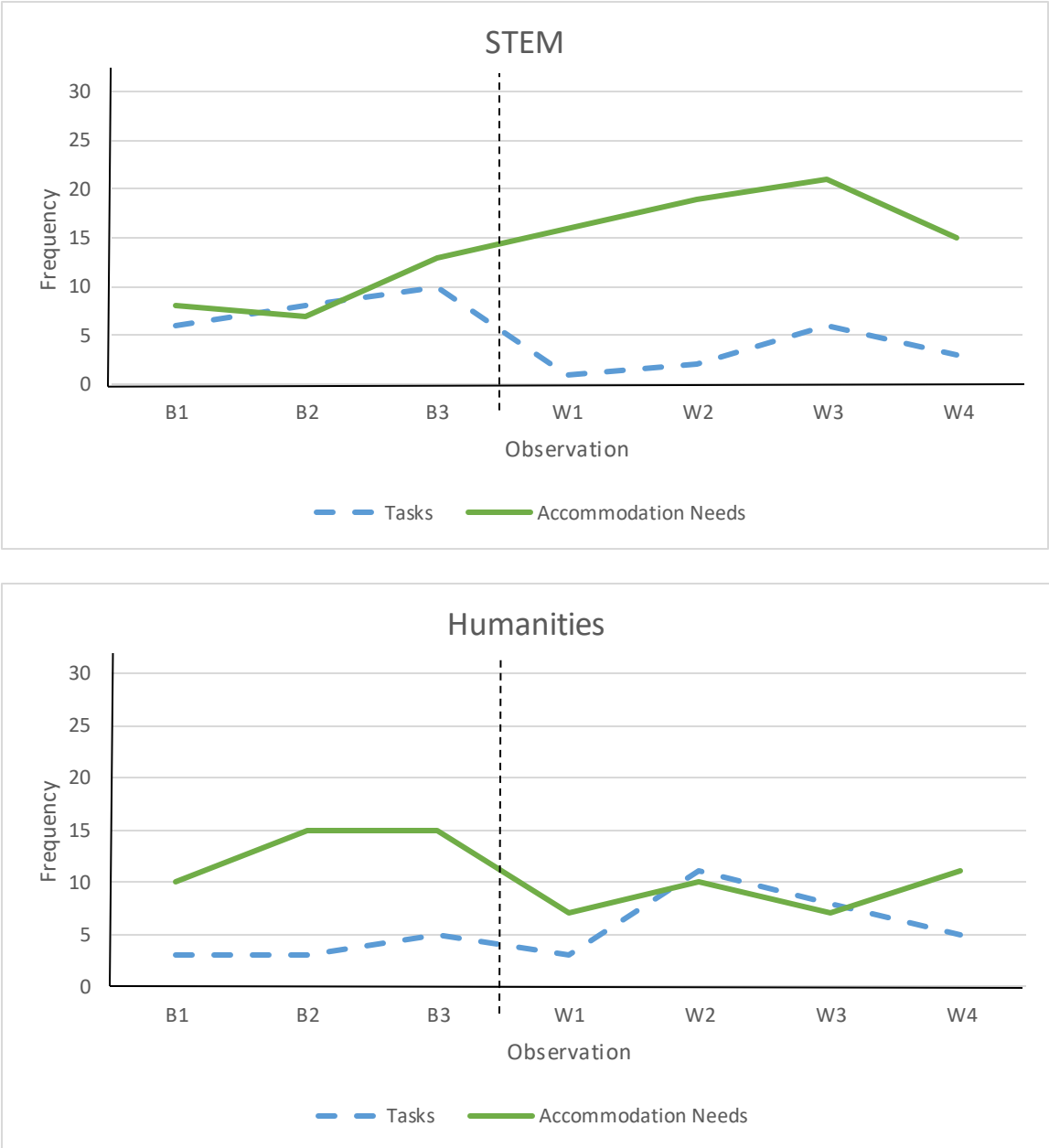
Accommodation Practices

Data on accommodation practices reveal that Emily experienced some changes in the rate and type of accommodations that she needed in addition to increasing her advocacy for those accommodations. Furthermore, her teachers reported slight improvements in accommodation use, engagement, and learning after strategy instruction.

Rate of need. Emily demonstrated variable changes in the average number of accommodation needs per task after strategy instruction based on observations. Across the three Baseline observations, she used an average of 1.17 accommodations per task in STEM. There was a large increase in the number of accommodations she needed per task immediately after strategy instruction, with a steady decline in Weeks 2 through 4. On average, Emily needed 5.92 accommodations per task during Classroom Application and Ongoing Support STEM observations. In contrast, Emily's rate of accommodations per task decreased in humanities. Before strategy instruction, she used approximately 3.64

accommodations per task, but after she needed an average of 1.30 accommodations for each task. Figure 3 shows the number of tasks and number of accommodation needs that Emily experienced during each observation in STEM and humanities.

Figure 3. Tasks and accommodation needs, Emily



Type of accommodations. During observations, Emily demonstrated some noticeable changes in the types of accommodations she used before and after strategy

instruction. Accommodations for content support and anxiety were used more often in Classroom Application and Ongoing Support than in Baseline, while language support and sensory accommodations were used less often. Other categories of accommodations were observed with consistency. The accommodations that Emily used most often differed before and after strategy instruction as well. Access accommodations (e.g., large print, electronic materials) were most prevalent during Baseline observations, but content support was the most often used accommodation category in Classroom Application and Ongoing Support. In addition to shifts in the types of accommodations that she used, Emily was observed to replace more passive accommodations with more active ones after strategy instruction. For example, during Baseline, Emily would typically listen as her humanities teacher read aloud from a novel, but during Classroom Application and Ongoing Support, Emily would read along with a digital version of the novel while her teacher read aloud. According to the humanities teacher, Emily took the initiative to download and read from the digital book.

Emily's accommodation checklists and her preferred accommodations lists echo the observed accommodations with one noticeable exception: clarifying directions. This was the most common accommodation that Emily reported using on her accommodation checklists, and she expressed it as a preferred accommodation for Algebra I and physics. However, it was only observed once. One possible explanation for this discrepancy is that Emily may have operationalized clarifying directions to include support on individual problems in STEM classes. For example, if her Algebra I teacher supported her in the steps of solving a particular problem, Emily might have considered that to be clarifying

directions; whereas, that exchange would have been documented as content support by the observer.

Advocacy. As mentioned previously, Emily did not use the SAP in full in her classes, but one outcome of learning the strategy was that Emily more often advocated for her accommodation needs. Not only was this documented through self-reports, it was also observed. One notable instance of advocacy occurred during a humanities observation when the teacher asked Emily about her preferred font size for printing a document. Emily asked instead that the teacher e-mail the document to her so that she could adjust the size herself and word process within the document. While advocacy improved for Emily after strategy instruction, this illustration also demonstrated that she was not applying the strategy comprehensively. Once the teacher e-mailed the document, Emily remembered that she had been having trouble opening e-mail attachments on her laptop. Thus, she did not select an appropriate accommodation for that situation.

Engagement. Teacher surveys provided additional information about Emily's accommodation practices in STEM and humanities in addition to engagement and learning. Emily's humanities teacher reported that she improved slightly in seeking assistance when faced with a challenge and attempting to meet the challenge herself, but this was never a strength for her. On both items, the teacher expressed that she *seldom* did these at Baseline and improved slightly to doing them *a little bit less than peers* by Classroom Application and Ongoing Support. Emily's STEM teacher reported no change in these domains, asserting that she sought assistance from others *a little bit more than peers,* but she attempted to meet challenges herself *a little bit less than peers.* Both teachers reported that Emily's learning was *a little below average* on the pre- and post-

surveys. They also agreed that Emily made small improvements in achievement (*a little below average* to *about average*) and participation (*a little bit less than peers* to *about the same as peers*) after strategy instruction. In general, classroom engagement and learning did not come easily to Emily, but her teachers recognized slight improvements after learning and attempting to apply the SAP in their classes.

Influencing Factors

Several factors, including within-student and environmental factors, impacted Emily's ability to learn and use the SAP. Some factors seemed to facilitate strategy use while others seemed to hinder it.

Within-student factors. According to a review of Emily's cumulative folder, her verbal comprehension abilities are in the borderline range, reasoning is extremely low, and working memory is average. Lower verbal and reasoning skills may explain why some components of the SAP challenged Emily, such as conceiving multiple options and evaluating the effectiveness of a selected accommodation. Additionally, average working memory skills align with Emily's ability to memorize the strategy during instruction but to quickly forget it without consistent review. For the semester prior to the study, Emily earned a C+ in English and a B in Algebra I, which were the classes in which she was observed. These grades indicate that she was advancing and achieving in these content areas, but engagement and learning had room to improve with strategy use.

In addition to cognitive skills and class performance, Emily's strategy learning and performance and her accommodations practices were affected by emotional-behavioral dysregulation and unrealistic perceptions of her experiences, both of which relate to her Bardet-Beidl syndrome according to her humanities teacher. The humanities

and STEM teachers agreed that Emily demonstrates anxiety and emotional variability within and across days that made her classroom performance fluctuate. This assertion was supported by observation data. On "good days," Emily was punctual, focused, engaged, and compliant, and these days corresponded to advocacy, independent provision of accommodations, and appropriate use of accommodations during observations. However, on "bad days," Emily arrived late to class and/or excused herself from class to speak with a counselor. Additionally, her accommodation needs were more likely to be signaled in a passive way (e.g., putting her head down on her desk instead of asking for help on a math problem), they were less likely to be self-provided, and she was less likely to use accommodations appropriately. In general, "good days" corresponded to strategy use while "bad days" did not. Furthermore, Emily's humanities teacher and a member of the dormitory staff reported that Emily tends to exhibit unrealistic expectations, perceptions, and self-assessments. This tendency may have hindered Emily's ability to monitor strategy performance, resulting in incomplete use of the strategy. It also may have directly affected her ability to perform SAP step 5, which involved evaluating the effectiveness of a selected accommodation.

Finally, on the interviews and SAP use write-ups, Emily exhibited an over-reliance on others to provide information and supplies. For example, on the Week 4 interview, one item asked Emily how she would decide if she should use the given accommodation in the future, and she responded, "I would pull the teacher aside and ask [him/her] if I will need [the accommodation] for future assignments or not." This dependence on others likely contributes to Emily attending to some aspects of the SAP more than others.

Environmental factors. In STEM, Emily experienced several accommodation needs for which accommodations were not provided. Based on teacher comments during the observation, he intentionally did not provide some accommodations in an attempt to force Emily to take more responsibility for providing her own accommodations. Others were temporarily not provided in instances when Emily signaled for an accommodation while the teacher was working with another student. Typically, under this circumstance, Emily would wait to re-signal when the teacher finished with the other student rather than provide her own accommodation. While neither of these situations prompted Emily to utilize the SAP in full, they did foster some advocacy and responsibility regarding accommodations use.

Metacognition and Self-Regulated Learning

In general, Emily did not exhibit changes to metacognition or self-regulated learning (SRL) after strategy instruction; however, data did reveal metacognitive knowledge and reinforce Emily's challenge with evaluation. Emily's pre-/post- responses to the *Junior Metacognitive Awareness Inventory* (Sperling et al., 2002) varied such that there was no obvious pattern of change; her scores are presented in Table 5. Procedural knowledge, planning, and monitoring showed variable changes, meaning that one item in those domains increased while the other decreased or one item received a consistent score while the other increased or decreased. Emily reported slight to moderate decreases in declarative knowledge and information management. Scores for conditional knowledge improved somewhat, and scores for evaluation remained consistent. Ratings on the teacher surveys support that Emily's metacognition did not change after strategy instruction. Her teachers reported on items related to declarative knowledge (i.e.,

awareness of expectations) and procedural knowledge (i.e., proficiency in a range of skills). The humanities teacher rated her skill in both domains as *a little bit less than peers* on both the pre- and post- surveys. Emily's STEM teacher gave the same rating on both surveys for proficiency in a range of skills, but he noted a slight decrease in knowing expectations (*a little bit more than peers* to *about average*).

Table 5. Junior Metacognitive Awareness Inventory Scores, Emily

Domain	Item	Pre- Response	Post- Response
Declarative Knowledge	1	Always	Sometimes
	4	Always	Always
	12	Often	Seldom
Procedural Knowledge	3	Never	Sometimes
	16	Often	Sometimes
Conditional Knowledge	2	Sometimes	Often
	5	Always	Always
	13	Often	Often
	14	Often	Always
Planning	9	Sometimes	Often
	18	Always	Sometimes
Information Management	6	Never	Never
	11	Always	Often
Monitoring	8	Always	Often
	10	Sometimes	Always
	15	Sometimes	Often
Evaluation	7	Sometimes	Sometimes
	17	Always	Always

Emily did not demonstrate a strength in any of the metacognitive or SRL domains on the *Junior Metacognitive Awareness Inventory*. This may be related to teacher reports that her ability to self-assess is unreliable because she demonstrated metacognitive knowledge on other data sources. Emily exhibited declarative knowledge on interviews by explaining that she does not perform well on tests and quizzes in physics, which impacts how she takes notes and studies. She also demonstrated conditional knowledge generally by knowing that each accommodation is not appropriate for all circumstances

and specifically by equating notetaking tasks with needing her laptop. Emily also exhibited conditional knowledge on the SAP use write-ups by describing how she asked for breaks at appropriate times in addition to demonstrating procedural knowledge by explaining how she used one of her accommodations to accomplish a task.

In contrast, the *Junior Metacognitive Awareness Inventory* indicated that evaluation is a challenge for Emily. This supports field notes from strategy instruction and interview data that demonstrate her struggles to determine if a selected accommodation was effective in helping to accomplish a task. Most often on the interviews, Emily would defer to her teacher to make that evaluation. For example, on the Week 1 interview, Emily said, "You can ask your teacher at the end and say, 'Is this a good idea for me for using my [accommodation] in the future?'."

Strategy Effectiveness

Emily's perception of the effectiveness of the SAP improved over time according to the interviews. In response to a question inquiring about how helpful the SAP was for her taking responsibility for her accommodations, she claimed that it was *a little helpful* at Pretest, *usually helpful* during Weeks 1 through 3, and *very helpful* on the Week 4 interview. Her opinion improved as she gained familiarity with and used the strategy. Another item on the interviews asked Emily why students should use the SAP. She expressed that the SAP promoted independence (Pretest) and improved education and learning (Pretest-Week 4). Her responses were consistent and general but nonetheless evidenced valuing the strategy. On the social satisfaction survey, Emily asserted that the SAP would be *often helpful* for students receiving special education services and that the strategy would *radically* change how well she used accommodations in her classes.

Overall, Emily found the SAP beneficial, and this encouraged her to continue using the strategy in her classes.

Summary

Emily's trajectories for accommodation and strategy learning and use were characterized by inconsistency. She improved in some areas of accommodations knowledge but not all, she excelled in some aspects of the strategy such as troubleshooting but struggled with others, and she demonstrated some metacognitive knowledge but did not develop SRL skills. Overall, she was willing to capitalize on the skills and knowledge that she did have to apply the SAP—at least in part—in her classes with the intention of becoming more responsible and independent. Ultimately, Emily was in the process of becoming more strategic in selecting and utilizing her accommodations, but she needed more time and focused support to do so comprehensively.

Evan

Accommodations Knowledge

Evan's interview responses demonstrate that he improved his knowledge of accommodations following initial instruction. This trend began with his understanding of the definition of accommodations. On the Baseline and Pretest interviews, he *adequately* defined an accommodation as something that is helpful, while in Weeks 1 through 4, his definitions were scored as *accurate* for explaining that an accommodation is a small change in how education is provided or how a student participates in their education "without drastically modifying it" (Week 2). Evan's knowledge of the purpose of accommodations also improved from an *inaccurate* understanding at Baseline. His responses on the Classroom Application and Ongoing Support interviews varied between

adequate and *accurate*. He consistently acknowledged that accommodations allow for equity in education (*adequate*), but he only connected needs for equity with disabilities (*accurate*) on some of the interviews. From the beginning of the study, Evan knew that accommodations are afforded to students with disabilities. Additionally, he demonstrated increased recall of his own accommodations. During the Baseline interview he could name four of his fifteen, he listed seven on the Pretest interview, and Weeks 1 through 4 ranged from nine (Week 4) to thirteen (Week 2).

Strategy Learning and Performance

Strategy recall. Evan excelled in recalling the strategy steps. In line with the SRSD model provision that allows for student modification of strategies (Graham & Harris, 1993), he opted to omit the step that prompted him to consider how to obtain his accommodation, considering it unnecessary, because his accommodations were usually on his person. Evan was able to recall the steps early during strategy instruction (excluding that step), and he maintained this ability throughout the interviews. Evan explained all of the steps using paraphrasing at Pretest and Weeks 2 through 4. His only mistake with recall occurred during the Week 1 interview when he described steps 1 and 2 both with the actual step 2 (i.e., he said step 2 twice). Evan confirmed his strength with recall on the social satisfaction survey by reporting that the strategy was *very easy* to learn and that he *learned it fully*.

Comprehension. Evan understood the procedures and purpose of the SAP to think explicitly through his accommodation needs. However, his ability to implement this understanding was inconsistent in that he sometimes applied the strategy to a task rather than an accommodation. This happened a few times during strategy instruction, at which

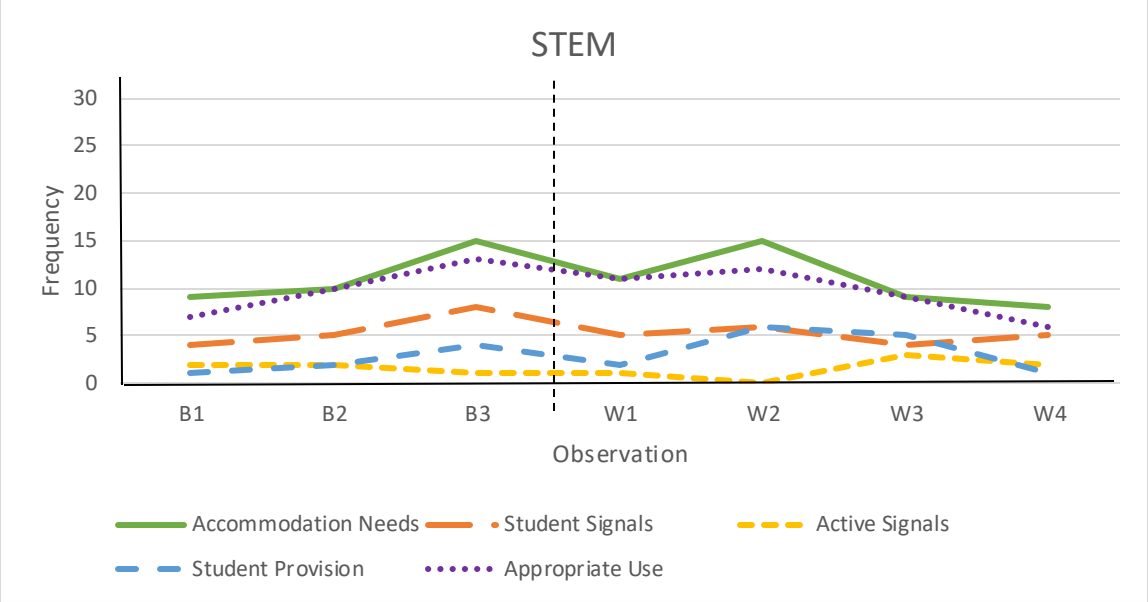
point Evan was prompted to use the SAP to think about his accommodation needs. Application of the SAP to a task was also evident on the Week 3 interview. The hypothetical scenario for this interview was that Evan could use a place marker to make copying from a book more efficient. Rather than start with the task (i.e., copying) and conceiving multiple accommodation options, Evan started with the accommodation (i.e., a place marker) and thought through multiple tasks on which that accommodation could be used.

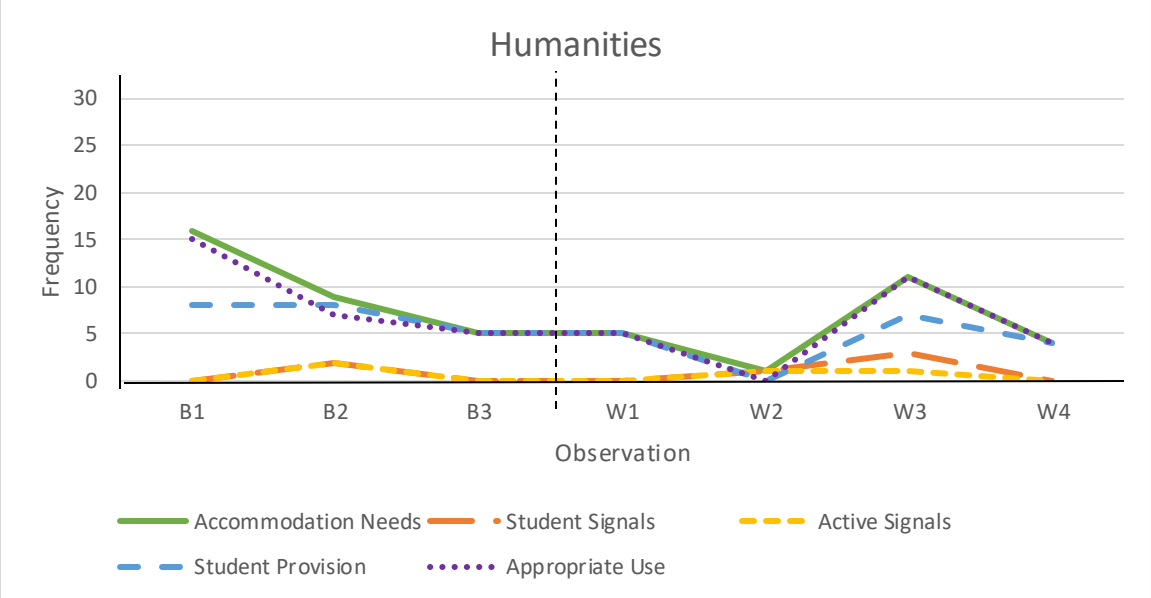
Performance. There was a discrepancy for Evan between performance of the strategy on interviews and in-class. During the interviews, he demonstrated variable performance when given a broad prompt to apply the SAP to a hypothetical scenario ("how would you use the SAP in that situation?"). Evan's responses were *accurate* in Weeks 1 and 2 when he talked through all of the steps to select and implement an accommodation for that scenario. At Week 4, he received a score of *adequate* for using an incomplete strategy to think through the situation, but on the Pretest and Week 3 interviews, he *inaccurately* responded to the prompt by straying from the given accommodation or focusing on the task rather than the accommodation. Evan's performance in determining if an accommodation was needed (step 1) was also variable because, in some instances, he did not heed the given purpose of his hypothetical accommodation. Considering accommodation options (step 2) and troubleshooting (step 5) were areas of strength on all of his interviews. Evaluating the effectiveness of his selected accommodation (step 5) improved over time. At Pretest, Evan asserted that his teacher would be the one to determine if the hypothetical accommodation was effective, and in Weeks 1 and 2, he took responsibility for evaluating effectiveness but used vague

criteria. Both of these responses were considered *adequate*. On the interviews for Weeks 3 and 4, Evan not only acknowledged that he would be the one to determine if the accommodation he selected was effective, he also provided specific criteria for making that judgement that was linked to the hypothetical task that the accommodation would help him accomplish. At the end of each interview, Evan consistently self-assessed that he could perform the strategy *extremely well*.

