School and Class-Wide Approaches to Supporting Students with Disabilities in the Context of Openness and Transparency

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CHAPTER 1

Introduction

Executive Summary

Multi-Tier System of Supports (MTSS) is a tiered framework that can be used to support the academic, behavioral, and social needs of students (McIntosh & Goodman, 2016). Under MTSS, schools integrate a continuum of system-wide resources, structures, and practices to address barriers to success for all students (Sugai