Although Evan's responses to interview questions indicated that he could recall, comprehend, and perform the SAP, observations did not provide trace evidence that he was performing the strategy in his classes. Evan supported this finding with consistent reports that he was not implementing the strategy in class or that he was unaware if he was using it. Figure 4 displays observation data that indicate trace evidence of strategy application in Evan's STEM and humanities classes: the number of accommodation needs, the number of times that Evan signaled an accommodation need, the number of active student signals, the number of accommodations that Evan provided, and the number of accommodations that he used appropriately.

Figure 4. Trace evidence of classroom application, Evan





There is no obvious pattern of change to the frequency of student signals relative to the number of accommodation needs across observations. The same is true for frequency of active signals relative to the number of student signals. In STEM, less than or precisely half of Evan's signals for an accommodation need were active signals with the exception of Week 3. Four of the seven observations in humanities did not yield any

signaling by Evan, while during the Baseline 2 and Week 2 observations, all of Evan's signals were active. Considered together, the lack of consistent changes to student signaling, and specifically active signaling, indicate that Evan did not become more pro-active in seeking accommodations. Evan's rate of accommodation provision relative to need increased slightly in STEM from Baseline to Classroom Application and Ongoing Support; however, with the exception of Week 3, his provision rate was below 50%. In contrast, Evan did not demonstrate any improvement in accommodation provision in humanities, but he provided at least half of his own accommodations during each observation, except for Week 2 when only one accommodation was needed. Evan's accommodation provision seems contingent upon context, but neither context experienced a change in provision sufficient to demonstrate strategy use. Additionally, Evan appropriately used most of his accommodations throughout the study. Discrepancies between accommodation needs and appropriate use can be attributed to either an accommodation need going unfulfilled or an inability of the observer to determine whether an accommodation was effectively utilized.

Evan directly addressed the disconnect between strategy performance on interviews and in classes. He consistently reported during interviews that he had not implemented SAP in his classes—or at least he was unaware of employing the strategy—because he was so familiar with accommodation needs and practices that the process of selecting and utilizing an accommodation was more intuitive than explicit to him. On the Week 3 interview, Evan said,

> I may not even realize I am using it…therefore, it does not stay in my mind that it is actually a strategy. Also…sometimes I will come to a decision so fast, like it is not even a consideration it is more or less what comes naturally.

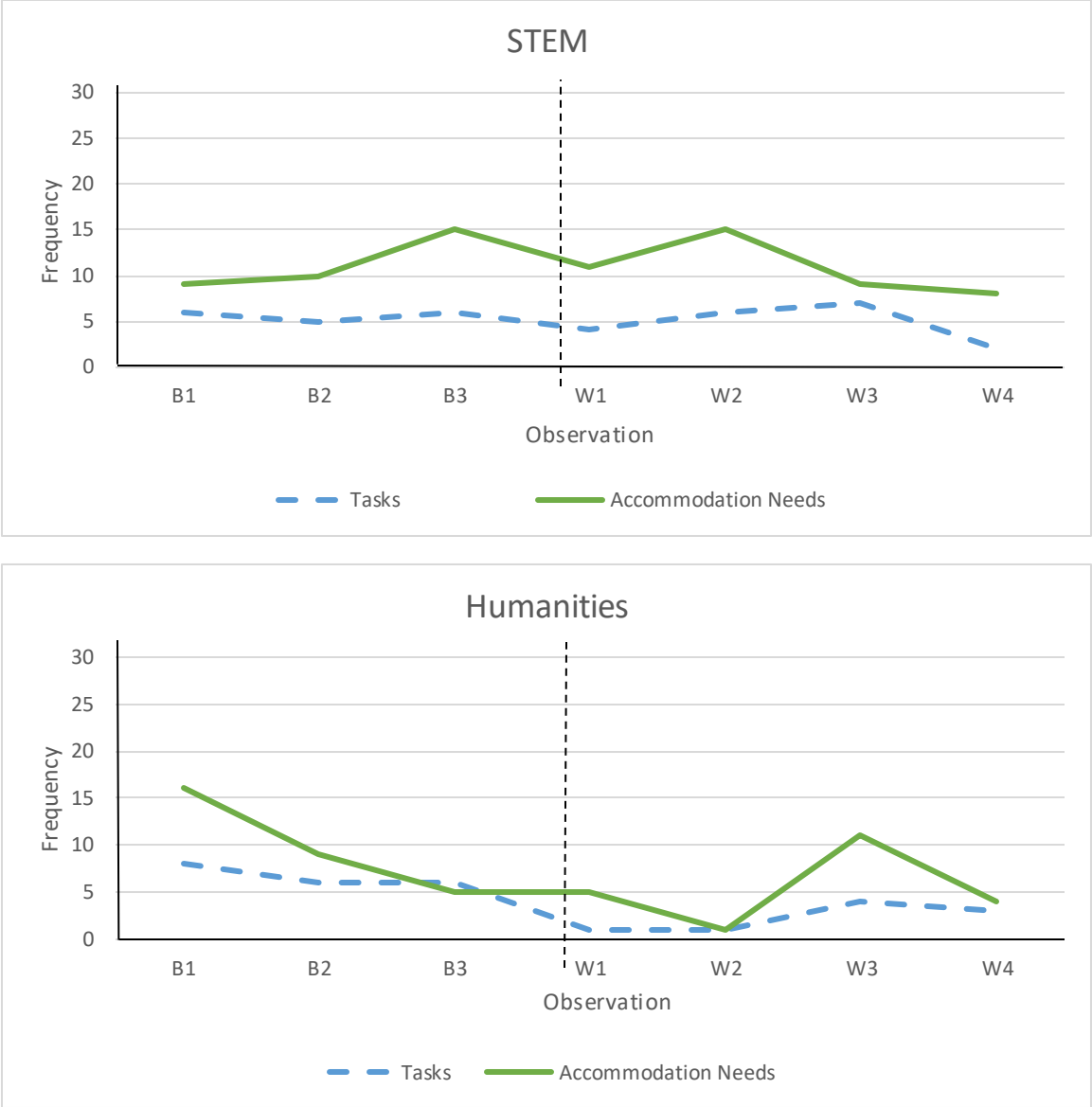
The social satisfaction survey asked Evan if he had any suggestions for improving the SAP, and his response further emphasized this point. He recommended in-class coaching to draw students' attention to times when they are using the strategy without realizing it.

Accommodation Practices

Data sources addressing Evan's accommodation practices show that his accommodation use did not change considerably throughout the study, but he was more likely to advocate for accommodations after strategy instruction. Additionally, Evan demonstrated improvement in or consistently high classroom engagement based on accommodation practices.

Rate of need. Evan experienced variable changes in the average number of accommodation needs per task from Baseline to Classroom Application and Ongoing Support according to observation data. In STEM, Evan needed an average of two accommodations per task prior to learning the SAP and an average of 3.625 accommodations after strategy instruction. Conversely, the average decreased in humanities from 3.94 accommodations per task to 2.5. Figure 5 shows the number of tasks and number of accommodation needs that Evan experienced during each observation in STEM and humanities.

Figure 5. Tasks and accommodation needs, Evan



Type of accommodations. Despite variation in his rate of accommodation needs, the accommodations that Evan used remained consistent throughout the study. Evan's observations, preferred accommodations list, and accommodations checklists were in agreement regarding his most commonly-used accommodations. Based on observations, Evan utilized individual categories of accommodations (e.g., access accommodations,

problem solving support) at similar rates before and after strategy instruction, indicating that strategy instruction did not change how he engaged in his classes. Categories without similar rates were evidenced only once each, exclusively in Baseline (i.e., experiential learning, cuing back to task, repetition and practice) or Classroom Application and Ongoing Support (i.e., processing time, breaks, emotional support, behavioral support). He used access accommodations (e.g., notetaker, braille, electronic materials) the most, accounting for 56.9% of all accommodations observed. The second most common type of accommodations for Evan was content support, which represented 15.4% of observed accommodations.

According to Evan's accommodations checklists, he reported using his cane, electronic notetaker, and braille materials most often during Classroom Application and Ongoing Support. The electronic notetaker and braille materials were included on Evan's preferred accommodations list and were frequently observed as part of the access accommodations category. Evan's cane was not documented on observations nor his preferred accommodations list because these two data sources were limited to class time, unlike the accommodations checklist which was open to use at any point during the school day. He did not use his cane during class time because he was moving only short distances, if at all, in a highly familiar environment; however, he always used his cane between classes to navigate from place-to-place. Evan also listed the calculator on his notetaker as a preferred accommodation, but it was not often observed nor was it ever reported on his accommodations checklists. This discrepancy is likely based on two factors. First, most of the observed time in Evan's math class focused on concepts more than computation. Second, the pre-populated option on Evan's accommodations checklist

was "talking calculator" per his IEP, and Evan may have interpreted this as the stand-alone calculator available in his math class instead of the one on his electronic notetaker.

Advocacy. Although Evan did not demonstrate changes in the accommodations that he used before and after learning the SAP, he did engage in more advocacy regarding his accommodations. While advocacy did not occur frequently enough to describe a trend, it was observed multiple times after strategy instruction but never before. One example of advocacy occurred during his Week 1 STEM observation. Evan's math teacher recommended that he take notes on his electronic notetaker; however, he preferred to take notes on his mechanical braillewriter. Evan justified this preference by explaining that the notetaker was not compatible with Nemeth (i.e., the braille code for science and mathematics), but the braillewriter would allow him to effectively use Nemeth and spatially format practice problems if those would be incorporated in his notes. This justification persuaded his teacher to let him use the braillewriter.

Engagement. Teacher surveys were used to inquire about Evan's accommodation practices in STEM and humanities as well as his resulting engagement and learning. Evan's STEM and humanities teachers reported improvements in his willingness to seek assistance and to meet challenges himself when struggling in class. These correspond to advocacy and provision of accommodations, respectively. The STEM teacher expressed that Evan sought assistance from others *a little bit more than peers* at Baseline but improved to *often* by the end of the study. She also claimed that he attempted to meet challenges himself *often* at Baseline and then *almost always* during Classroom Application and Ongoing Support. Similarly, Evan's humanities teacher reported gains from *a little bit less than peers* to *a little bit more than peers* for seeking assistance and

from *a little bit less than peers* to *often* for attempting to meet challenges himself. The two teachers also reported on the outcomes of Evan's changes in accommodation practices in the domains of learning, achievement, and participation. Surprisingly, Evan's STEM teacher noted slight declines in learning (*very well* to *a little above average*) and participation (*almost always* to *often*) and stability in achieving (*very well*); although, all of her ratings were positive. In humanities, Evan improved in learning from *a little bit above average* at Baseline to *among the best* and in achieving from *a little bit above average* to *very well*. He remained consistent in participation with a teacher rating of *almost always*. Overall, Evan's teachers reported that he engaged well in their classes whether or not improvement was noted.

Influencing Factors

Several within-student and environmental factors impacted Evan's strategy learning and performance and his accommodation practices. In general, these factors facilitated strategy learning but impeded strategy application.

Within-student factors. Evan demonstrates above average verbal, working memory, and reasoning skills according to a review of his cumulative folder. These domains are all beneficial for comprehension and performance of the SAP. Evan also earned A's in STEM and humanities during the semester prior to the study, which indicated that he was adept in these subjects and did not need a substantial change in accommodations practices.

Evan also exhibited a strong sense of independence, which aligns with the purpose of the SAP. On the interviews, Evan was clear that decisions regarding accommodations are his to make. For example, at Week 4, he was asked what he would

do in a hypothetical situation in which his teacher said that he would not need a particular accommodation that day but then engaged in an activity for which he needed it. Evan responded,

> I am the one who decides whether or not I need my accommodation. I do not need my teacher telling me what I do not need and what I do need…I can make the decision to bring my accommodations and use or not use them.

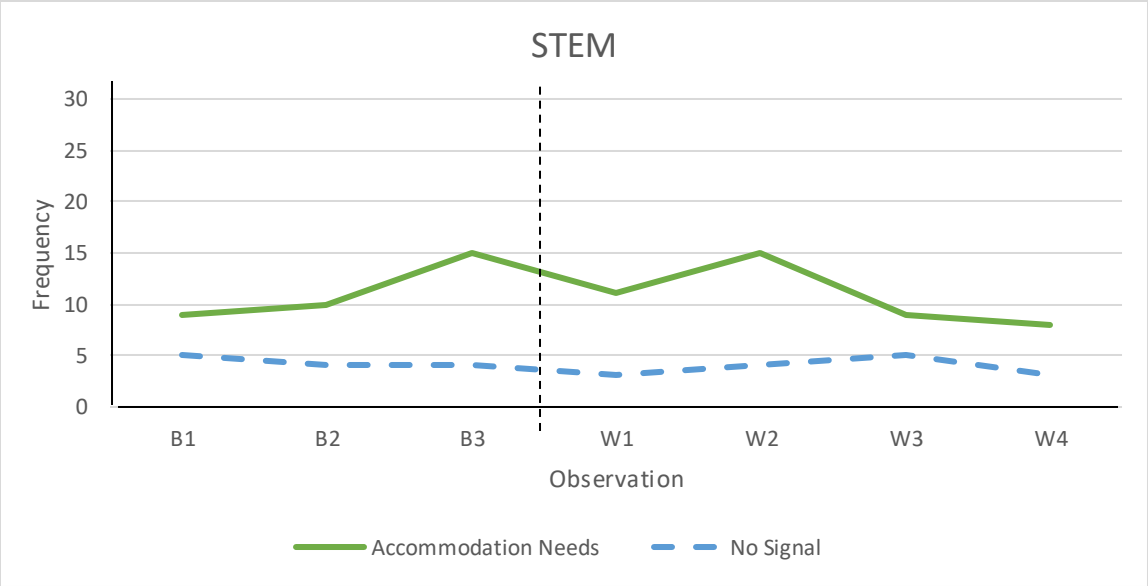
In addition to independently making decisions regarding his accommodations, Evan prioritized independent use of accommodations. He noted several times on the interview how he took the initiative for implementing several accommodations in his classes. Additionally, on the hypothetical scenarios, Evan's first choice out of multiple accommodation options was the one that he could implement himself.

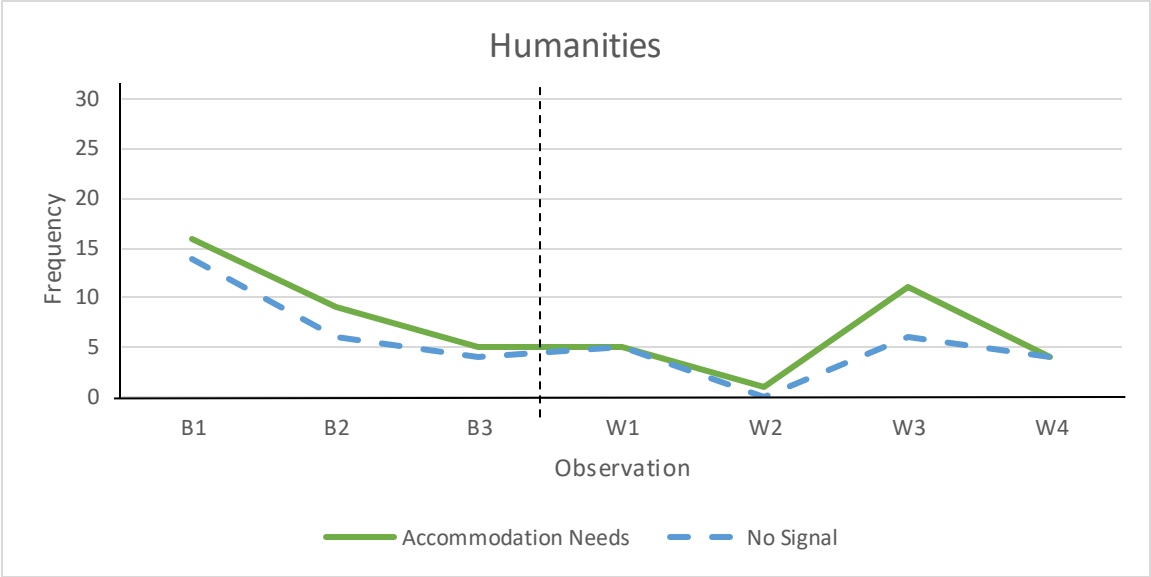
According to Evan's humanities teacher, he experienced a substantial loss of vision during the school year prior to the study, which resulted in more emotional challenges than he previously demonstrated. His STEM teacher further explained that these emotional difficulties could be a stumbling block in class. Evan exhibited some emotional variability during strategy instruction, but in these instances, he was able to pull himself together if given a little time. For example, Evan arrived to one of our instructional sessions extremely agitated and angry at himself for accidentally deleting a personal document on his electronic notetaker. I offered him some time to collect himself, and after a few minutes, he calmed down and indicated that he was ready to start working. Thus, these emotional challenges did not influence strategy learning or understanding, but they impeded classroom performance and accommodations practices on occasion. This was particularly noticeable during the Week 2 STEM observation,

when Evan arrived to math class clearly upset and agitated. During this period, the teacher encouraged Evan to take a few breaks to calm himself, which meant that Evan was not advocating for his own accommodation needs and that he was not participating in class consistently. Additionally, Evan was more argumentative with his teacher and more resistant to work than had previously been observed.

Environmental factors. Observation data revealed moderate to high rates of *no signals*, meaning no indication of a need before the accommodation was put into effect. Figure 6 presents the number of *no signals* compared to the number of accommodation needs per observation in each setting. *No signals* accounted for 38.6% of all signal opportunities in STEM and 69.8% in humanities. This trend indicates familiarity or routine use of accommodations, which is reasonable at a school for students with visual impairments where accommodations use is supported and expected. It also supports Evan's assertion that he did not often use SAP explicitly but accommodations are a more intuitive practice in his classes.

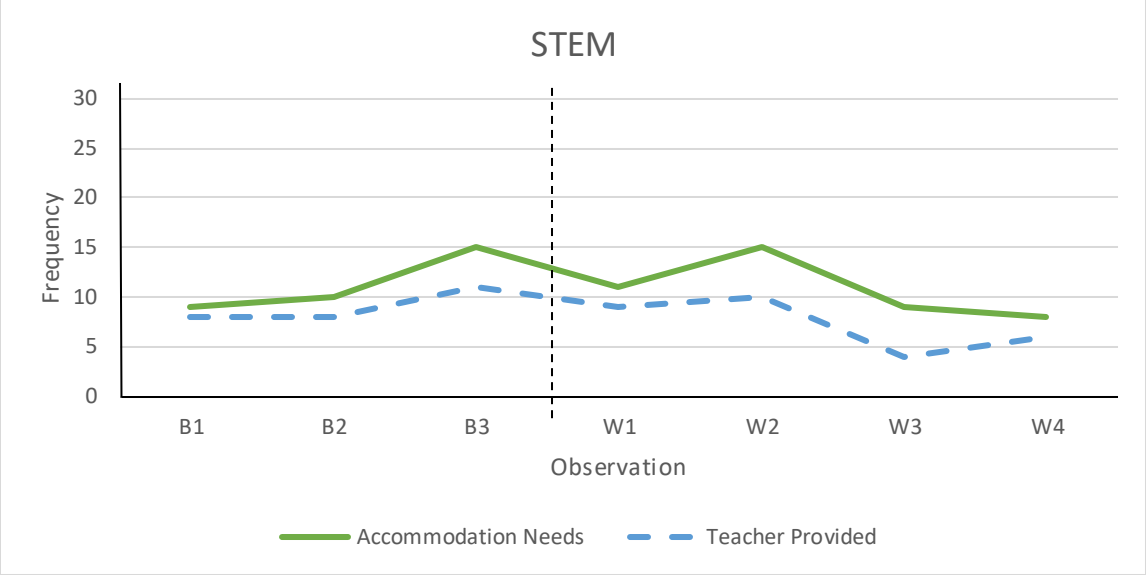
Figure 6. No signals and accommodation needs, Evan

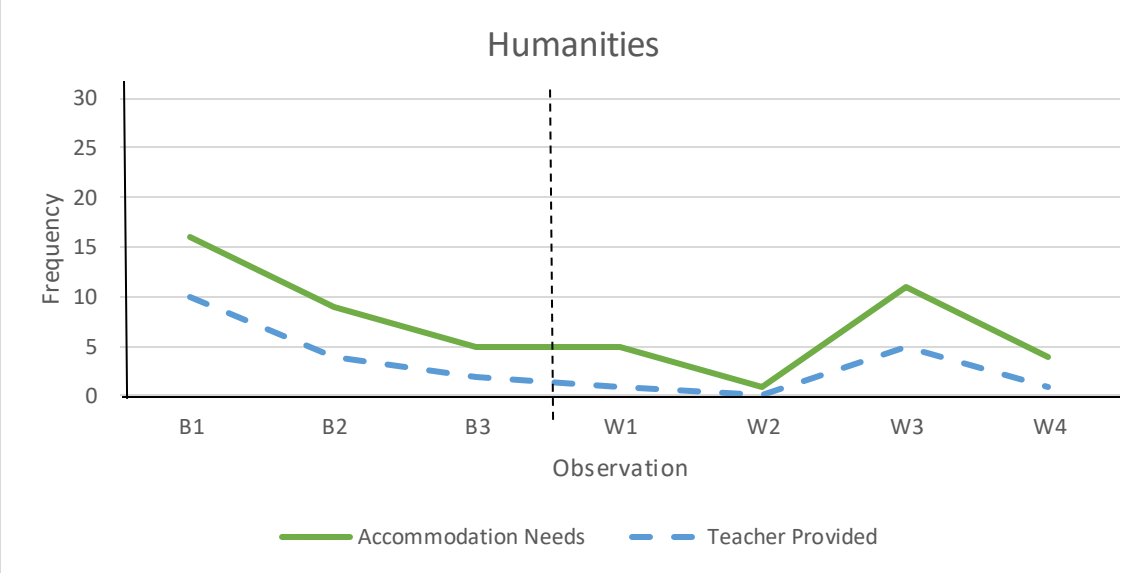




An additional factor that likely influenced Evan's strategy performance was the frequency of teacher-provided accommodations. Figure 7 shows how many accommodations were provided by a teacher in relation to the number of accommodations needed in each of the observed classes. Evan's STEM teacher provided most of his accommodations, several of which could have been student-provided such as the teacher retrieving Evan's braille textbook. Because these happened before class started, they may have hindered opportunities for Evan to use SAP and to advocate for his accommodations. In contrast, the teacher-provided accommodations in humanities occurred less frequently and tended to be out of necessity during class time. An example of this type of accommodation was opportunities for experiential learning. Teacher provision in humanities could have deterred Evan from using the SAP, but based on timing and necessity, it may have also created opportunities for advocacy.

Figure 7. Teacher provision and accommodation needs, Evan





Metacognition and Self-Regulated Learning

Overall, data on metacognition and SRL did not demonstrate changes for Evan after strategy instruction, but they did reveal areas of strength and weakness. Table 6 shows his responses to the *Junior Metacognitive Awareness Inventory* (Sperling et al., 2002). The inventory revealed consistent responses before and after strategy instruction in the domains of procedural knowledge, declarative knowledge, planning, and

information management and variable changes in conditional knowledge, monitoring, and evaluation. Ratings on the teacher surveys also showed consistence or variable changes on items addressing declarative knowledge (i.e., awareness of expectations) and procedural knowledge (i.e., proficiency in a range of skills).

Table 6. Junior Metacognitive Awareness Inventory Scores, Evan

Domain	Item	Pre- Response	Post- Response
Declarative Knowledge	1	Often	Often
	4	Often	Sometimes
	12	Always	Always
Procedural Knowledge	3	Always	Always
	16	Often	Always
Conditional Knowledge	2	Sometimes	Often
	5	Often	Sometimes
	13	Always	Always
	14	Often	Sometimes
Planning	9	Sometimes	Sometimes
	18	Always	Always
Information Management	6	Seldom	Sometimes
	11	Always	Always
Monitoring	8	Often	Never
	10	Often	Often
	15	Often	Always
Evaluation	7	Sometimes	Seldom
	17	Seldom	Often

Evan's self-assessment on the *Junior Metacognitive Awareness Inventory* demonstrated a strength in procedural knowledge. His teachers agreed by rating him highly in the area of proficiency in a range of skills (STEM: *almost always*; humanities: *often* to *almost always*). They also gave him high marks in knowing expectations, with ratings of *almost always* to *often* in STEM and *often* to *almost always* in humanities. Additionally, the preferred accommodations list and interviews revealed that Evan had strong conditional knowledge regarding his accommodations by indicating that context influences accommodation practices. During interviews, he made general comments

demonstrating conditional knowledge such as "when certain situations call for [accommodations]" (Week 3) as well as specific comments related to actual usage (e.g., "In math I am always using the brailler and given extra time to possibly think things through"; Week 2) and to the hypothetical scenarios (e.g., "I decide whether or not [to use that accommodation] by what kind of activity it was"; Week 1).

The *Junior Metacognitive Awareness Inventory* also indicated evaluation as an area of weakness for Evan. This was supported by early interviews. Initially, Evan asserted that a teacher would be the appropriate person to determine if a given accommodation was effective (Pretest), and then, even when he assumed the responsibility for evaluating effectiveness, he was vague as to the criteria for making that evaluation (Weeks 1 and 2). His responses to the interviews for Weeks 3 and 4, however, described criteria linked to the task that the given accommodation was intended to help accomplish, which demonstrated some improvement in this domain.

Strategy Effectiveness

On the social satisfaction survey, Evan acknowledged that the SAP would be *very helpful* for students receiving special education services. He also reported that the strategy would *significantly* change how well he used accommodations in his classes. Similarly, on the interviews, Evan expressed that that SAP was *usually helpful* (Pretest) or *very helpful* (Weeks 1-4) in enabling him to take responsibility for his own accommodations. This shift likely occurred as Evan gained familiarity with the strategy and its benefits. When asked on the interviews why students should use SAP, Evan provided several reasons: to better understand accommodations (Pretest, Week 3); to level the playing field with students without disabilities (Pretest); to promote

independence (Weeks 1 and 4); because it will be useful in college (Weeks 1, 2, and 4); to facilitate explicit thinking about accommodations (Weeks 2 and 4); and because it accounts for the influence of context on accommodations. Overall, these responses demonstrate that Evan perceived the strategy to be beneficial on several dimensions, not only for himself but also for other students with disabilities.

Although Evan gave many reasons for using SAP, his justification related to college is particularly interesting. This point seems to explain the discrepancy between strategy learning and strategy application for him. It was evident from the interviews that Evan could perform the strategy fairly well, but observations and self-reports indicated that he was not using it in classes nor was it changing his accommodation practices. The hypothetical scenarios in the interviews (on which Evan demonstrated solid strategy learning) were intended to be set in high school, but Evan always interpreted them as being in a collegiate context. In addition to explicitly mentioning college, he would refer to professors, TAs, and scribes. Evan indicated that he did not perceive a need to use the strategy in his current classes or at his current school, which is not surprising and is supported by the intuitive provision and use of accommodations and the consistency with which accommodations were being used. However, Evan recognized changes that he will likely experience when he transitions to college: he will need to be more intentional about which accommodations are used, there exists the potential to utilize different accommodations, and it will be his responsibility to advocate for the accommodations that he needs. Evan also realized that the SAP will help him accomplish these things.

Summary

Throughout the study, Evan became more knowledgeable about accommodations in general and about his own accommodations. He successfully learned the SAP, as evidenced by recall, comprehension, and performance on the interviews. However, Evan did not intentionally apply the strategy in his classes, nor did his accommodation practices change. This can primarily be attributed to success in and familiarity with his current classes and the value Evan saw in the SAP for future educational opportunities instead of his current context. Evan did not experience a change in metacognitive or SRL skills after strategy instruction, but he did demonstrate metacognitive knowledge (i.e., declarative, procedural, conditional) throughout the study. Collectively, these findings demonstrate that Evan learned to be strategic in selecting and utilizing his accommodations, but he chose not to be strategic in this educational setting.

Graham

Accommodations Knowledge

Graham excelled on accommodations knowledge. He learned this information very quickly and retained most of it throughout the study. At Baseline, Graham did not have a working definition of accommodations, but he *accurately* defined accommodations on all interviews after strategy instruction, based on the definition that he learned during pre-teaching. Even on the Baseline interview, Graham demonstrated an *adequate* understanding of the purpose of accommodations. When asked why students get accommodations, Graham responded, "Students get accommodations because some of them cannot sit through the whole test, the whole time, and some of them need serious help." This explanation was rated as *adequate* because Graham addressed education-

related needs, but he did not make an explicit connection between needs and disabilities. At Week 3, he also provided an *adequate* response, but on all of the other interviews, his answers were *accurate*. Graham started the study with the knowledge that students with disabilities can receive accommodations, and he continued to provide this answer on all of the interviews when asked who is eligible to receive accommodations. Conversely, Graham could only name one of his eighteen IEP accommodations on the Baseline interview. He named the most (14) at Pretest, likely due to proximity of instruction, but the amount steadily declined until Week 4 when he could only name seven.

Strategy Learning and Performance

Strategy recall. Graham's ability to recall the SAP steps varied. He correctly named all of the steps only once (Week 1). He missed one or two steps on each of the other interviews, but the omitted steps were inconsistent. At Pretest, he did not say step 2 (pick the best accommodation); on the Week 2 interview, he forgot steps 3 and 4 (state how to get the accommodation and get and use the accommodation); during the Week 3 interview, he did not list steps 1 (determine if an accommodation is needed) and 3; and at Week 4, he skipped step 2. In addition to omitting steps, Graham would sometimes repeat steps multiple times. On the Week 3 interview, he said step 5 (determine if the accommodation worked) three times. Similarly, at Week 4, he repeated step 4 three times.

Comprehension. Graham did not fully comprehend the purpose of the SAP, which was evident in two ways. First, he did not understand that the strategy was intended to promote independence. He would make reference to asking for permission or suggest accommodations that depended on others even when options existed that he

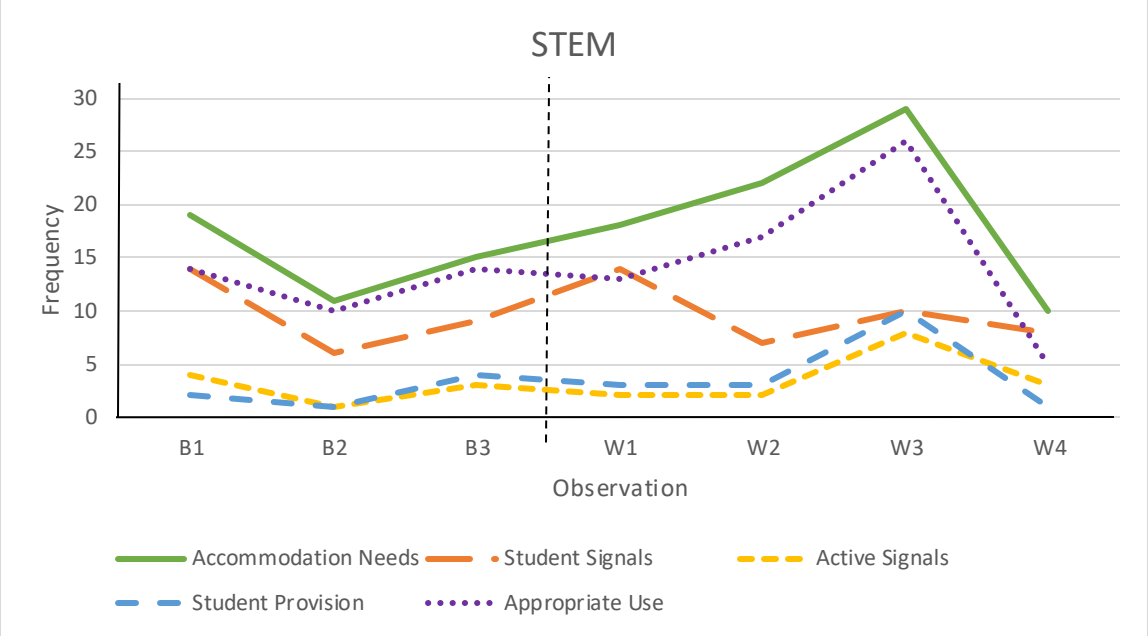
could have implemented himself. For example, on the Week 2 interview, Graham was told that he brought his hypothetical accommodation to school in his backpack and then asked what he should do with it upon arriving to class. He responded, "Ask the teacher if it's ok to use it." Similarly, on each interview, Graham was faced with a scenario in which a substitute teacher refused to let him use his accommodation. Each time, Graham stated that he would have the principal or case manager come to explain the accommodation to the substitute rather than explaining it himself. The second indication that Graham did not fully understand the purpose of the SAP occurred with his responses about when he could use the strategy. Sometimes he acknowledged that the strategy could be used when he needed help or to improve learning, but he also mentioned several times that it should be used specifically when he is stressed or frustrated, which was a narrow application for the strategy.

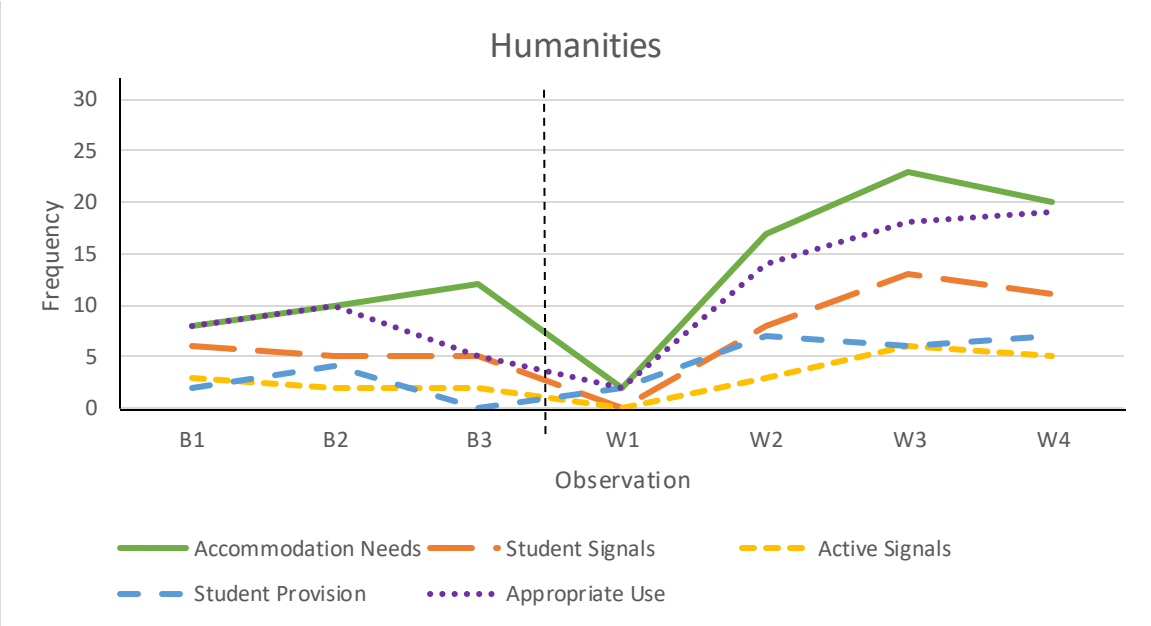
Performance. Overall, Graham demonstrated sufficient ability to perform the steps of the SAP on interviews, although his accuracy declined over time. However, observation data indicate that he did not apply the strategy in his classes. When given a general prompt to apply the SAP to each hypothetical scenario presented on the interviews, Graham's use of the strategy was *accurate* at Pretest and Week 1 for addressing all of the strategy steps, but his scores declined to *adequate* for Weeks 2 through 4 because he omitted some steps with each response. Graham's ability to determine if an accommodation was needed (step 1) varied. At Pretest and Week 1, his determinations did not relate to the purpose of the hypothetical accommodation, which received a rating of *inaccurate*. His answers were *accurate* in Weeks 2 and 3 because his reasoning aligned with the purpose of the accommodations. And, on the Week 4

interview, his response was *adequate* for connecting to the purpose of the accommodation but missing nuance with that purpose. On this interview, Graham's hypothetical accommodation was to use headphones to listen to the descriptive audio on films shown in class. When told by his teacher that they would be watching an old movie, Graham focused on the movie to conclude that he would need his headphones without considering the fact that an old movie might not have descriptive audio. Graham's performance with considering accommodation options (step 2) and troubleshooting (step 5) was fairly strong, but he sometimes struggled to evaluate the effectiveness of his accommodation (step 5). On the interviews and during strategy instruction, Graham knew that it was his responsibility to determine if an accommodation was working, but he often did not know how to make that assessment. Graham reported on the interviews that he could perform the SAP *fairly well* at Pretest, Week 1, and Week 4 but that he *could not perform it at all* at Weeks 2 and 3. On the social satisfaction survey, he acknowledged that the strategy was *not easy but not hard* to learn and that he *kind of* learned it.

While Graham's interview responses demonstrated that he was capable of performing the strategy, observation data indicated that he was not using it in his classes, which was confirmed by self-reports. Trace evidence of classroom application is presented in Figure 8 including Graham's number of accommodation needs, the number of times that he signaled an accommodation need, the number of active student signals, the number of accommodations that he provided, and the number of accommodations that he used appropriately.

Figure 8. Trace evidence of classroom application, Graham





Regarding student signals of accommodation needs, Graham's rates of signals relative to the number of accommodation needs in STEM during Classroom Application and Ongoing Support were outside of the range for Baseline each week, with Weeks 1 and 4 higher than Baseline and Weeks 2 and 3 lower. In humanities, his rates after

strategy instruction fell within the range of Baseline, but Week 1 was much lower because all of the signals were *no signals*. Active signals, those in which Graham explicitly requested an accommodation, increased in STEM during the Weeks 3 and 4 observations; however, Week 3 was the only STEM observation in which active signals were more common than passive signals. Interestingly, Graham actively signaled for accommodations more often than he passively signaled during all of the Baseline observations for humanities, but during Classroom Application and Ongoing Support, passive signals outnumbered active signals for all observations except Week 1, which had no student signals. Overall, Graham's ability or willingness to explicitly request accommodations declined after strategy instruction, indicating not only that he was not using the SAP in his classes but some additional factor was impeding his engagement more so than before strategy instruction. The number of accommodations that Graham provided compared to the number of accommodations that he needed increased slightly in STEM from Baseline to Classroom Application and Ongoing Support; however, his rate of provision remained low throughout the study. In humanities, Graham experienced a peak in provision in Week 1, but provision steadily declined through Week 4. Although he demonstrated higher rates of accommodation provision in humanities than in STEM, Week 1 was that only humanities observation in which Graham provided more than half of his accommodations. Learning the SAP did not appear to increase Graham's responsibility or independence for providing his own accommodations. Graham used most of his accommodations appropriately, but he demonstrated less appropriate use during Classroom Application and Ongoing Support than Baseline for STEM. Appropriate use remained relatively consistent in humanities with the exception of the

third Baseline observation, when Graham used only 40% of his accommodations appropriately. The social satisfaction survey and self-reports on interviews support observed trace evidence that Graham did not use the SAP in his classes. On the social satisfaction survey, Graham reported using the strategy in his classes *about half of the time*, but on the interviews that rate was much lower. At Week 1, Graham made a vague reference to using the strategy when prompted to recount an example of using the SAP recently in one of his classes. He said, "When I needed a break, and I was frustrated. I can't remember really." On the interviews for Weeks 2 through 4, Graham reported that he had not used the SAP in his classes and explained the lack of use due to emotional-behavioral challenges. For example, in response to the same prompt at Week 3, Graham answered, "I can't because I haven't had a chance to because I've been so upset."

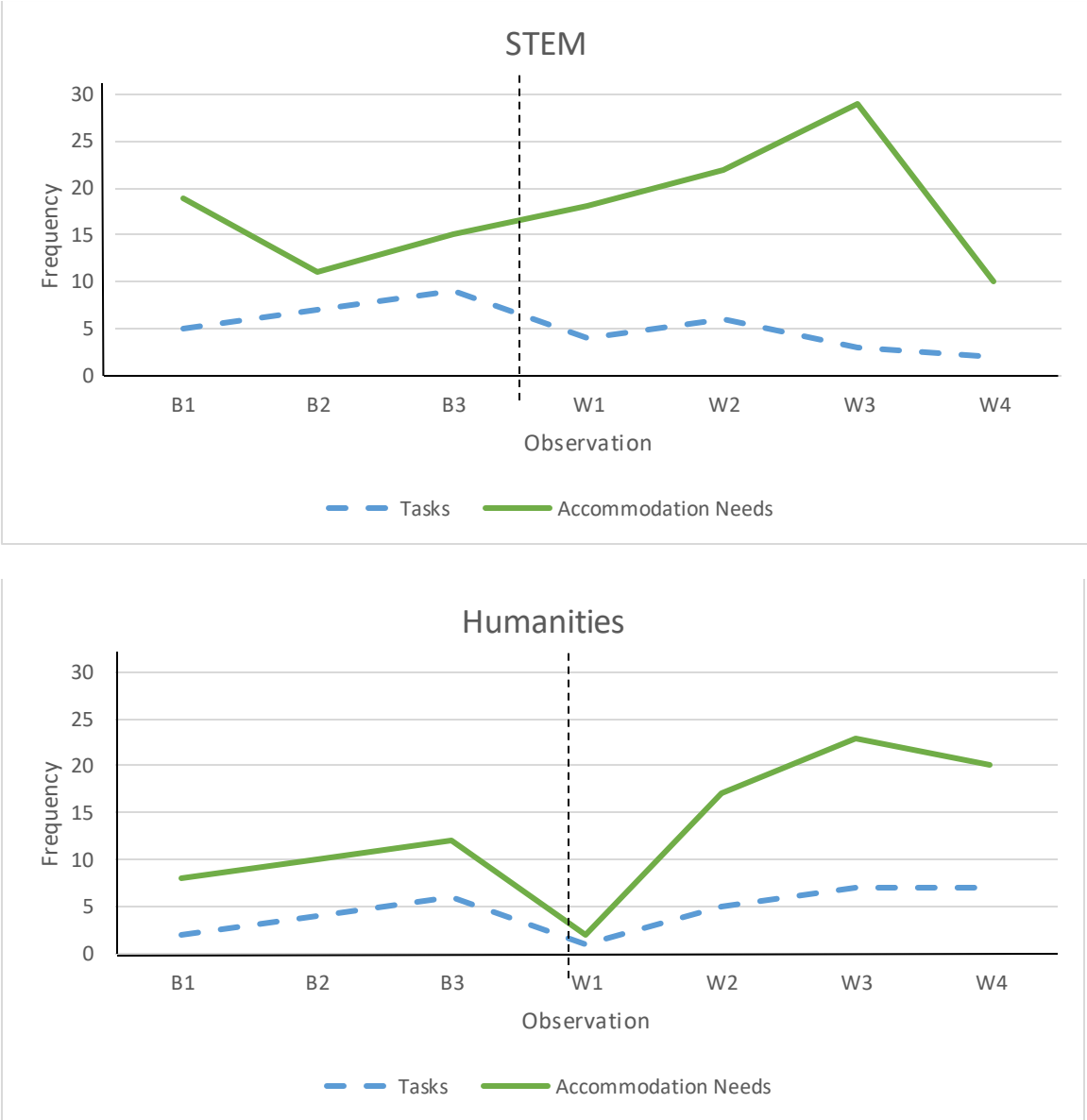
Accommodation Practices

Graham's accommodation practices changed somewhat, but not substantially, after strategy instruction. Changes included an increase in the number of accommodations needed per task in STEM and an increase or decrease in some categories of accommodations.

Rate of need. Graham experienced an increase in the number of accommodations needed per task in STEM during Classroom Application and Ongoing Support. The number of accommodation needs compared to the number of tasks encountered in each of the observed classes is presented in Figure 9. The ratio for accommodation needs per task was equal or higher for each STEM observation during Classroom Application and Ongoing Support than for the Baseline observations. The average for Baseline was 2.14 accommodations per task, and the average after strategy instruction was 5.27. For

humanities, the number of accommodations per task during each Classroom Application and Ongoing Support observation was within the range of the Baseline observations. The average before strategy instruction was 2.50 accommodations per task, and the average after was 3.10.

Figure 9. Tasks and accommodation needs, Graham



Type of accommodations. Across all of the observations, Graham most commonly used access accommodations (19.4%) and accommodations for anxiety

(15.2%). This differed somewhat from Baseline to Classroom Application and Ongoing Support. Access accommodations were most prevalent during Baseline with accommodations for behavioral challenges the second most common. During Classroom Application and Ongoing Support, however, accommodations for anxiety were used most often while access accommodations were second. Other categories of accommodations increased or decreased in frequency after strategy instruction also. Accommodations to support social skills decreased for Graham while accommodations for sensory needs, environmental awareness, and problem solving increased.

Graham's preferred accommodations list documented accommodations in many of these categories, further supporting their importance for engagement and learning. In STEM, Graham's preferred accommodations included his electronic notetaker (an access accommodation), problem solving help, and cueing back to task (an accommodation for behavior). For humanities, Graham expressed preferences for accommodations related to behavior and anxiety as well as access. The behavior and anxiety accommodations that he specified included breaks, cueing back to task, a distraction-free learning environment, and small group instruction. His electronic notetaker, electronic documents, auditory output, and braille materials constituted access accommodations.

Engagement. Teacher surveys document a discrepancy in Graham's engagement and learning between STEM and humanities. Graham's STEM teacher reported that when he faced a challenge in class, he would *often* seek assistance from others and he improved in his willingness to meet the challenges himself from *seldom* before strategy instruction to *about the same as peers* after. However, the STEM teacher rated Graham as decreasing in learning (*a little bit below average* to *not very well*), achievement (*about*

average to *a little bit below average*), and participation (*a little bit more than peers* to *about the same as peers*). The humanities teacher reported that Graham decreased his willingness to seek assistance from others when facing a challenge (*often* to *about the same as peers*) but improved in attempting to meet the challenge himself (*a little bit less than peers* to *a little bit more than peers*). She also expressed that Graham improved in learning and participation after strategy instruction. Her ratings for learning improved from *a little above average* to *among the best* and from *often* to *almost always* for participation. She also gave Graham a consistently high rating in achievement, which was *among the best*.

Influencing Factors

Graham's strategy learning and performance and accommodations practices were heavily influenced by factors beyond strategy instruction. These were primarily within-student factors rather than environmental factors.

Within-student factors. Graham's cumulative folder indicates that he has low-average verbal abilities, which may have impacted comprehension of the SAP. He working memory is average and short-term memory is excellent. This likely explains why Graham recalled the strategy steps and received high scores for his responses on interviews conducted closer to strategy instruction. Low-average reasoning skills probably contributed to variability in performing each step. Graham earned an A in history and a B- in budgeting—the two classes in which he was observed—for the semester prior to the study. Based on his progress in these classes, Graham may not have perceived a need to use the SAP or change his accommodation practices.

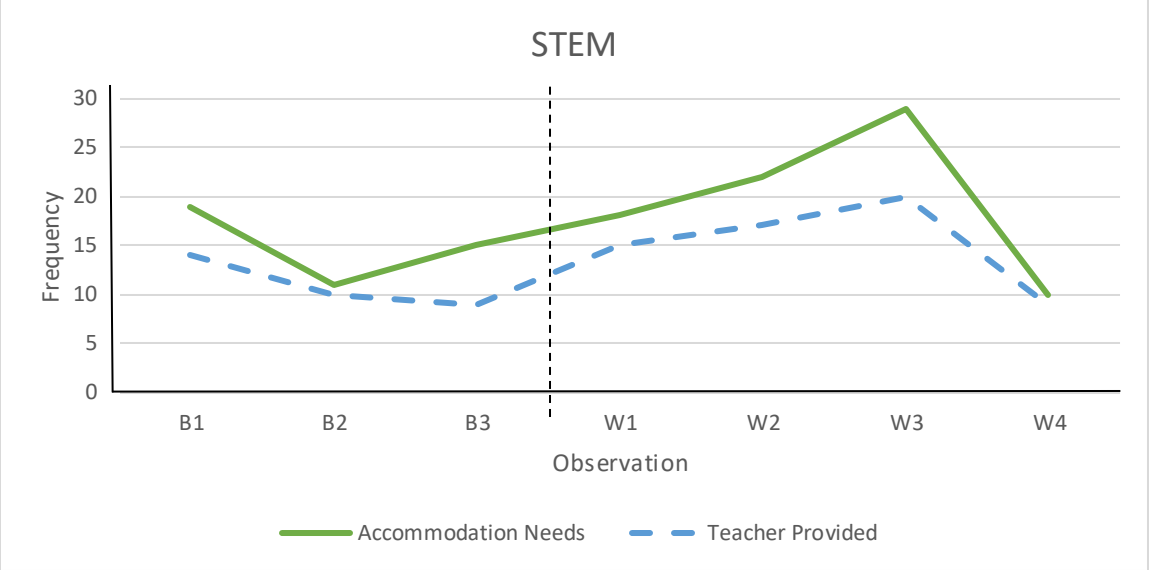
Graham's cumulative folder review also revealed that, in addition to a visual impairment, he has diagnosed disabilities related to emotional and behavioral dysregulation including attention-deficit/hyperactivity disorder, anxiety, and depression. His STEM and humanities teachers also reported concerns with generalized maladaptive behaviors. Graham's performance during strategy instruction, observations, and interviews was directly related to his ability to regulate his emotions and behaviors that day. For example, one of the strategy instruction sessions was unproductive because Graham was perseverating on an issue from his dorm. Observations demonstrated that emotional-behavioral dysregulation substantially hindered his ability to engage in his classes, much less attempt to apply the strategy in those classes. Graham was aware of his challenges with regulating his emotions and behaviors and the extent to which that impacted his ability to engage with activities. There was an interesting juxtaposition on Graham's interviews of Graham claiming that times of emotional-behavioral dysregulation were when he should use the SAP but then using emotional-behavioral dysregulation to explain why he was not using the SAP in his classes. Essentially, this pair of ideas makes the point that the times Graham was most in need of support for regulation, he was least capable of using a support for regulation.

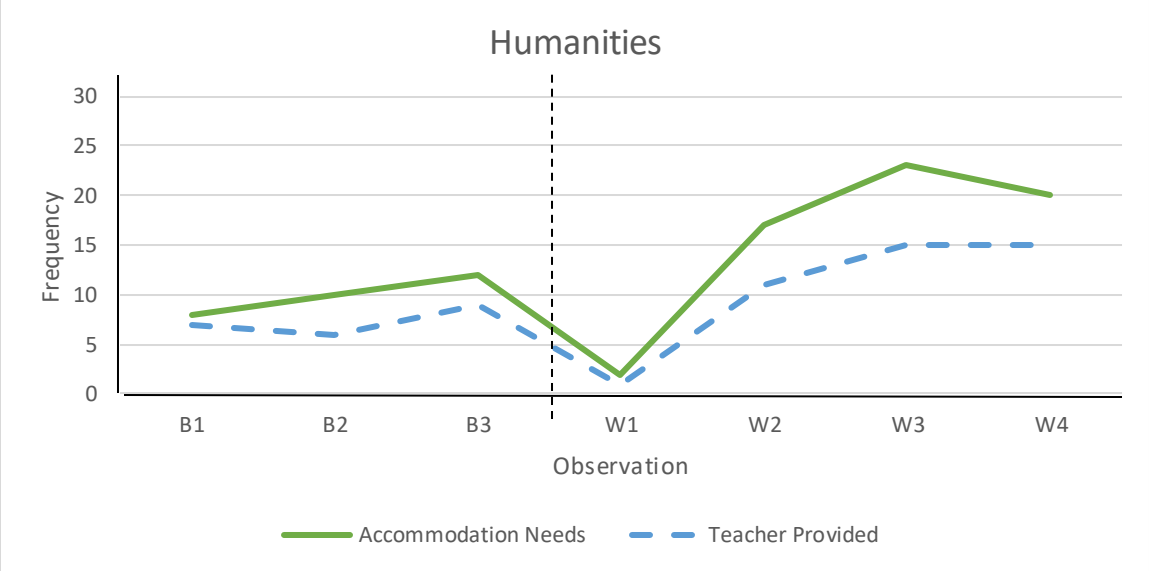
Additionally, Graham demonstrated an overreliance on others, which was discussed previously as related to limited understanding of the purpose of the SAP. This dependence on others manifested during the interviews. Graham's responses to the hypothetical scenarios addressed asking permission to use an accommodation, seeking accommodations from others (some that legitimately needed to be provided by someone else but some that could have been self-provided), and expecting someone else to

explain, justify, or advocate for his accommodations. For example, on the Week 4 interview, when posed with a situation where a substitute would not allow him to use one of his accommodations, Graham initially said that he would ask an administrator to justify his accommodations to the substitute, and his follow-up option was "I would have them call my mom or e-mail my mom…" even though he was 19 years old and his own legal guardian.

Environmental factors. Another manifestation of dependence on others was evident during Graham's observation, specifically the high rates of teacher provision of accommodations. Figure 10 presents the number of teacher-provided accommodations relative to the number of accommodation needs for each observation in STEM and humanities. At least 60% of Graham's accommodations in STEM were provided by the teacher across all observations, and at least 50% of accommodations were teacher-provided in humanities. Many of the accommodations that teachers provided were related to behavior and anxiety, particularly in STEM. Because Graham was the only student in that class, his teacher could address emotional-behavioral dysregulation without detracting from other students. Other kinds of accommodations provided by his teachers included environmental awareness (e.g., reorienting Graham to a room when he became disoriented), electronic documents, braille materials, and verbal descriptions of visual elements of videos.

Figure 10. Teacher provision and accommodation needs, Graham





Metacognition and Self-Regulated Learning

Data sources addressing metacognition and SRL indicate that Graham did not experience changes in these areas after strategy instruction, but they did demonstrate areas of strength and weakness. On the *Junior Metacognitive Awareness Inventory* (Sperling et al., 2002), Graham's self-reported skills were consistent in procedural knowledge, conditional knowledge, and evaluation before and after strategy instruction.

His scores are presented in Table 7. Ratings for planning increased while information management and monitoring decreased. Declarative knowledge showed variable changes.

Table 7. Junior Metacognitive Awareness Inventory Scores, Graham

Domain	Item	Pre- Response	Post- Response
Declarative Knowledge	1	Often	Always
	4	Always	Often
	12	Always	Always
Procedural Knowledge	3	Sometimes	Often
	16	Often	Sometimes
Conditional Knowledge	2	Often	Often
	5	Always	Always
	13	Often	Often
	14	Always	Often
Planning	9	Sometimes	Sometimes
	18	Sometimes	Always
Information Management	6	Never	Seldom
	11	Always	Often
Monitoring	8	Often	Often
	10	Often	Never
	15	Always	Often
Evaluation	7	Seldom	Seldom
	17	Often	Often

Graham demonstrated two strengths on the *Junior Metacognitive Awareness Inventory*: declarative knowledge and conditional knowledge. The strength in declarative knowledge was supported by Graham's humanities teacher on the teacher surveys. She gave him high marks for knowing expectations (*often* to *almost always*). Conditional knowledge was also demonstrated on Graham's interviews and preferred accommodations list when he indicated that accommodations are appropriate for particular tasks and contexts, not universally appropriate. Graham also demonstrated procedural knowledge on his preferred accommodations list by describing how he implemented each accommodation. His humanities teacher also rated him highly on

procedural knowledge (i.e., proficiency with a range of skills) with ratings of *a little bit more than peers* before strategy instruction and *almost always* after strategy instruction.

Conversely, Graham's STEM teacher rated his metacognitive abilities lower for his class. He gave Graham ratings of *seldom* to *a little bit less than peers* for knowing expectations with a consistent rating of *a little bit less than peers* for proficiency in a range of skills. Graham also demonstrated lower abilities with evaluation on the *Junior Metacognitive Awareness Inventory*, on the interviews, and during strategy instruction. Evaluation is related to step 5 of the SAP, when students determine if the accommodation that they selected is working effectively. Graham expressed during strategy instruction that he did not know how to make this determination, and his responses to the interviews for Weeks 1 through 3 indicated the same. When he was asked to specify what he would think about to know if he should use the selected accommodation on a similar task in the future, Graham's answers tended to be vague. On the Week 1 interview, he said, "How well it worked for you." Even after a prompt to be more specific, Graham responded, "Did it do a good job or not for you."

Strategy Effectiveness

Graham recognized benefits to the SAP in general, but he did not perceive value in the strategy for himself. On the social satisfaction survey, he expressed that the SAP would be *very helpful* for students in special education. When asked on the interviews why students should use the SAP, he responded that it would help with problem-solving (Pretest), it could be beneficial if students are experiencing stress or frustration (Pretest and Week 1), it will improve class participation (Week 2), and it could help students work and learn more effectively (Week 3). When asked about the benefits of the SAP

specific to him, Graham perceived fewer benefits. He reported on the social satisfaction survey that the strategy would *somewhat* change how well he used accommodations. On the interviews, his reports of how helpful the SAP was in fostering his responsibility for his accommodations declined over time. At Pretest, he reported that it was *very helpful*. On Weeks 1, 2, and 4, he claimed that it was *usually helpful*. During the Week 3 interview, he said that it was *not very helpful*. The disconnect between general benefits and specific benefits seemed to be related to his realization that he was not actually using the strategy in his classes. On the Week 4 interview, he stated, "If I use it, it will work most of the time."

Summary

Graham demonstrated solid knowledge of accommodations throughout the study. He learned the SAP steps and how to perform them, but his ability to do so varied more as time passed after strategy instruction. Even though Graham demonstrated that he could perform the strategy on the interviews, observed trace evidence and self-reports indicated that he did not use the SAP in his classes. This trend was primarily due to his challenges with emotional and behavioral regulation. Graham did not improve metacognitive knowledge nor self-regulated learning skills with strategy instruction, but he did demonstrate metacognitive knowledge on multiple data sources. Furthermore, data sources agreed that evaluation was an area of weakness for Graham. Graham recognized value in the SAP overall, but he did not experience benefits himself because he did not use the strategy in his classes. Broadly speaking, Graham did not become strategic in selecting and utilizing his instructional accommodations.

James

Accommodations Knowledge

James remained relatively consistent in his general accommodations knowledge, but he improved considerably in knowledge of his own accommodations. His definition of accommodations was fairly consistent across the intervention phase, scoring *adequate* on all interviews except for Pretest. At Baseline, James indicated that accommodations are something that helps students learn better. On the interviews after strategy instruction, James included teachers and teaching in his definition, but he missed that an accommodation is a small change. He included this component in his definition at Pretest, which earned a score of *accurate*. James was consistently *accurate* regarding the purpose of accommodations except for on the Week 3 interview, on which he did not link accommodations to disability-based needs. He developed a more specific understanding of who can receive accommodations with strategy instruction. On the Baseline interview, he included students with disabilities and English Language Learners (*adequate*), but for the interviews after strategy instruction, he only noted that individuals with disabilities could receive them, which was *accurate*. James substantially improved in awareness of his own accommodations. Of the twenty-one accommodations on his IEP, he could name four of them at Baseline, twelve to thirteen from Pretest to Week 3, and fifteen on the Week 4 interview.

Strategy Learning and Performance

James demonstrated exceptional strategy learning and performance. He learned the steps and how to perform them quickly during strategy instruction, and recall and

strategy use did not diminish over time. Additionally, trace evidence from observations indicated that James applied the strategy in his classes.

Strategy recall. James's recall of the strategy steps was perfect. He stated, sometimes paraphrasing and explaining, all of the steps in each of the interviews from Pretest through Week 4.

Comprehension. James demonstrated a strong understanding of the purpose of the SAP as guiding students to think explicitly about whether an accommodation is needed, and if so, which one is most appropriate for that context. He articulated this nicely on the Week 1 interview:

> [The SAP] helps to kind of think critically about whether you need an accommodation and it helps you better decide what accommodation you might need instead of just picking one randomly and hoping that it will work because then it is more likely to work if you think about it first.

Performance. James performed the SAP well even when given a broad prompt to apply the strategy to the hypothetical scenarios. His response at Pretest was *adequate* because he omitted step 2 (pick the best accommodation); however, he responded completely and *accurately* to the prompt on Weeks 1 through 4. James *accurately* determined if an accommodation was needed (step 1) on each of the interviews, and the justifications for his answers connected to the hypothetical task and purpose of the given accommodation. For example, the hypothetical accommodation provided on the Week 3 interview was a place marker to be used for copying assignments. Faced with the situation where the teacher says that students will need their textbooks that day, James asserted, "I would ask if we are going to need to write anything down from the book that

day, and if we are, then I would know that I would need the place marker." James demonstrated strong performance in considering accommodation options (step 2) and troubleshooting (step 5). Additionally, he excelled in considering the effectiveness of the accommodation he selected (step 5); he was explicit about the criteria he would use to make that determination, which were linked to the given task. James consistently reported on the interviews that he could perform the strategy *fairly well*, and on the social satisfaction survey, he expressed that the strategy was *a little hard to learn* but that he learned it *fully*.

James reported on the social satisfaction survey that he used the SAP in his classes *about half of the time*, and this frequency aligned with self-reports on the interviews and his SAP use write-ups. On approximately half of the interviews (Pretest, Week 3, Week 4) and write-ups, James noted that frequent absences prevented him from using the strategy in his classes. However, the other interviews and write-ups documented strategy application. On the Week 2 interview, James recounted an instance of using the SAP in his history class:

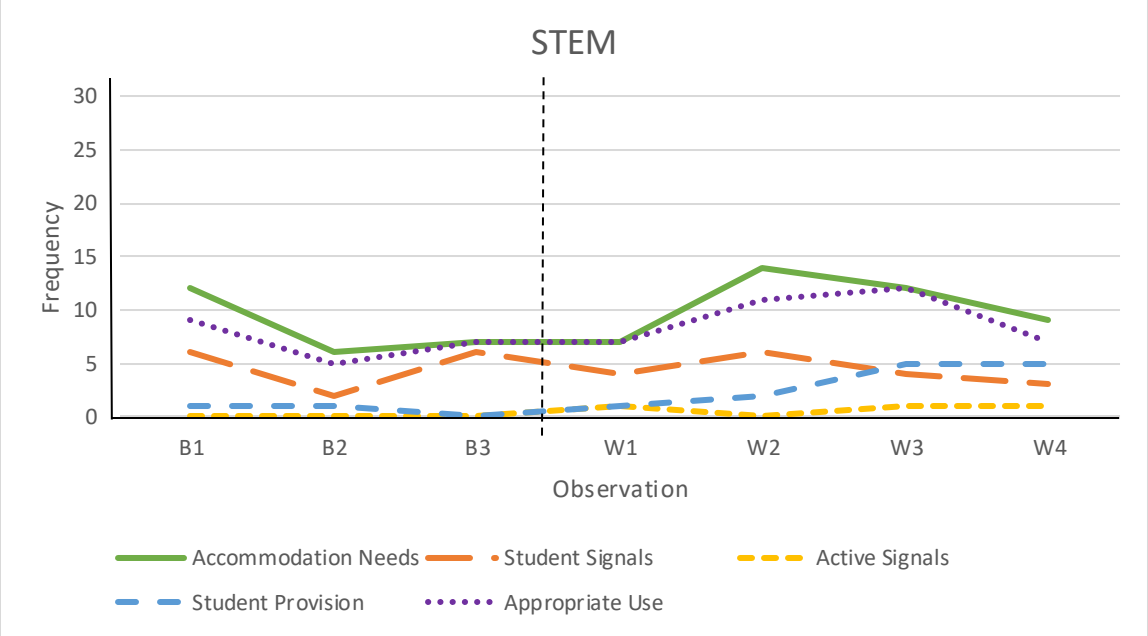
> We were reading from the textbook in history and I think, I cannot remember exactly, but I think I was having trouble keeping up with everyone else, so I thought about whether it would be appropriate for me to listen instead of reading it and then I kind of figured that 'yep, it probably would be' so then I thought about how I would get that so I asked the teacher if I could just listen and she said 'yes' and then I thought about whether it was working or not, and it was.

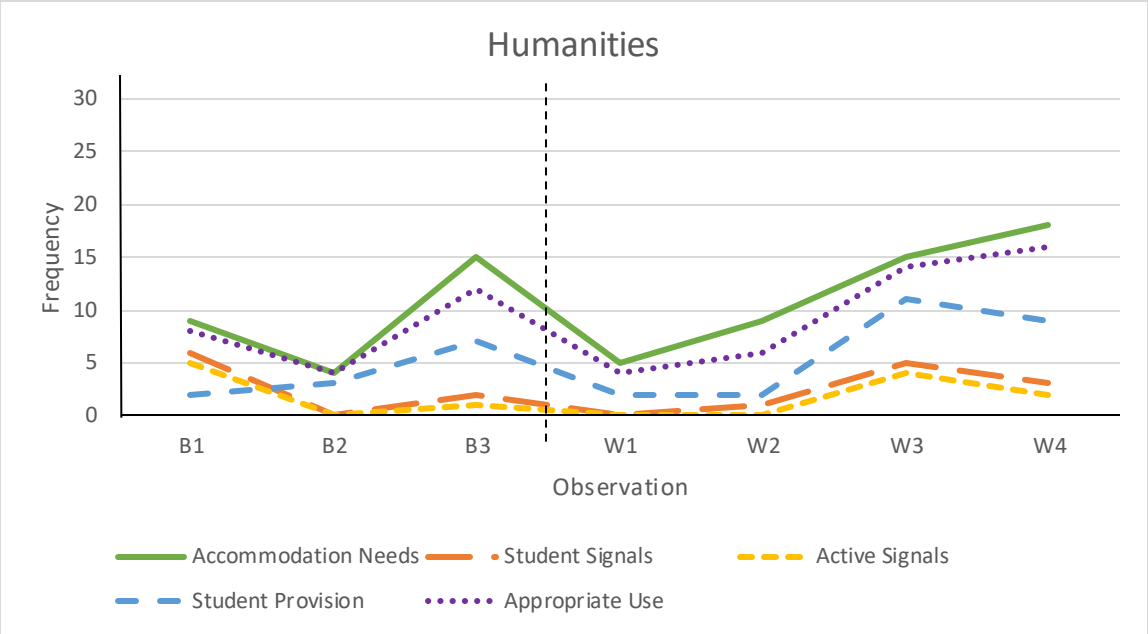
Similarly, James's first write-up worked through the strategy steps. However, his later write-ups (those that did not report frequent absences) focused more on independence and

using accommodations without teacher prompting than on explicit application of the SAP steps.

Observed trace evidence—and one instance of overt evidence—support James's assertions and accounts of using the SAP in his classes. Figure 11 displays trace evidence of classroom strategy use: number of accommodation needs, number of times that James signaled an accommodation need, number of active student signals, number of student-provided accommodations, and the number of accommodations that he used appropriately.

Figure 11. Trace evidence of classroom application, James





In STEM, James exhibited a steady decline in the rate of student signals relative to the number of accommodation needs during Classroom Application and Ongoing Support; however, all of the rates were within the range of Baseline observations. Student signaling was much lower in humanities than in STEM, but the rates after strategy instruction were still within the range of those before strategy instruction. James did not engage in any active signaling during Baseline for STEM, so the active signals observed during Classroom Application and Ongoing Support were an improvement even though they were not frequent. The rates of active signals relative to the number of student signals varied in humanities. Three observations (Baseline 2, Week 1, Week 2) did not have any active signals; although, in the other weeks, at least half, and up to 80% of James's signals were active. Overall, there were limited changes to signaling after strategy instruction, but the increase in active signaling in STEM indicates strategy use in that class. James demonstrated a steady and substantial increase in provision of his own accommodations in STEM during Classroom Application and Ongoing Support, which

further indicates strategy use. In humanities, however, the rates of student provision of accommodations compared to the number of needs remained in the range of Baseline, which varied between 21% and 75% student provision. James used almost all of his accommodations appropriately throughout the study in both STEM and humanities. Variability in appropriate use can primarily be attributed to uncertainty on the part of the observer. For example, James regularly received language support accommodations that were presented to his entire class. If James did not respond to the support, appropriateness could not be determined. The appropriate use of accommodations during Classroom Application and Ongoing Support may have been related to the SAP, but because his rates of appropriate use were high during Baseline observations, this is difficult to determine.

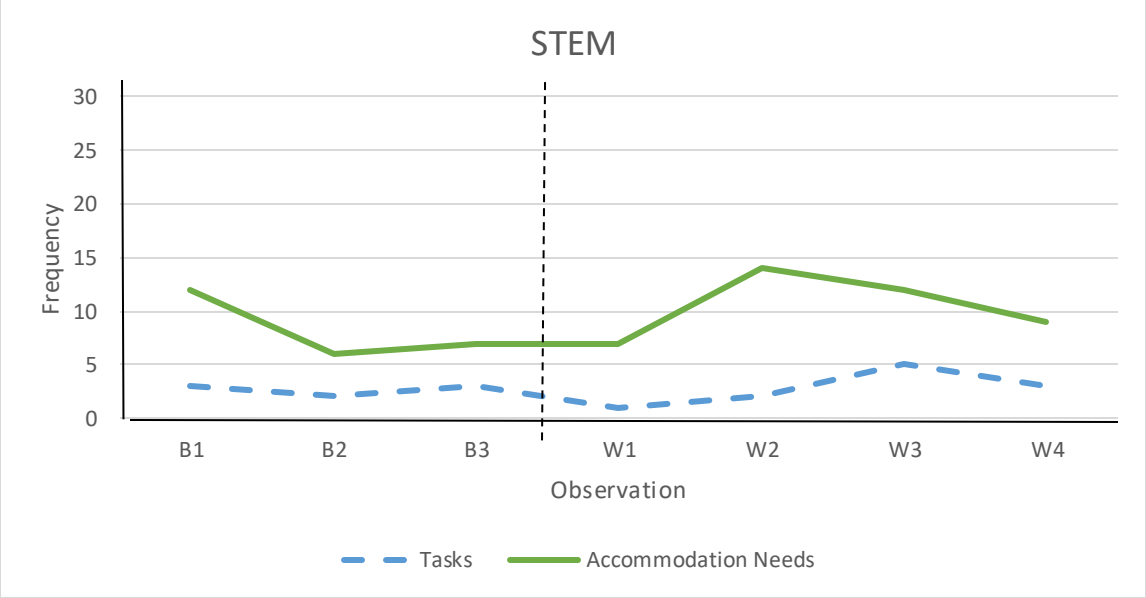
James had one anomalous observation in which his humanities teacher was absent. The students in James's class were sent to different locations in the school to complete an assignment that the teacher had sent them electronically. Because James and the observer were the only ones in a particular room, James engaged in think-alouds as he used the SAP to consider accommodations for his assignment. Thus, he provided an overt observation of strategy application in one of his classes. For example, he said, "I am going to start a new [electronic] document for this essay instead of using the assignment page. It will be easier to e-mail back and to spellcheck without the assignment prompt getting in the way."

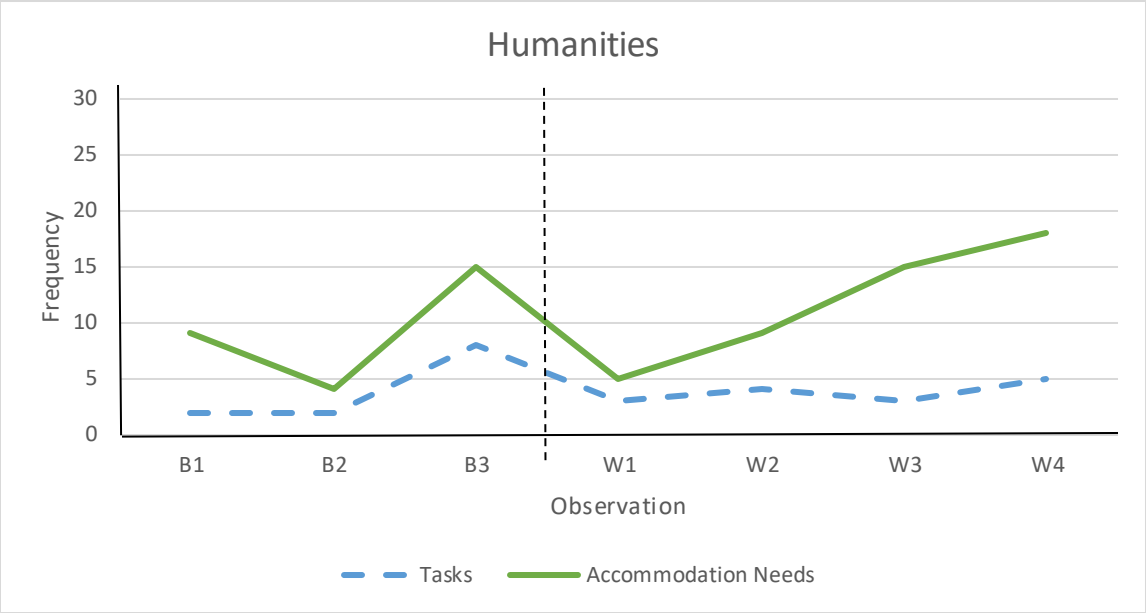
Accommodation Practices

Data on accommodations practices indicate that James did not experience changes in the frequency or type of accommodations used after learning the SAP. However, he did improve in engagement, independence, and advocacy.

Rate of need. James's rate of accommodation needs per task in STEM peaked immediately after strategy instruction but then returned to Baseline levels. On average, he needed 3.13 accommodations per task during Baseline and 3.82 during Classroom Application and Ongoing Support. There was no obvious pattern to changes in the number of accommodations that James needed compared to the number of tasks in humanities. He needed an average of 2.33 accommodations per task before strategy instruction and 3.13 after. Figure 12 shows the number of accommodation needs James exhibited compared to the number of tasks for each observation.

Figure 12. Tasks and accommodation needs, James





Type of accommodations. Most of the types of accommodations that James used remained consistent from Baseline to Classroom Application and Ongoing Support. The most commonly-observed accommodations were access accommodations (38.9% of all accommodations) and content support (21.5% of all accommodations). This was the case overall and for each stage of observation. Furthermore, the most often-used accommodations aligned across observations, accommodation checklists, SAP use write-ups, and James's preferred accommodations list. According to accommodations checklists, James's most commonly-reported accommodation was auditory lessons and materials, which constituted an access accommodation. James also referenced auditory lessons and materials in the form of read-alouds on his SAP use write-ups and on his preferred accommodation list for English, history, and Algebra I. The next most common accommodations by self-report were an electronic notetaker and braille materials, which also fell in the category of access accommodations. These were mentioned on the write-ups and preferred accommodations list as well.

One exception to the consistency with which James used his accommodations before and after strategy instruction was environmental awareness accommodations. They were rarely observed during Baseline but observed regularly during Classroom Application and Ongoing Support. Furthermore, James listed some accommodations as preferred accommodations that were observed or reported on the accommodations checklist infrequently. These included his iPhone, clarifying directions, outlines for writing, calculator, breaks, tactile graphics, and modeling/cuing.

Advocacy. Although the types of accommodations that James used remained consistent from Baseline to Classroom Application and Ongoing Support, one noticeable change that occurred regarding his accommodations practices was an improvement in advocacy after strategy instruction. Instances of advocacy were observed, but they were also documented on the SAP use write-ups and commented on by James's humanities teacher. On the write-ups, James detailed occurrences of advocacy when he needed accommodations that he could not provide himself, specifically requesting and justifying read-alouds in humanities and requesting directions to a braillewriter during a STEM class. Additionally, James's humanities teacher noted that James was taking more initiative in requesting extra time on assignments when legitimately needed.

Engagement. In addition to demonstrating improvements in advocacy, James made improvements in engagement after strategy instruction. His SAP use write-ups documented that he gained independence in initiating accommodations use; he needed less prompting from his teachers. James's humanities teacher also reported that he made improvements in completing assignments on time. Additionally, the teacher surveys primarily evidenced improvements in engagement. When struggling in class, James

advanced in seeking assistance from *seldom* to *about the same as peers* in STEM and from *a little bit less than peers* to *often* in humanities. The STEM teacher consistently reported that James sought to meet challenges himself *about the same as peers*, but his humanities teacher noted improvement from *a little bit less than peers* to *almost always*. Regarding some of the outcomes of engagement, James remained consistent in learning *(about average*), declined slightly in achievement *(a little bit above average* to *about average*), and increased in participation (*a little bit less than peers* to *a little bit more than peers*) in STEM from Baseline to Classroom Application and Ongoing Support. According to James's humanities teacher, he improved in all of these domains in humanities. Her ratings for James on learning improved from *a little below average* to *very well*, achievement advanced from *about average* to *very well*, and participation increased from *a little bit less than peers* to *a little bit more than peers*.

Influencing Factors

Several within-student and environmental factors influenced James's performance of the SAP and his accommodation practices. These factors had a largely positive impact.

Within-student factors. According to James's cumulative folder review, he demonstrates high-average verbal abilities and extremely high auditory working memory, both of which were beneficial for recall and comprehension of the SAP. James's auditory working memory also supports his preference for auditory materials and read-alouds. Conversely, James struggled with mathematical reasoning and decoding. Challenges with mathematical reasoning aligned with high rates of content support during STEM observations. Additionally, weak decoding skills, as observed and mentioned by James in

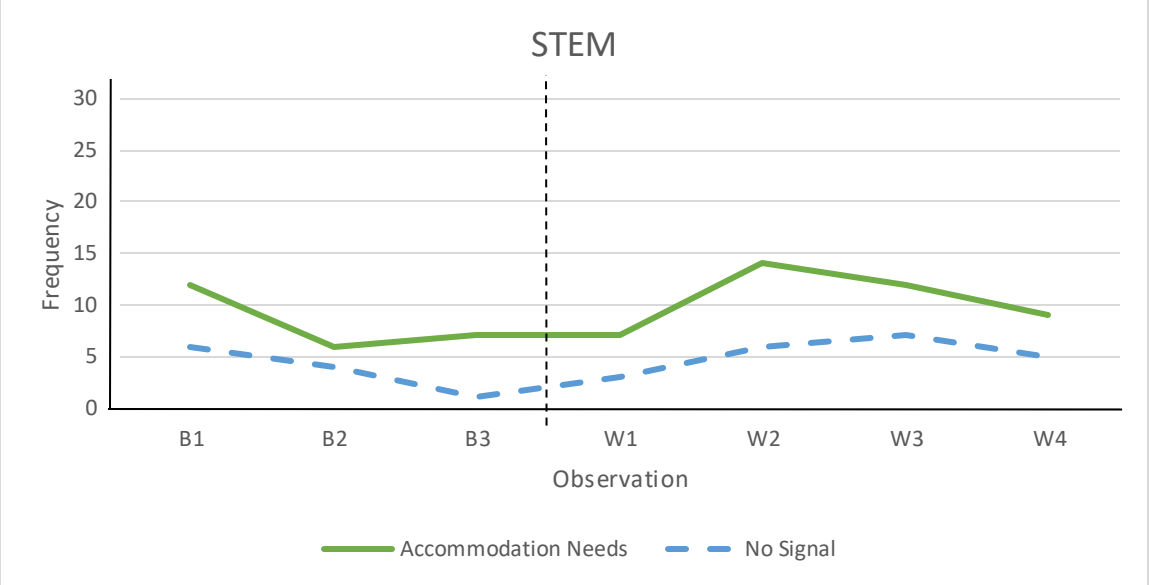
the SAP use write-ups, prompted James to apply the SAP primarily in humanities, and it implicated James's preferred accommodations of read-alouds and extra time.

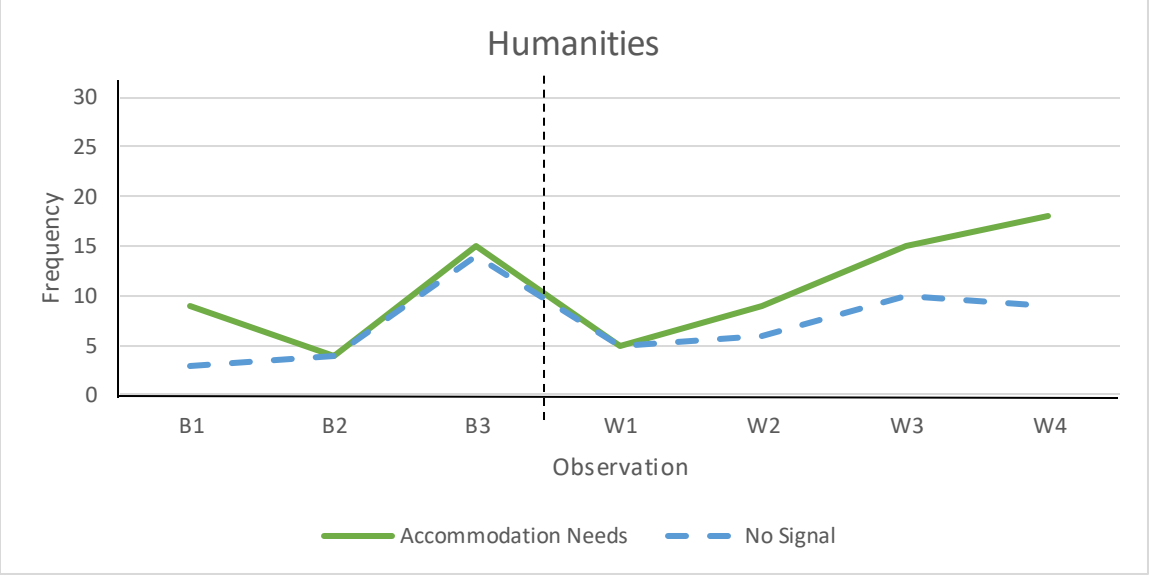
Another within-student factor that fostered strategy performance was James's willingness to advocate. For the other participants, advocacy was an outcome of strategy instruction, but for James the willingness to advocate improved his ability to perform the SAP. This willingness to advocate was apparent on many data sources including the preferred accommodations list, interviews, write-ups, and teacher comments. It promoted SAP performance in that James was willing to consider a greater range of accommodation options (step 2) other than just those he could provide himself (step 3). For example, on one of the write-ups, James submitted the following description of using the SAP:

> I used the strategy in history class on Tuesday. We were reading a section from the textbook, and I was having trouble keeping up. I asked the teacher if I could just listen instead of reading, and she said that would be fine…

Environmental factors. James used accommodations with fairly high rates of *no signals* (i.e., no precipitating indication from the student or teacher that an accommodation would be needed) during STEM and humanities observations. The number of *no signals* that James experienced in each observation compared to the number of accommodation needs is presented in Figure 13. On the whole, approximately 50% of his accommodation needs in STEM and 70% in humanities were not precipitated by a signal. High rates of *no signals* seem to indicate a familiarity and routine with accommodations use, which is supported by the consistency of accommodations use before and after strategy instruction.

Figure 13. No signals and accommodation needs, James

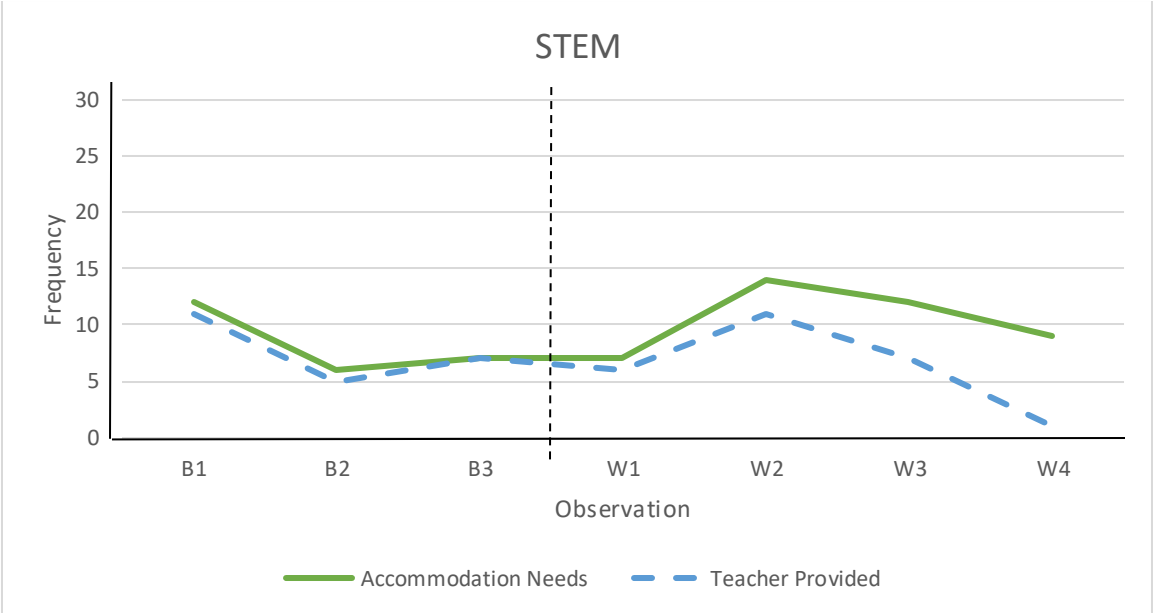


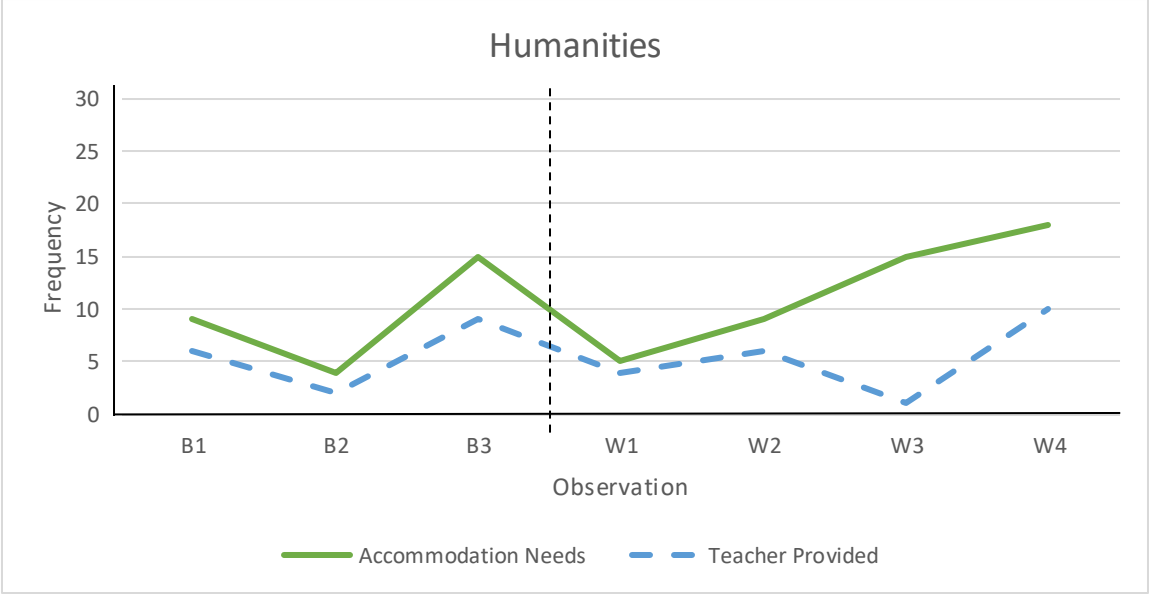


In addition to high rates of *no signals*, many of James's accommodations, in both STEM and humanities, were provided by a teacher. Figure 14 shows the number of teacher-provided accommodations compared to the number of accommodation needs for each observation in STEM and humanities. Although the rate of teacher provision relative to accommodation needs steadily declined in STEM after strategy instruction, all observations except Week 4 had at least 60% teacher-provided accommodations.

Typically, accommodations were teacher-provided out of necessity, such as content support, language support, electronic documents, and environmental awareness. While teacher provision likely hindered student provision of accommodations, it may have provided opportunities for advocacy.

Figure 14. Teacher provision and accommodation needs, James





Metacognition and Self-Regulated Learning

James demonstrated metacognitive knowledge and SRL skills on several data sources. While he exhibited strengths in multiple domains, data do not indicate that he improved in metacognition or SRL after strategy instruction. The only indication of weakness for James came from the teacher surveys completed by his STEM teacher, but they do not align with other data sources.

James's pre-/post- responses to the *Junior Metacognitive Awareness Inventory* (Sperling et al., 2002) do not exhibit a noticeable pattern of change after strategy instruction. Table 8 shows his scores. His self-ratings in the domains of procedural knowledge, declarative knowledge, monitoring, and evaluation remained consistent. Conditional knowledge showed variable changes (i.e., response to item 2 increased, item 5 remained the same, and items 13 and 14 decreased). Ratings for planning and information management decreased slightly from pre- to post- administrations of the survey.

Table 8. Junior Metacognitive Awareness Inventory Scores, James

Domain	Item	Pre- Response	Post- Response
Declarative Knowledge	1	Often	Always
	4	Often	Often
	12	Always	Always
Procedural Knowledge	3	Always	Always
	16	Often	Often
Conditional Knowledge	2	Often	Always
	5	Always	Always
	13	Often	Sometimes
	14	Always	Often
Planning	9	Sometimes	Sometimes
	18	Always	Often
Information Management	6	Never	Sometimes
	11	Always	Often
Monitoring	8	Often	Often
	10	Often	Sometimes
	15	Often	Often
Evaluation	7	Sometimes	Sometimes
	17	Often	Often

The *Junior Metacognitive Awareness Inventory* indicated strengths for James in procedural knowledge and declarative knowledge, which was supported by other data sources. James's humanities teacher reported that James was capable in these domains before strategy instruction but improved after strategy instruction. Regarding knowing expectations (i.e., declarative knowledge), she rated James's awareness as *a little bit more than peers* at Baseline and *almost always* during Classroom Application and Ongoing Support. For proficiency in a range of skills (i.e., procedural knowledge), James advanced from *about the same as peers* to *almost always*. James also demonstrated procedural knowledge on one of his SAP use write-ups in knowing how to asking for a listening accommodation when reading was expected and declarative knowledge during

an observation when he explained that starting a new electronic document would allow for easier return to the teacher and utilizing spellcheck.

James demonstrated other areas of metacognitive knowledge and SRL skills as well. He utilized conditional knowledge on the interviews in indicating that accommodations were context-dependent. For example, at Pretest, James was presented with a hypothetical accommodation of using headphones to listen to descriptive audio on videos. James understood that not all videos have descriptive audio and that his need for the accommodation was contingent upon this feature, not simply the use of a video. On the SAP use write-ups, James used conditional knowledge when he explained that his braillewriter was an appropriate accommodation for math due to the spatial arrangement of problems. Also, he indicated on the write-ups that when he was able to keep up with reading in history, the appropriate accommodation was his electronic notetaker, but when he could not keep up with reading, then the appropriate accommodation was listening to a read-aloud. Furthermore, James demonstrated monitoring and evaluation—both SRL skills—on the write-ups. Monitoring was used when he realized that he was not keeping up with in-class reading, and he showed evaluation in explaining "I then thought about whether [listening] was working, and I decided that it was because I was able to comprehend what was being read." James also excelled in evaluation on the interviews, which corresponded to step 5 of the SAP.

The only indication of limited capabilities in metacognitive knowledge for James was his STEM teacher's ratings of knowing expectations and proficiency in a range of skills, both of which decreased from *about the same as peers* to *a little bit less than peers* after strategy instruction. This report does not align with other data on metacognition and

may be specifically associated with the STEM context as James's cumulative folder indicates a particular challenge with mathematics.

Strategy Effectiveness

James found the SAP beneficial. He expressed that it would be *often helpful* for students receiving special education services on the social satisfaction survey. Additionally, he rated the SAP as *usually helpful* on all interviews in fostering responsibility for accommodations. When asked to give reasons why students should use the strategy, James consistently responded that the SAP helps him to recognize when he does not need an accommodation and that the strategy guides him to critically, systematically, and explicitly think about his accommodations so that he does not waste time on "random" accommodations.

Summary

James demonstrated sufficient general knowledge of accommodations and considerably increased his awareness of his own accommodations. He learned and performed the SAP very well, including performance on the interviews and application of the strategy in his classes. Several factors such as verbal skills, working auditory memory, and a willingness to advocate for his accommodations fostered his strategy learning and use, and he viewed the strategy favorably. After strategy instruction, the accommodations that James used remained relatively consistent, but he improved in the areas of engagement, independence, and advocacy. James demonstrated declarative, procedural, and conditional metacognitive knowledge as well as the SRL skills of monitoring and evaluation. Ultimately, James learned to be strategic in selecting and

utilizing his own accommodations, which improved his engagement and learning in core content classes.

Cross-Case Analysis

The individual cases were compared for trends to reveal key findings regarding the SAP, strategy instruction, and student performance. The goal of this comparison was not to develop a collective case but to discern differences among and similarities across the participants that indicated key findings (Khan & VanWynsberghe, 2008). In line with this goal, a typology approach was used to group participants by similar patterns of learning and performance; the groupings varied across the phenomena being considered. This section begins with a brief overview of each participant, and then key findings are presented by research question.

Participant Overview

Emily. Emily is best described as inconsistent, and this characteristic extended to her learning of and practice with both accommodations and the SAP. She improved her understanding of the purpose of accommodations and familiarity with her own accommodations, but she never learned the definition of accommodations. She performed some components of the strategy very well, such as troubleshooting, but was challenged by other aspects, such as evaluation. And, she demonstrated some metacognitive knowledge, but did not improve in this area, nor in self-regulated learning. Over time, Emily increasingly capitalized on the skills and knowledge that she did have when applying the SAP in her classes, but she did not use the strategy in its entirety. Relative to the other participants, Emily's SAP learning and performance on the interviews was on the lower end of the spectrum. It was sufficient but not comprehensive. While her in-class

strategy application also tended to be incomplete, she nonetheless used the SAP more often in her classes than Evan or Graham.

Evan. Evan improved his understanding of accommodations in general and his recall of his IEP accommodations. He learned the SAP well, as demonstrated on the interviews, but he did not apply the strategy in his classes. Evan's lack of in-class use was partially volitional, largely due to his familiarity with class routines and high achievement in each class; however, he anticipated that the strategy would be beneficial when he transitions to college, which seems to explain the disconnect between strong strategy performance on interviews and limited application in his classes. Metacognition and SRL did not change after strategy instruction for Evan, although, he evidenced metacognitive knowledge on multiple data sources. In comparison to the other participants, Evan's ability to recall, comprehend, and perform the SAP on the interviews was very good, second only to James. However, his high learning and performance in isolation contrasts with his non-use in the classroom, which was less in-class application than James and Emily but equivalent to Graham's.

Graham. Graham evidenced knowledge of accommodations throughout the study. He learned the SAP steps and how to perform them; although, he rarely recalled or performed all of the steps on a single interview. The steps that Graham forgot or did not perform accurately varied across interviews, meaning that at some point, he knew and performed each of the strategy steps. In his classes, however, Graham did not apply the SAP, primarily due to emotional-behavioral challenges. While he did not improve metacognitive knowledge, nor self-regulated learning skills with strategy instruction, he did demonstrate metacognitive knowledge on multiple data sources. Like Emily,

Graham's strategy learning and performance on the interviews was rarely complete, but at some point, he could recall and perform each of the steps. His application of the SAP was comparable to Evan's in that neither demonstrated trace evidence nor self-reported in-class use.

James. James somewhat improved his general understanding of accommodations and substantially increased his ability to name his own accommodations. He demonstrated strong recall, comprehension, and performance of the SAP on all of the interviews. He also regularly applied the strategy in his classes. James demonstrated metacognitive knowledge and SRL skills throughout the study, the latter of which was not evident with the other participants. Also, when compared to the others, his SAP learning, performance, and application was the strongest.

Accommodations Knowledge

Generally, the participants increased or maintained an initially strong knowledge of accommodations, including the definition and purpose of accommodations, eligibility for accommodations, and, namely, awareness of their individual accommodations. All of these elements were taught to the participants in the first phase of strategy instruction. Learning these characteristics of accommodation was required for each participant to move to the next phase of instruction, and these topics were reviewed throughout strategy instruction. This indicates that explicit instruction and frequent review of accommodations knowledge improved participants' understanding of accommodations and familiarity with their own accommodations.

Strategy Learning and Performance

Most of the findings pertaining to SAP learning and performance are variable across the participants, but the variability indicates relationship among recall, comprehension, and performance when the cases are compared. The participants varied in their recall of the strategy steps; however, they all demonstrated an ability to recall the full strategy on at least one interview. While Evan and James were very consistent in their ability to name—or paraphrase—the strategy steps, Emily and Graham were less consistent. Similarly, the participants varied in their comprehension of the purpose of the SAP. In general, James and Evan understood the purpose of the strategy more comprehensively than did Emily or Graham, who maintained more narrow understandings of its purpose. Additionally, Evan and James demonstrated stronger performance of the strategy on interviews than Graham and Emily. These trends indicate that consistent and complete recall of the SAP steps and comprehensive understanding of the strategy purpose are associated with better performance of the strategy.

While a relationship is evident among the three dimensions of learning, learning did not correlate with in-class strategy use. Data indicate that half of the participants employed the SAP in their classes while the other half did not, but the pairings differ from similarities in learning. Trace evidence from observations, self-reports from interviews, and SAP use write-ups (which were only submitted by Emily and James) agreed that James completely and Emily partially used the strategy in their classes; whereas, Evan and Graham did not implement it in their classes at all.

Overall, the participants learned and performed the SAP; although, their levels of accuracy and classroom use varied. This speaks to the accessibility of the SAP. Before

the current study, the SAP was modified in an attempt to improve accessibility based on implications from previous research (Scanlon et al., in review). The language used in each step was simplified, and the number of steps was condensed from seven to five. Even with variability, the participants learned and performed the SAP sufficiently to indicate that it is accessible in its current form.

Accommodation Practices

In contrast to strategy learning and performance, findings regarding accommodation practices were fairly consistent across the four participants. The most commonly-used type of accommodation was access accommodations, which did not change from Baseline to Classroom Application and Ongoing Support. The category of access accommodations included specific accommodations such as electronic notetakers, laptops, braille materials, and large print. Accommodations for content support were the second most often used. Like access accommodations, this was the case before and after strategy instruction. Content support included prompting, strategies, and resources. Data sources (i.e., observations, preferred accommodation lists, accommodation checklists [except for Graham]) agreed on the most commonly-used accommodations. The consistency of use and agreement among data sources regarding the most common accommodations indicates the value of these accommodations in the participants' education.

In addition to the trend of most-common accommodations, similarities were noted among the participants regarding advocacy. The teachers indicated that the participants improved or maintained high performance in seeking assistance when facing a challenge, which corresponds to advocacy for accommodations. Three of the four participants also

demonstrated advocacy during observations after strategy instruction; the exception was Graham. The key distinction between advocacy and active signaling was that the former included a rationale or justification for a particular accommodation option. Advocacy was not frequent enough to identify it as a trend, but there were noticeable instances of advocacy during Classroom Application and Ongoing Support that were not observed during Baseline. This indicates a connection between strategy instruction and advocacy, but because advocacy was not an explicit component of strategy instruction nor frequently observed, it is difficult to determine the precise relationship.

Influencing Factors

While each of the participants had unique factors that influenced their strategy learning and performance, three factors had a substantial impact on all of the participants: verbal and reasoning skills, achievement, and emotions/behaviors. The effect of each factor on the participants varied, however. For some, the factor fostered strategy learning and performance, but for others, it impeded it.

First, verbal and reasoning skills impacted strategy learning and performance. Evan and James had higher verbal and reasoning abilities, as documented in their cumulative folders, which corresponded to stronger strategy learning and performance. On the other hand, Emily and Graham demonstrated lower verbal and reasoning skills. Their ability to recall the strategy steps was less consistent, and they struggled to perform more of the steps than did Evan and James.

Additionally, the participants' achievement in the observed classes influenced their strategy use. If participants did well in a class, they were less likely to use the SAP, presumably because they did not perceive a need to improve their engagement and

learning. Specifically, Evan and Graham demonstrated relatively high achievement, and they neither reported nor were observed to use the strategy in STEM or humanities. If participants struggled in a class, then they were more prone to apply the strategy, most likely because they viewed the strategy as a tool for improving achievement. This was the case for Emily and James, who demonstrated notably lower levels of achievement. It was previously asserted that in-class use did not correlate to strategy learning. Rather, data indicate that strategy use in STEM and humanities is associated with student achievement in those courses.

The final factor that substantially influenced strategy performance was emotional-behavioral (dys)regulation. The one participant most capable of regulating his emotions and behaviors (James) exhibited the best strategy performance, and he most often applied the strategy in his classes. However, the other three participants had teacher reports, demonstrations, and/or diagnoses indicating emotional variability, anxiety, depression, and maladaptive behaviors. Examples of corresponding emotions and behaviors were reported in the individual cases. Instances of emotional-behavioral dysregulation impacted strategy instruction to some extent, but more so, they affected the participants' engagement in their classes, which then precluded strategy use. Furthermore, when facing an emotional-behavioral challenge, the three participants were less likely to actively signal for an accommodation, provide their own accommodations, and use those accommodations appropriately. Emotional and behavioral (dys)regulation had the most noticeable—and probably most profound—influence on strategy performance and use indicating that participants who struggled to regulate their emotions and behaviors had difficulty using a strategy to regulate their learning.

Metacognition and Self-Regulated Learning

The participants did not demonstrate obvious patterns of change in metacognition or SRL based on a comparison of their pre-/post- responses to the *Junior Metacognitive Awareness Inventory* (Sperling et al., 2002). However, the participants exhibited abilities and relative strengths on multiple data sources, typically in domains of metacognitive knowledge and rarely in domains of SRL. Collectively, the participants excelled in the domain of conditional knowledge, which is one element of metacognition. This means that they understood in which contexts to use certain accommodations and why those accommodations were appropriate for those contexts. Conversely, three of the participants (excluding James) had a weakness in the SRL domain of evaluation. Thus, they experienced difficulty with assessing the effectiveness of a chosen tool or strategy, which corresponded to step 5 of the SAP.

Although the participants did not demonstrate growth in metacognition or SRL after strategy instruction, metacognition and SRL nonetheless related to strategy performance. The participants' metacognitive knowledge allowed them to perform the early steps of the SAP fairly well. Declarative knowledge assisted with step 1, knowing *that* an accommodation is or is not needed. Conditional knowledge helped the participants know *when* or *why* an accommodation was appropriate (step 2). Procedural knowledge supported steps 3 and 4 of considering *how* to obtain and then actually using an accommodation. However, a lack of or limited SRL skills seemed to hinder strategy initiation. Specifically, challenges in the SRL domains of planning and information management might not have allowed participants to recognize opportunities to use the SAP. Also, weakness with evaluation interfered with performance of step 5, which

directed them to assess the effectiveness of a selected accommodation. It is worth noting that the one participant who demonstrated some self-regulated learning (James) also exhibited the best strategy performance and was most likely to use (initiate) it in his classes. Overall, the participants were more likely to think about their accommodations from a metacognitive perspective than a self-regulated learning perspective, which impacted strategy performance and limited in-class use.

Strategy Effectiveness

All of the participants agreed that the SAP is a beneficial tool. They believe that it would be *very* or *often* beneficial for students in special education in addition to recognizing that it prompted them to take more responsibility for their accommodations and improved how well they used their accommodations. While previous research indicated that student perceptions of the strategy impacted strategy learning and performance (Scanlon et al., in review), the converse seems to be true for these participants. Specifically, Graham's opinions declined (although still largely on the positive side) over time as he realized that he was not using the strategy in his classes. On the other hand, Emily and Evan's opinions on the SAP improved over time as they gained familiarity with the strategy. Thus, strategy use influenced their perceptions on the value of the strategy.

Chapter 5: Discussion

This chapter further discusses important trends in findings as they relate to existing literature on accommodations and the education of students with visual impairments. Topics include accommodations, self-determination, and regulation. Next, implications for research and practice are presented. Then the relevance of this study for the field of visual impairments is addressed. The chapter ends with limitations of the study and concluding thoughts.

Accommodations

The accommodations most commonly used by the participants in this study were accommodations that provided access to instruction, materials, and assignments and those that supported the participants as they engaged with the content of each of their classes. Examples of access accommodations are electronic notetakers, laptops, electronic materials, braille, and large print. Content support accommodations included prompting, strategies, and resources. These two categories of accommodations align most directly with the purpose of accommodations according to Lee et al. (2010), they allow students to access and advance in the general education curriculum.

The emphasis on access accommodations also supports Yarbrough, Trotter, and Lewis's (2019) finding that teachers of students with visual impairments (TVIs)—in their role as related service providers—tend to prioritize their instruction on tools, materials, and skills that most directly relate to accessing the general curriculum. Not only do TVIs focus on compensatory access and assistive technology (many of the access accommodations used in this study are assistive technology devices), these are also among the areas for which they report providing the most effective instruction. Attention to access and especially assistive technology is heavily influenced by the amount of time

that TVIs have available to work with students as well as their caseload size (Johnstone et al., 2009; Yarbrough et al., 2019). The participants involved in this study, because they attend a specialized school for students with visual impairments, received instruction in and practice with their access accommodations in isolated contexts (e.g., braille or technology classes) and in core content classes over several years. Additionally, the teacher-to-student ratio (the correlate to caseload size for TVIs working in public schools) is small. Both of these factors increase the amount of support students receive in learning to use their accommodations, which likely contributed to a greater variety of access accommodations used by each participant and adeptness with them beyond what is expected of students with visual impairments in inclusive settings based on limited time with their TVIs and large caseload sizes.

Like access accommodations, accommodations for content support align closely with the purpose of accommodation in that they allow students to advance in the curriculum (Lee et al., 2010). Additionally, the prevalence of content support connects to trends apparent in literature regarding schools for students with visual impairments. One trend is that most students enrolled in these schools have concomitant disabilities (Mahon, 2014). More specifically as it applies to this study, students who participate in academic programs at specialized schools tend to exhibit learning challenges that precluded them from making sufficient progress in the general curriculum in their local schools. Consequently, content support is one reason for enrolling them in a school for students with visual impairments. The other trend is that classroom teachers at specialized schools are uniquely situated to provide content support accommodations because they are trained both in working with students with visual impairments and in the

academic subjects that they teach (Allman & Lewis, 2017). Not only do the teachers know how vision-specific accommodations can and should be used in the content learning context, they understand how to make content-based accommodations accessible to students with visual impairments.

Student awareness of their accommodations is another trend in the present study that relates to existing research. Erin et al. (2006) and Lusk (2012) assert that students with visual impairments need support in making data-based decisions regarding their accommodations. However, a notable trend in this study indicates that students may need more foundational support upon which data-driven practices can then build. The four participants in this study could not identify many of their accommodations before strategy instruction, even though they were nearing the end of their high school education, but when their accommodations were listed for them, they were familiar with almost all of them. This may indicate that some students with visual impairments know the tools that they use, but particularly in naturally-accommodating environments, however, they may not recognize the exceptionality of those tools as accommodations. With limited awareness of their accommodations, students cannot accurately anticipate how they would function in novel settings (e.g., work, college) nor can they advocate effectively for the accommodations that they need.

Self-Determination

As noted in the introductory chapter, this intervention's intention of increasing student involvement in the accommodations process relates to self-determination, the practice of making decisions for oneself and/or acting on one's own behalf (Argan et al., 2007). Elements of pre-teaching used in this study and the SAP itself parallel Sapp and

Hatlen's (2010) criteria for fostering self-determination for students with visual impairments. The participants understood their abilities and disabilities through the activities list completed during pre-teaching: for each activity commonly encountered in a core content class, the participants discussed with the researcher their strengths and weaknesses. They knew the choices available to them by learning their individual IEP accommodations. The ability to advocate for or take advantage of their choices and the freedom to make their own choices corresponded to elements of the strategy.

Even with the alignment of the strategy and strategy instruction to the components of self-determination, however, the intervention was not entirely effective in promoting self-determination. This supports Robinson and Liebermann's (2004) evidence that students with visual impairments not only engage in self-determination infrequently but that their engagement does not increase in adolescence. Their findings also indicate that these limitations may be related to high levels of involvement from teachers, which corresponds to the moderate to high rates of teacher provision of accommodations in this study. Another explanation that Robinson and Liebermann offered is that students with visual impairments may be hindered by a lack of instruction or skill in self-determination. However, the participants in this study were explicitly instructed in self-determination knowledge and skills, but especially Graham and Emily remained overly-reliant on others to make decisions or take action on their behalf. This may indicate that habit or learned helplessness can impede self-determination even after instruction.

Self-determination is often associated with independence even though the two are not synonymous. The distinction between these concepts was important to consider in the present study because of the necessity of teachers providing some of the participants'

accommodations. James and Evan provided indications, through interviews and observations, of what self-determination looks like when involving others is necessary. The first indicator is that they took responsibility for deciding if and which accommodation was needed. They also knew that the selected accommodations were permissible because they were listed on their respective IEPs. It is worth noting that James and Evan did ask permission to use some of their accommodations; however, this occurred as an act of respect for the teacher or as a means of initiating the accommodations, not because they thought they needed teacher permission. In contrast, Emily and Graham sought permission for their accommodations because they did not believe that the decision was theirs to make, which indicates that they did not recognize the freedom to make their own choices. James and Evan initiated their accommodations by implementing ones to which they had access or by requesting others that needed to be teacher-provided. Finally, they knew that they had the right to respectfully redirect accommodations provided by a teacher if they did not meet their needs. Essentially, self-determination meant that they retained control of their accommodations even when they could not provide them themselves.

Regulation

Forms of self-regulation were confirmed as relevant to learning and performing the SAP. One of the most apparent trends in this research is the impact that emotional-behavioral challenges had on strategy learning and performance and accommodation practices. To some extent, dysregulation of emotions and behaviors slowed strategy instruction in that, occasionally, participants were unable to focus on the SAP or related pre-teaching. More so, however, it hindered their engagement in their classes and

prevented them from using the SAP in those settings. Specifically, during instances of dysregulation, the participants were less proactive in requesting accommodations, less capable of providing their own accommodations, and less likely to use those accommodations effectively. The influence of emotional-behavioral dysregulation was further supported by the fact that the one participant without emotional-behavioral challenges (James) demonstrated the strongest SAP performance and most frequent application of the strategy in his classes. This trend is worth considering further because of the higher than average prevalence of emotional-behavioral disorders within the population of individuals with visual impairments (Demir et al., 2014).

Emotional and behavioral regulation is one component of self-regulation. As described in Chapter 2, self-regulation is the process of managing one's thoughts, behaviors, and emotions to attain a goal (Legault & Inzlicht, 2013). While self-regulation can be used in any context and to attain any goal, self-regulated learning distinguishes itself by utilizing select thought processes (i.e., planning, monitoring, evaluating) in academic environments for the goal of learning (Dinsmore et al., 2008). Given the educational setting and application of the SAP to learning tasks, this study aligned with self-regulated learning rather than self-regulation. Furthermore, previous research on the Student Self-Accommodation Strategy indicated that for the cognitive strategy to be learned and used well, instruction needed to incorporate principles and practices of self-regulated learning (Scanlon et al., in review). Despite the greater relevance of self-regulated learning, issues of self-regulation nonetheless hindered the intervention.

Furthermore, the current study's finding regarding emotional-behavioral dysregulation speaks to Lee et al.'s (2010) assertion that accommodations can reduce

challenging behaviors. There may be some element of contradiction in that accommodations responding to emotional and behavioral challenges were less likely to be used effectively in this study than other types of accommodations. However, the two findings together more so seem to indicate a "catch-22": accommodations decrease challenging behaviors, but challenging behaviors hinder accommodations use. Directly addressing self-regulation in the intervention may help break this cycle.

Implications

Findings from the present study have practical implications for the education of students with visual impairments in addition to implications for future research on the SAP. The first implication for practice is that TVIs should be intentional to not only teach students how to use accommodations but also to draw attention to the fact that they are accommodations. This may be more important for students who attend a school for students with visual impairments because of the naturally accommodating nature of these schools and because of the normalizing that occurs with accommodations in that setting. Student awareness of their accommodations is an essential component of preparing to advocate for those accommodations outside of primary and secondary school contexts (Sapp & Hatlen, 2010).

Another implication that relates to preparing students to advocate for their needs is that instruction in self-determination should begin when students are younger. Often the focus on self-determination intensifies (or begins) in adolescence. This may be due to an intentional focus on transition (e.g., the IDEA regulations for when IEP teams must consider transition planning) or the realization that typically-developing peers are well-versed in self-determination at that point. Waiting until the high school years, however,

may diminish the effectiveness of instruction in self-determination. By then, students may have habituated non-self-determined practices that they are resistant to change. Beginning instruction when students are younger, in developmentally appropriate ways, may help normalize self-determination so that students are more receptive to it as they mature.

Thinking specifically about SAP research, the present findings yield several implications for future studies. One is that the SAP itself is more accessible in its current form. Changes to the strategy from the previous study to the present one included simplifying the language involved in each step and streamlining the steps from seven down to five. The four participants sufficiently learned the steps and how to perform them indicating that this version of the SAP is appropriate to use in future research without warranting further revision.

Additionally, more time for instruction and practice would be beneficial for students with lower verbal and reasoning skills. This characteristic was associated with weaker learning and performance for the participants in the present study. Evidence did not indicate that they were incapable of learning and performing the strategy, simply that those with lower verbal and reasoning skills did not develop the same level of proficiency as participants with higher skills. More learning opportunities over a longer time would allow them to develop proficiency through increased practice and targeted instruction in the steps on which they struggle.

Another practice that might prove beneficial during strategy instruction in future studies is the use of in-class strategy coaching. Conceivably, this may serve three purposes related to strategy performance. First, it is anticipated to shift students from

intuitive, routinized accommodation practices to explicit, strategic accommodation use. Second, in-class coaching may encourage teachers to limit accommodation provision to necessities only, thereby increasing opportunities for SAP use. Finally, this practice would allow the teacher to prompt strategy use during emotional-behavioral dysregulation. Data on this function of in-class coaching would also contribute to an understanding on whether emotional and behavioral challenges impact students' abilities to perform the strategy or simply to initiate it. In-class strategy coaching could be implemented for a specified amount of time or it could fade based on student performance.

Continuing with implications for emotional-behavioral dysregulation, future research should attempt to anticipate participants' needs regarding self-regulation. As appropriate, the topic of self-regulation could be addressed in pre-teaching, and then incorporated in strategy practice. This includes providing several opportunities for students to practice the SAP related to instances of emotional and behavioral challenges and discussing with them what might prompt them to use the strategy when they are feeling overwhelmed/anxious/sad/angry/upset/frustrated. While these implications could be incorporated into a larger study, SAP research would benefit from a study specifically focused on the usefulness of the strategy for students with emotional-behavioral dysregulation. Not only has the impact of dysregulation on strategy learning and performance emerged as a hard finding in this study, it has been a soft finding in previous strategy research, especially for students with ADHD (Scanlon, Paisner-Roffman, & Nannemann, 2016).

An additional implication of the findings of the current study is a need for more time and focused instruction on self-regulated learning. The participants began the study with some metacognitive knowledge and continued to demonstrate it throughout the intervention. They did not begin the study with much awareness of regulating their own learning, however, and it was slow to develop if it developed at all. This indicates that more time and focused instruction are needed for students to develop skills in planning a course of action, in monitoring their own performance, in trouble-shooting if things are not working, and in evaluating the effectiveness of a chosen tool or strategy.

Finally, future SAP research should implement and investigate the strategy with students with visual impairments in public high schools. This implication is not based on findings but rather a logical next step for studying the SAP with students with visual impairments. Several factors differ between schools for students with visual impairments and public high schools that warrant this shift in research setting. First, public high schools are less accommodating for students with visual impairments, meaning that they will need more individualized accommodations to function in that environment. Second, students spend less time with their TVIs, which corresponds to less time for instruction and support in using their accommodations. Third, general education teachers are not knowledgeable about accommodations for students with visual impairments, placing greater responsibility on the students to advocate for and implement their accommodations. Thus, knowledge about the effectiveness of the SAP for students with VI in general would be discovered.

Relevance

In addition to the implications of the present study on educating students with visual impairments, this research is relevant to the field of visual impairments more broadly. It considers metacognition and self-regulated learning, which are almost non-existent in the literature. The study also relates to accommodations for individuals with visual impairments on a larger scale than education.

Metacognition and Self-Regulated Learning

In the existing literature, only one article currently addresses metacognition for students with visual impairments (i.e., Garb, 2000), with none on SRL. However, there are benefits to metacognition and SRL that correspond to challenges in the field of visual impairments. They improve achievement (Bishara, 2016; Dent & Koenka, 2016; Tanner, 2012), which can be a struggle for students with visual impairments, particularly those enrolled in specialized schools (Mahon, 2014). Even students in inclusive settings face lower expectations for achievement from the classroom teachers (Ajuwon et al., 2015; Bardin & Lewis, 2008). Metacognitive knowledge and SRL skills can counter inappropriate instructional practices commonly utilized in general education classrooms (Paris & Winograd, 1990). Not only are instructional practices a barrier to accessing the curriculum, instructional accommodations for students with visual impairments are not often implemented in inclusive classrooms (Abramo & Pierce, 2013; Jones et al., 2006; Rule et al., 2011; Wild et al., 2013). Additionally, an intentional focus on metacognition and self-regulated learning draws students' attention to an important similarity between themselves and typically-developing peers: all students have challenges to overcome in learning, experience confusion sometimes, and struggle with self-doubt (Paris &

Winograd, 1990). This would be a beneficial realization for students with visual impairments because many feel so stigmatized by the educational supports that they receive that they refuse their accommodations and/or to ask for help when needed (Rule et al., 2011). Furthermore, instruction in metacognition and SRL places more responsibility on students for their own learning while giving them the knowledge and skills that they need to do so effectively (Paris & Winograd, 1990; Pui, 2017; Tanner, 2012). This corresponds to several challenges facing students with visual impairments. Teachers report that these students exhibit lower levels of effort, motivation, initiative, and engagement that typically-developing students (Bardin & Lewis, 2008). Teachers and parents may provide too much support, leaving students without opportunities to develop skills in monitoring and directing their own learning (Robinson & Leibermann, 2004). Also, in inclusive classrooms, balancing individual and group needs can be difficult (Pui, 2017), which is further complicated by the fact that general education teachers lack experience and training in working with students with visual impairments (Ajuwon et al., 2015) while TVIs have limited availability to support students in the classroom (Herzberg & Stough, 2009; Zebehazy & Wilton, 2014a).

Although the present study does not use metacognition and SRL to address all of these challenges, it does highlight the application of metacognitive knowledge to accommodation practices and recognize the need for explicit instruction in self-regulated learning skills. Furthermore, it reintroduces the concepts of metacognition and SRL to the field of visual impairments, allowing researchers and practitioners to capitalize on the benefits experienced in other disability areas.

Accommodations

For individuals with visual impairments, accommodations are a necessity across the lifespan. Infants may need sound cues to know where a parent is in relation to them, and toddlers may benefit from having fewer toys on a shelf so that they can see each toy distinctly (Family Connect, 2019). Employers must provide "reasonable accommodations" according to the Americans with Disabilities Act to mitigate or overcome barriers in the workplace (American Foundation for the Blind, 2019). And, in retirement, seniors may benefit from adapted leisure activities such as audiobooks or braille playing cards (Vision Aware, 2019). While these illustrations represent distinct stages of life and areas of need, accommodations in one stage of life tend to be closely related to the accommodations in an adjacent stage. This study acknowledges this trend and intentionally engages with high school students to support their transition from secondary school into post-secondary education or employment regarding accommodations.

One of the defining aspects of this transition is that students shift from being recipients of accommodations to being advocates for accommodations. This draws attention to another global trend evident in the field of visual impairments, which is a lack of knowledge in the general population. Because visual impairment is a low-incidence disability, people have limited experience with individuals with visual impairments and, consequently, little understanding of their abilities and needs (Ajuwon et al., 2015; Garber & Huebner, 2017). This means that advocating for accommodations is not as simple as making a request. Individuals with visual impairments must be able to identify what they need, explain how they use it, articulate why they need it, and justify

how it relates to the expectations of a particular setting. The SAP prepares individuals to do precisely these things. Although it was taught to students for use on classroom accommodations, the process is applicable in any context where an accommodation is needed.

Limitations

This study had two notable limitations. The first regards timing. The study took place over thirteen weeks, which was a necessity of working within a school semester and around inclement weather (i.e., snow days). Increased time would have allowed for more strategy instruction and practice for participants with lower verbal and reasoning skills. Additionally, more time would have permitted a less condensed schedule for strategy instruction. Conducting strategy instruction over a two-week period allowed some of the participants to capitalize on short-term memory for demonstrating accommodations knowledge and strategy learning before progressing to the subsequent phase of strategy instruction and on the Pretest interview. However, as more time passed between strategy instruction and each of the Classroom Application and Ongoing Support interviews, it became evident that some of the participants struggled to retain what they had learned in strategy instruction. If strategy instruction had been spread out across more time, challenges with retention might have been realized and addressed before moving into Classroom Application and Ongoing Support. Finally, with more time, more data points could have been collected during Baseline and Classroom Accommodation and Ongoing Support to yield more reliable trends.

The second limitation relates to the emotional and behavioral challenges evidenced by Emily, Evan, and Graham during strategy instruction. No preparation was

done to plan responses to participants' instances of dysregulation that aligned with their behavior support plan (if they had one) or emotional/behavioral-related practices commonly used by teachers and staff. In the moment, the researcher's responses were based on observed interactions between the participants and teachers and the researcher's training and experience as a special educator. While those responses never exacerbated the participants' emotional-behavioral concerns, using practices established by the school may have been more effective in redirecting the participants back to strategy instruction.

Conclusion

The present study sought to increase the involvement of students with visual impairments in the accommodations process by using the SAP to teach them to be strategic in selecting and utilizing their accommodations. Strategy instruction began with pre-teaching focused on accommodations knowledge, the importance of preparedness, and the role of context before teaching and practicing the SAP. Because the SAP is a cognitive strategy, metacognition and self-regulated learning were incorporated into strategy instruction to foster performance of the strategy.

Cross-case analysis revealed key findings regarding strategy instruction, strategy learning and performance, and metacognition and self-regulated learning. First, explicit instruction and frequent review of accommodation knowledge can improve students' understanding of the purpose of accommodations and awareness of their individual accommodations. Second, students with visual impairments and related disabilities are capable of learning and performing the SAP. However, strategy learning, application, and performance are impacted by their verbal and reasoning skills. Furthermore, students who struggle to regulate their emotions and behaviors have difficulty using a strategy to

regulate their learning. Finally, students are more likely to think about their accommodations from a metacognitive perspective than a self-regulated learning perspective.

Considering the overarching goal of this intervention to improve the participants' strategic capabilities in selecting and utilizing their instructional accommodations, in the end, the participants reflected a spectrum of accomplishing this purpose. On one end of the spectrum is Graham, who never became a strategic thinker regarding his accommodations. Next is Emily, her strategic capabilities emerged over time but did not fully develop by the conclusion of the study. Then comes Evan. Evan learned to think strategically about his accommodations using the SAP, but he chose not to apply this capability in his current educational context. On the opposite end of the spectrum from Graham is James, who not only became strategic in selecting and utilizing his accommodation but also employed that way of thinking in his classes. Ultimately, this spectrum of outcomes indicates that strategic thinking can be taught and the SAP is a valuable tool for strategically thinking about accommodations; however, characteristics of each student and their learning environments have a considerable impact on the development of strategic thinking for accommodations.

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Appendices

Appendix A

Student Consent Form

Dear Student,

This is a project that Mrs. Nannemann is doing with high school students to learn more about how students participate in their classes. You can help with this project if you want to, but you do not have to participate.

In this project, Mrs. Nannemann will teach you a strategy for participating in your classes by using your accommodations. Every school day during the study, you will be asked to complete a check list of the accommodations you used that day, and once a week, you will be asked to write a few sentences about how you used the strategy in one of your classes during the week. Every other week, you will complete an interview about how you are using the strategy and you will be observed in two classes. At the end of the study, you will complete a survey of your opinions about the strategy. You will not be asked to do any extra work other than learning the strategy, completing the daily checklist of accommodations, and writing a few sentences about using the strategy once a week. This study will last for about 15 weeks.

Your name will not be used in any papers written about this project. Your name will also not be put on the audio recordings of the interviews, and these recordings will be erased when the study is finished.

If you decide to help with this study but then change your mind, you can stop participating at any time. Helping with this project might help you understand how to learn better, but it might be uncomfortable to talk about your learning with me. Participating in this project will not cost you anything.

If you do not understand what Mrs. Nannemann would like you to do, please ask her questions.

If you want to help with this study, please sign your name below.

Student's Name _____

Student's Signature _____

_____ Check here if it is okay for Mrs. Nannemann to audio record your interviews

_____ Check here if you do not want to have your interviews audio recorded

Witness in lieu of signature: In my judgement, the student understands the information in this consent form and agrees to be in the study.

Witness Signature _____ Date _____

Appendix B

Parent Consent Form

Informed Consent for Your Child's Participation in

A Self-Accommodation Strategy for Students with Visual Impairments

Investigator: Allison Nannemann, M. Ed.

Dear Parent or Guardian,

I am asking your permission for your son/daughter to be in a research study. Your child was selected as a possible participant because he/she has a visual impairment and is enrolled in inclusive classes. Please read this form and ask any questions you may have before agreeing to have your child participate in the study.

Purpose of the Study:
The purpose of this study is to understand how students learn and use a cognitive strategy for taking an active role in using their accommodations in inclusive classes.

Description of Study Procedures:
If you agree for your child to participate in this study, you will allow the Investigator to collect the following data from/about your child:

- interviews on accommodations knowledge and strategy performance (30 minutes approximately every other week);
- classroom observations (45 minutes approximately every other week);
- checklists of used accommodations (5 minutes daily);
- descriptions of strategy use during an inclusive class (5 minutes weekly);
- a social satisfaction survey (10 minutes, end of study); and
- demographic information, including age, gender, race/ethnicity, grade, description of visual impairment (eye condition, acuity, field restrictions), and special education status.

Participating teachers will be asked to complete surveys on student accommodation practices at the beginning and end of the study. This study will take approximately 15 weeks to complete.

The Investigator, an experienced teacher of students with visual impairments, will teach the experimental Student Self-Accommodation Strategy to participating students, conduct interviews, and complete observations. Only the observations will take place during academic classes. Strategy instruction and interviews will occur during the school day during a non-academic class. Checklists of used accommodations and descriptions of strategy use will be completed by students on their own time through electronic surveys. Every week day, the link to that day's survey will be texted or e-mailed to your child at 6:00pm. You will have the opportunity at the end of this form to indicate your preferred method of sharing the link, the best cell phone number or email address to use, and the time you would like the link to be sent if other than 6:00pm.

Risks to Being in the Study:
The risk associated with this study is that your child might experience discomfort when being observed or sharing his/her ideas with the Investigator on surveys or interviews. The investigator will stress that the goal is to learn from him/her about how to better teach students. Your child's responses to questions will in no way impact his/her grades in school. This study may include risks that are unknown at this time.

Benefits to Being in the Study:
The data collected during this study will help determine the effectiveness of the Student Self-Accommodation Strategy to support student success in inclusive classes. Your child may benefit educationally from effective accommodations usage through the Student Self-Accommodation Strategy. Another benefit of participating include that your child will indirectly help other students and teachers make effective use of accommodations in the classroom.

Cost/Payment:
There is no cost or financial reimbursement for participation in this study. A $15 Simon Giftcard will be given to each participating student as a gesture of appreciation regardless of whether or not they finish the study. An additional dollar ($1) will be added to the giftcard for each of the electronic surveys (checklist of used accommodations and description of strategy usage) completed, with a $10 bonus if all of these surveys are completed.

Confidentiality:
Only the Investigator and her dissertation committee will have access to records from this study. Your child's name will be changed to a pseudonym to protect his/her identity. The original records will be stored in a locked file (paper documents) or on a secure electronic server (electronic files) until their destruction five years after the completion of the project. These records will be kept private. In any report that is published from this study, it will not include any information that will make it possible for your child or school to be identified. Please note that regulatory agencies, the Boston College Office for Research Protections, and internal auditors may review the research records.

Voluntary Participation/Withdrawal:
Your child's participation is voluntary. If you choose not to have him/her participate, it will not affect current or future relations with Boston College or your child's school. You are free to withdraw your child at any time for any reason. Your child is also free to withdraw. There is no penalty or loss of benefits for not taking part or for stopping participation. If your child appears uncomfortable, the Investigator may ask if he/she would like to withdraw from the study.

Contacts and Questions:
The Investigator conducting this study is Allison Nannemann, M. Ed. This research project is being supervised by Dr. David Scanlon. For questions or more information about this project, please contact Allison Nannemann at 615.483.3083 or allison.nannemann@bc.edu. If you have additional concerns, please contact Dr. David Scanlon at 617.552.1949. If you have any questions about your rights as a research participant, you may contact the Director of the Office for Research Protections at Boston College at 617.552.4778 or irb@bc.edu.

Copy of Consent Form:
You are being given a copy of this form to keep for your records and future reference.

Statement of Consent:
I have read (or had read to me) the contents of this consent form and have bee n encouraged to ask questions. I have received answers to my questions. I give consent for my child to participate in this study. I have received a copy of this form.

Study Participant (Print Child's Name): _____

Parent/Guardian (Print Name): _____

Parent/Guardian (Signature): _____ Date: _____

*****Please complete the following information for sharing the link to the electronic surveys. Failure to complete this section will result in the link being shared via text to the number provided by the student participant at 6:00pm each week night.**

Check One:

_____ Please text the link to the following cell phone number: _____

_____ Please e-mail the link to the following e-mail address: _____

Check One:

_____ The link may be sent at 6:00pm

_____ Please send the link at the following time: _____

Appendix C

Teacher Consent Form

Teacher Informed Consent for Participation in

A Self-Accommodation Strategy for Students with Visual Impairments

Investigator: Allison Nannemann, M. Ed.

Dear Educator,

You are being asked to participate in a research study examining how students learn and use the Student Self-Accommodation Strategy. You were selected as a possible participant in this study because you teach students with visual impairments enrolled in academic inclusive classes; the school district has provided permission for this study. Please read the form and ask any questions that you may have before agreeing to participate.

Purpose of the Study:
The purpose of this study is to understand how students learn and use a cognitive strategy for taking an active role in using their accommodations in inclusive classes.

Description of Study Procedures:
If you agree to be in this study, you will participate in the following forms of data collection:

- teacher demographics form,
- observations of your class(es) in which participating student(s) are enrolled (1-3 times per week approximately every other week), and
- survey on student accommodation practices for each participating student you teach (beginning and end of study).
- The following data from/about the participating student will also be collected:
- interviews on accommodations knowledge and strategy performance (30 minutes approximately every other week),
- checklists of used accommodations (5 minutes daily),
- descriptions of strategy use during an inclusive class (5 minutes weekly), and
- a social satisfaction survey (10 minutes, end of study).

The study is anticipated to take 15 weeks to complete.

The Investigator, an experienced teacher of students with visual impairments, will teach the experimental Student Self-Accommodation Strategy to participating students, conduct interviews, and complete observations. Only the observations will take place during academic classes. Strategy instruction and interviews will occur during the school day during a non-academic class. Checklists of used accommodations and descriptions of strategy use will be completed by students on their own time through electronic surveys.

Risks to Being in the Study:
The risk associated with this study is that you might experience discomfort when being observed. This study may include risks that are unknown at this time.

Benefits to Being in the Study:
The benefits of participation are that you will have the opportunity to reflect on and improve your own instructional practices as well as help other teachers in improving their instruction and students to improve their learning.

Cost/Payment:
There is no cost or financial reimbursement for participation in this study. You will receive a $50 Visa giftcard for participating in the study. If you decide to withdraw from the study for any reason, your payment will be prorated.

Confidentiality:
The records of this study will be used for both research and educational purposes. Only the Investigator and her dissertation committee will have access to the records. All records will have pseudonyms for the teachers and students to protect their identity. Original records will be stored in a locked file (paper records) or on a secure server (electronic records) until their destruction five years after the completion of this project. Any report published from this study will not include information that will make it possible to identify a participant. Please note that regulatory agencies, Boston College's Institutional Review Board, and internal auditors may review the research records.

Voluntary Participation/Withdrawal:
Your participation is voluntary. If you choose not to participate, it will not affect current or future relations with Boston College or your school. You are free to withdraw at any time for any reason. There is no penalty for not taking part or for stopping participation, and as mentioned above, your compensation will be prorated. If you appear uncomfortable, the Investigator may ask if you would like to withdraw from the study.

Contacts and Questions:
The Investigator conducting this study is Allison Nannemann, M. Ed. This research project is being supervised by Dr. David Scanlon. For questions or more information about this project, please contact Allison Nannemann at 615.483.3083 or allison.nannemann@bc.edu. If you have additional concerns, please contact Dr. David Scanlon at 617.552.1949. If you have any questions about your rights as a research participant, you may contact the Director of the Office for Research Protections at Boston College at 617.552.4778 or irb@bc.edu.

Copy of Consent Form:
You are being given a copy of this form to keep for your records and future reference.

Statement of Consent:
I have read (or had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give consent to participate in this study. I have received a copy of this form.

Study Participant (Print Name): _____

Participant or Legal Representative Signature: _____

Date: _____

Appendix D

Cumulative Folder Review Form

Today's Date: _____

Student Name: _____

Gender: _____

Race/Ethnicity: _____

Age: _____

Current Grade: _____

Grades:

Semester:	
Subject	**Grade**

IQ: _____

Diagnosed Disabilities: _____

Date of Eye Report: _____

Eye Condition: _____

Visual Acuity: _____

Peripheral Field Restriction: _____

IEP Reporting Categories: _____

Allowable Accommodations:

_____

_____

_____

_____

_____

Appendix E

Observation Protocol

Student	
On Time?	Yes No
Check Environ?	Yes No ? N/A
Has Tools?	Yes No ? N/A
Tools Prep?	Yes No ? N/A

Task	
Materials	
Student Role(s):	Li Re Wr No V ( )
Reason	
Who signaled?	Student GT ST PP N/A
How signaled?	
Who provided?	Student GT ST PP N/A
# got acc	1 a few class
Stu use approp?	Y N ?
Monitored? Y N	
Outcome	
New need? Y N	

Task	
Materials	
Student Role(s):	Li Re Wr No V ( )
Reason	
Who signaled?	Student GT ST PP N/A
How signaled?	
Who provided?	Student GT ST PP N/A
# got acc	1 a few class
Stu use approp?	Y N ?
Monitored? Y N	
Outcome	
New need? Y N	

Task	
Materials	
Student Role(s):	Li Re Wr No V ( )
Reason	
Who signaled?	Student GT ST PP N/A
How signaled?	
Who provided?	Student GT ST PP N/A
# got acc	1 a few class
Stu use approp?	Y N ?
Monitored? Y N	
Outcome	
New need? Y N	

Student	
On Time?	Yes No
Check Environ?	Yes No ? N/A
Has Tools?	Yes No ? N/A
Tools Prep?	Yes No ? N/A

Task	
Materials	
Student Role(s):	Li Re Wr No V ( )
Reason	
Who signaled?	Student GT ST PP N/A
How signaled?	
Who provided?	Student GT ST PP N/A
# got acc	1 a few class
Stu use approp?	Y N ?
Monitored? Y N	
Outcome	
New need? Y N	

Task	
Materials	
Student Role(s):	Li Re Wr No V ( )
Reason	
Who signaled?	Student GT ST PP N/A
How signaled?	
Who provided?	Student GT ST PP N/A
# got acc	1 a few class
Stu use approp?	Y N ?
Monitored? Y N	
Outcome	
New need? Y N	

Task	
Materials	
Student Role(s):	Li Re Wr No V ( )
Reason	
Who signaled?	Student GT ST PP N/A
How signaled?	
Who provided?	Student GT ST PP N/A
# got acc	1 a few class
Stu use approp?	Y N ?
Monitored? Y N	
Outcome	
New need? Y N	

	Individual/small group instruction
	Predictable environment
	Distraction-free environment
	Appropriate timing

Date	
Class and Period	
Teacher(s)	
Number of students	

Appendix F

Baseline Accommodations Knowledge and Skills Interview

Name: _____ Date: _____

Accommodations Knowledge and Skill Survey

Directions: Answer all questions from memory or with your opinion –do not look up any answers.

1. What is an accommodation?

Please write a definition, don't just give an example.

2. Why do students get accommodations?

3. What students can get an accommodation?

4A. ***Please list:***

Accommodations I am supposed to receive.	**In which classes?**

4B. ***Please list:***

Any other accommodations I sometimes receive.	**In which classes?**

Appendix G

Pretest and Week 4 Accommodations Knowledge and Skills Interview

Name: _____ Date: _____

Accommodations Knowledge and Skill Interview

Directions: Answer all questions from memory or with your opinion –do not look up any answers.

1. What is an accommodation?

Please write a definition, don't just give an example.

2. Why do students get accommodations?

3. What students can get an accommodation?

4A. ***Please list:***

Accommodations I am supposed to receive.	**In which classes?**

4B. ***Please list:***

Any other accommodations I sometimes receive.	**In which classes?**

5. Why do you get your accommodations?

(This question is about just you.)

6. Explain how you feel about having accommodations in your classes.

Hint: *Do you like having them? Do they help you? What's it like to get them?*

7. How often do you get accommodations in…

…your English & History classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

…your Math & Science classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

Accommodations Knowledge and Skill *Usage* Survey

I'm going to ask you some questions about our self-accommodation strategy and accommodations. You might remember being asked these questions before. We just want to find out how you think about using the SSA in your classes. You are being very helpful to us learning about whether or not the strategy will be useful for students.

Please answer for your English, Math, Science, and Social Studies/History classes."

---

8. What is the name of our strategy for remembering to use accommodations?

9. What does it mean to be strategic in using your accommodations?

10. Describe each step in the student self-accommodation strategy.

14. When can you use the student self-accommodation strategy?

15. Why should students use the self-accommodation strategy?

Metacognitive Think-Aloud

Speak the following to the student:

(probe: how would you do that?, or tell me more? as needed)

Let's say an accommodation you are supposed to get is to use wireless headphones when a video is shown during class so that you can more clearly hear the video's descriptive audio if it has that feature.

16. Explain to me how you would use the student self-accommodation strategy for that accommodation.

17. How could you figure out when you get to class whether you will need your headphones today?

18. Let's say you brought your headphones in your book bag in case you are going to need them at some point in class, what should you do with them when you arrive to class?

19. If all the teacher says at the start of class is "after attendance we are going to watch an old movie," how could you determine if you need to use your headphones or not? Remember: you need the headphones if the video has descriptive audio.

20. OK, for any assignment you are doing in class, how would you decide whether you need to use your headphones for the assignment? Remember: you need the headphones if the video has descriptive audio.

21A. What if you forget to bring your headphones and the teacher says everyone has to take notes on the video?

(prompt: if student says something like "the teacher could have us work in groups instead" say, "good idea, but tell me how you would do the SSA in this situation")

B. after reply: OK, what's one other thing you could do?

22A. What if your teacher says you don't need your accommodation today but then she decides to show a video to demonstrate something that came up in class?

B. after reply: OK, what's one other thing you could do?

23A. What if you have a sub who says "everyone will watch the video, no one can listen to headphones."

B. after reply: OK, what's one other thing you could do?

24A. What if you are using your headphones but they stop working in the middle of the movie?

B. after reply: OK, what's one other thing you could do?

25. What will you think about at the end of class regarding whether you need to use your headphones on future assignments in this class?

Tell me how you have used the self-accommodation strategy recently for one of your classes.

What is hard about using the SSA?

What is easy about using the SSA?

Directions: Circle your answer.

11. ***How responsible are you for using your accommodations…***

…in Math & Science classes?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

…in English & History class?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

12. How helpful is our strategy for you taking responsibility for your accommodations?

Not at all helpful	A little helpful	Usually helpful	Very helpful

13. How well can you perform our strategy today?

Can't perform at all	Can perform but poorly	Can perform fairly well	Can perform extremely well

Appendix H

Week 1 Accommodations Knowledge and Skills Interview

Name: _____ Date: _____

Accommodations Knowledge and Skill Interview

Directions: Answer all questions from memory or with your opinion –do not look up any answers.

1. What is an accommodation?

Please write a definition, don't just give an example.

2. Why do students get accommodations?

3. What students can get an accommodation?

4A. ***Please list:***

Accommodations I am supposed to receive.	**In which classes?**

4B. ***Please list:***

Any other accommodations I sometimes receive.	**In which classes?**

5. Why do you get your accommodations?

(This question is about just you.)

6. Explain how you feel about having accommodations in your classes.

Hint: *Do you like having them? Do they help you? What's it like to get them?*

7. How often do you get accommodations in…

…your English & History classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

…your Math & Science classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

Accommodations Knowledge and Skill *Usage* Survey

I'm going to ask you some questions about our self-accommodation strategy and accommodations. You might remember being asked these questions before. We just want to find out how you think about using the SSA in your classes. You are being very helpful to us learning about whether or not the strategy will be useful for students.

Please answer for your English, Math, Science, and Social Studies/History classes."

---

8. What is the name of our strategy for remembering to use accommodations?

9. What does it mean to be strategic in using your accommodations?

10. Describe each step in the student self-accommodation strategy.

14. When can you use the student self-accommodation strategy?

15. Why should students use the self-accommodation strategy?

Metacognitive Think-Aloud

Speak the following to the student:

(probe: how would you do that?, or tell me more? as needed)

Let's say an accommodation you are supposed to get is to use a tablet to record lectures or discussions because it is difficult to keep accurate and complete notes when listening for more than 10 minutes and you are in a class where those sometimes last as long as 15 – 20 minutes.

16. Explain to me how you would use the student self-accommodation strategy for that accommodation.

17. How could you figure out when you get to class whether you will need your tablet today?

18. Let's say you brought your tablet in your book bag in case you are going to need it at some point in class, what should you do with it when you arrive to class?

19. If all the teacher says at the start of class is "after attendance we are going to talk about what we discussed yesterday," how could you determine if you need to use your tablet or not? Remember: you can take notes for up to 10 minutes but need your tablet for longer periods of times.

20. OK, for any activity you are doing in class, how would you decide whether you need to use your tablet? Remember: you can take notes for up to 10 minutes but need your tablet for longer periods of times.

21A. What if you forget to bring your tablet and the teacher says most of the period will be lecture-based?

(prompt: if student says something like "the teacher could have us work in groups instead" say, "good idea, but tell me how you would do the SSA in this situation") (prompt: if the student says "then I would have to use my tablet because that is longer than 10 minutes" say "OK, but explain to me what you would do after the teacher says that")

B. after reply: OK, what's one other thing you could do?

22A. What if your teacher says you don't need your accommodation today but then she talks about an important topic for longer than 10 minutes?

B. after reply: OK, what's one other thing you could do?

23A. What if you have a sub who says "your teacher recorded a lecture for you, and everyone is required to take notes for the entire period."

B. after reply: OK, what's one other thing you could do?

24A. What if you are using your tablet but it stops recording after 1 minute?

B. after reply: OK, what's one other thing you could do?

25. What will you think about at the end of class regarding whether you need to use your tablet in this class in the future?

Tell me how you have used the self-accommodation strategy recently for one of your classes.

What is hard about using the SSA?

What is easy about using the SSA?

Directions: Circle your answer.

11. ***How responsible are you for using your accommodations…***

…in Math & Science classes?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

…in English & History class?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

12. How helpful is our strategy for you taking responsibility for your accommodations?

Not at all helpful	A little helpful	Usually helpful	Very helpful

13. How well can you perform our strategy today?

Can't perform at all	Can perform but poorly	Can perform fairly well	Can perform extremely well

Appendix I

Week 2 Accommodations Knowledge and Skills Interview

Name: _____ Date: _____

Accommodations Knowledge and Skill Interview

Directions: Answer all questions from memory or with your opinion –do not look up any answers.

1. What is an accommodation?

Please write a definition, don't just give an example.

2. Why do students get accommodations?

3. What students can get an accommodation?

4A. ***Please list:***

Accommodations I am supposed to receive.	**In which classes?**

4B. ***Please list:***

Any other accommodations I sometimes receive.	**In which classes?**

5. Why do you get your accommodations?

(This question is about just you.)

6. Explain how you feel about having accommodations in your classes.

Hint: *Do you like having them? Do they help you? What's it like to get them?*

7. How often do you get accommodations in…

…your English & History classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

…your Math & Science classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

Accommodations Knowledge and Skill *Usage* Survey

I'm going to ask you some questions about our self-accommodation strategy and accommodations. You might remember being asked these questions before. We just want to find out how you think about using the SSA in your classes. You are being very helpful to us learning about whether or not the strategy will be useful for students.

Please answer for your English, Math, Science, and Social Studies/History classes."

---

8. What is the name of our strategy for remembering to use accommodations?

9. What does it mean to be strategic in using your accommodations?

10. Describe each step in the student self-accommodation strategy.

14. When can you use the student self-accommodation strategy?

15. Why should students use the self-accommodation strategy?

Metacognitive Think-Aloud

Speak the following to the student:

(probe: how would you do that?, or tell me more? as needed)

Let's say an accommodation you are supposed to get is to use a camera to take pictures of notes or work on the whiteboard so that they can be magnified or typed for you later.

16. Explain to me how you would use the student self-accommodation strategy for that accommodation.

17. How could you figure out when you get to class whether you will need your camera today?

18. Let's say you brought your camera in your book bag in case you are going to need it at some point in class, what should you do with it when you arrive to class?

19. If all the teacher says at the start of class is "after attendance we are going to learn some new vocabulary," how could you determine if you need to use your camera or not?

20. OK, for any activity you are doing in class, how would you decide whether you need to use your camera?

21A. What if you forget to bring your camera and the teacher says she will be working practice problems on the board?

(prompt: if student says something like "the teacher could have us work in groups instead" say, "good idea, but tell me how you would do the SSA in this situation") (Note: if the student has been assuming she/he has a camera not on a smartphone and answers "I would take out my smartphone and use that camera" consider that as using this accommodation)

B. after reply: OK, what's one other thing you could do?

22A. What if your teacher says you don't need your accommodation today but then draws diagrams on the whiteboard?

B. after reply: OK, what's one other thing you could do?

23A. What if you have a sub who says "you have to copy the information on the board; you can't use your camera"?

B. after reply: OK, what's one other thing you could do?

24A. What if you are using your camera but after the first picture, it gives you a warning that the storage is full (it can't save any more pictures)?

B. after reply: OK, what's one other thing you could do?

25. What will you think about at the end of class regarding whether you need to use your camera in this class in the future?

Tell me how you have used the self-accommodation strategy recently for one of your classes.

What is hard about using the SSA?

What is easy about using the SSA?

Directions: Circle your answer.

11. ***How responsible are you for using your accommodations…***

…in Math & Science classes?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

…in English & History class?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

12. How helpful is our strategy for you taking responsibility for your accommodations?

Not at all helpful	A little helpful	Usually helpful	Very helpful

13. How well can you perform our strategy today?

Can't perform at all	Can perform but poorly	Can perform fairly well	Can perform extremely well

Appendix J

Week 3 Accommodations Knowledge and Skills Interview

Name: _____ Date: _____

Accommodations Knowledge and Skill Interview

Directions: Answer all questions from memory or with your opinion –do not look up any answers.

1. What is an accommodation?

Please write a definition, don't just give an example.

2. Why do students get accommodations?

3. What students can get an accommodation?

4A. ***Please list:***

Accommodations I am supposed to receive.	**In which classes?**

4B. ***Please list:***

Any other accommodations I sometimes receive.	**In which classes?**

5. Why do you get your accommodations?

(This question is about just you.)

6. Explain how you feel about having accommodations in your classes.

Hint: *Do you like having them? Do they help you? What's it like to get them?*

7. How often do you get accommodations in…

…your English & History classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

…your Math & Science classes:

Check only one:
o regularly, almost every day
o often, maybe once or twice a week
o sometimes, once a week or less
o rarely, I get them sometimes, but most days I don't
o never

Accommodations Knowledge and Skill *Usage* Survey

I'm going to ask you some questions about our self-accommodation strategy and accommodations. You might remember being asked these questions before. We just want to find out how you think about using the SSA in your classes. You are being very helpful to us learning about whether or not the strategy will be useful for students.

Please answer for your English, Math, Science, and Social Studies/History classes."

---

8. What is the name of our strategy for remembering to use accommodations?

9. What does it mean to be strategic in using your accommodations?

10. Describe each step in the student self-accommodation strategy.

14. When can you use the student self-accommodation strategy?

15. Why should students use the self-accommodation strategy?

Metacognitive Think-Aloud

Speak the following to the student:

(probe: how would you do that?, or tell me more? as needed)

Let's say an accommodation you are supposed to get is to use a place marker when copying from a book to make copying more efficient.

16. Explain to me how you would use the student self-accommodation strategy for that accommodation.

17. How could you figure out when you get to class whether you will need your place marker today?

18. Let's say you brought your place marker in your book bag in case you are going to need it at some point in class, what should you do with it when you arrive to class?

19. If all the teacher says at the start of class is "after attendance you're going to need your textbook," how could you determine if you need to use your place marker or not? Remember: you use the place marker when copying

20. OK, for any assignment you are doing in class, how would you decide whether you need to use your place marker? Remember: you use the place marker for copying

21A. What if you forget to bring your place marker and the teacher says you will be copying definitions out of your book?

(prompt: if student says something like "the teacher could have us work in groups instead" say, "good idea, but tell me how you would do the SSA in this situation")

B. after reply: OK, what's one other thing you could do?

22A. What if your teacher says you don't need your accommodation today but then assigns an essay that required quotes from the book you are reading?

B. after reply: OK, what's one other thing you could do?

23A. What if you have a sub who says "you can't use that place marker in your textbook because the book belongs to the school"?

B. after reply: OK, what's one other thing you could do?

24A. What if you are using your place marker but it keeps sliding around on the page, making you lose your place?

B. after reply: OK, what's one other thing you could do?

25. What will you think about at the end of class regarding whether you need to use your place marker in this class in the future?

Tell me how you have used the self-accommodation strategy recently for one of your classes.

What is hard about using the SSA?

What is easy about using the SSA?

Directions: Circle your answer.

11. ***How responsible are you for using your accommodations…***

…in Math & Science classes?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

…in English & History class?

Never take responsibility	Sometimes take responsibility	Often am responsible	Always am responsible for using it

12. How helpful is our strategy for you taking responsibility for your accommodations?

Not at all helpful	A little helpful	Usually helpful	Very helpful

13. How well can you perform our strategy today?

Can't perform at all	Can perform but poorly	Can perform fairly well	Can perform extremely well

Appendix K

Junior Metacognitive Awareness Inventory

Name: _____ **Grade level:** _____

We are interested in how students learn in their classes. Please read the following sentences and circle the answer that relates to you and the way you are when you are doing school work or home work. Please answer as honestly as possible.

Never (1) Seldom (2) Sometimes (3) Often (4) Always (5)

1.	I know when I understand something.	1	2	3	4	5
2.	I can make myself learn when I need to.	1	2	3	4	5
3.	I try to use ways of studying that have worked for me before.	1	2	3	4	5
4.	I know what the teacher expects me to learn.	1	2	3	4	5
5.	I learn best when I already know something about the topic.	1	2	3	4	5
6.	I draw pictures or diagrams to help me understand while learning.	1	2	3	4	5
7.	When I am done with my schoolwork, I ask myself if I learned what I wanted to learn.	1	2	3	4	5
8.	I think of several ways to solve a problem and then choose the best one.	1	2	3	4	5
9.	I think about what I need to learn before I start working.	1	2	3	4	5
10.	I ask myself how well I am doing while I am learning something new.	1	2	3	4	5
11.	I really pay attention to important information.	1	2	3	4	5
12.	I learn more when I am interested in the topic.	1	2	3	4	5
13.	I use my learning strengths to make up for my weaknesses.	1	2	3	4	5
14.	I use different learning strategies depending on the task.	1	2	3	4	5
15.	I occasionally check to make sure I'll get my work done on time.	1	2	3	4	5
16.	I sometimes use learning strategies without thinking.	1	2	3	4	5
17.	I ask myself if there was an easier way to do things after I finish a task.	1	2	3	4	5
18.	I decide what I need to get done before I start a task.	1	2	3	4	5

Appendix L

Accommodations Checklist Example

1. Check all of the accommodations you used today.
   - ☐ Braille
   - ☐ Braille notetaker
   - ☐ Screen reading software
   - ☐ Tactile graphics
   - ☐ Extra time
   - ☐ Talking calculator
   - ☐ Previewing
   - ☐ None
   - ☐ Other (please specify): ☐

Appendix M

Accommodations Checklist with SSA Use Write-Up Example

1. Check all of the accommodations you used today.
   - ☐ Braille
   - ☐ Braille notetaker
   - ☐ Screen reading software
   - ☐ Tactile graphics
   - ☐ Extra time
   - ☐ Talking calculator
   - ☐ Previewing
   - ☐ None
   - ☐ Other (please specify): _____

2. Briefly describe one instance of using the SSA in a class this week.

Appendix N

Social Validity Survey

1. How easy was it to learn the self-accommodation strategy?

Very hard	Fairly hard	A little hard	Not easy, but not hard	A little easy	Fairly easy	Very easy

2. How helpful would the SSA be for students in special education?

Not at all helpful	Not very helpful	Just a little helpful	Somewhat helpful	Sometimes helpful	Often helpful	Very helpful

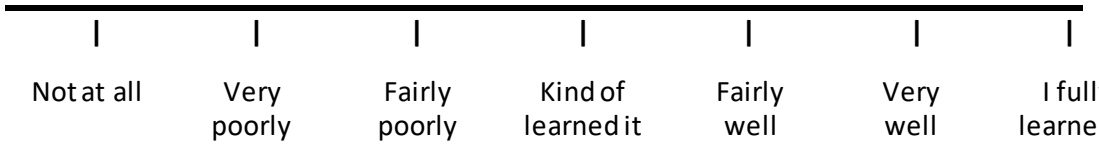
3. How helpful would the SSA be for your classmates not in special education?

Not at all helpful	Not very helpful	Just a little helpful	Somewhat helpful	Sometimes helpful	Often helpful	Very helpful

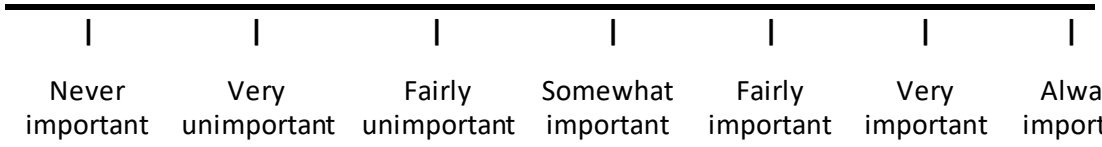
4. How often did you use the SSA in your classes?

Never	Rarely	Sometimes, but not very often	About ½ of the time	Fairly often	Most of the time	All of the time

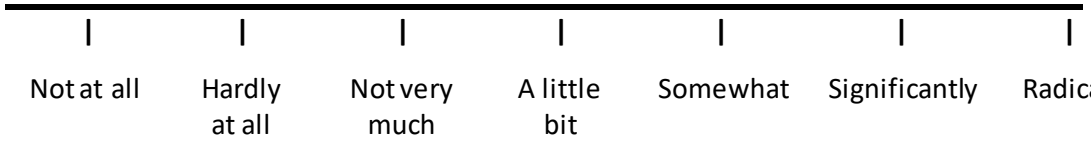
5. How well did you learn the SSA ?



6. How important is it for you to receive accommodations in your classes?



7. How much would using the SSA change how well you use accommodations in your classes?



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8. One suggestion I have to improve the student self-accommodation strategy:

Appendix O

Teacher Demographic Information Form

Name: _____

Age: 21-25 26-30 31-35 36-40 41-45 46-50 51-55

Race/Ethnicity: _____ Gender: _____

Highest Degree Held in Education: _____

Highest Degree Held Other Than Education (please indicate the area): _____

Areas of Teaching Licensure: _____

Number of Years Teaching: _____

Number of Years Teaching at Perkins School for the Blind: _____

Please complete the following table for each course you teach in the current school year:

Course Taught	**Total # of Blocks You Teach**	**# of Blocks You Co-Teach**	**Name of Co-Teacher(s)**
e.g., American Lit	*3*	*2*	*Edwards, Jones*

Before teaching at Perkins, did you work with individuals with VI? Yes No

If yes, in what capacity? _____

Number of Years Working in This Capacity: _____

Appendix P

Teacher Survey on Student Accommodation Practices

Dear _____,

Please answer the following questions regarding _____, a student in your _____ period class. Answer giving your overall impression of the student (i.e., don't focus on a single lesson).

Compared to other students in the same grade and class, ***She/He …***

1. is learning

among the best	very well	a little above avg.	about average	a little below avg.	not very well	among weakest

2. is achieving (e.g., grades)

among the best	very well	a little above avg.	about average	a little below avg.	not very well	among weakest

3. actively participates

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

4. arrives at class prepared to participate and learn

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

5. knows what is expected of her/him in most class activities (e.g., how to participate, how to learn, what to produce)

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

6. is proficient in the range of skills required to participate in most class activities

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

7. struggles or is challenged by tasks/expectations

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

8. when struggles or is challenged more than others, is aware of that

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

9. when struggles or is challenged more than others seeks assistance

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

10. when struggles or is challenged more than others attempts to meet the struggle/challenge her/himself

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never

11. enjoys the class

almost always	often	a little bit more	about the same	a little bit less	seldom	almost never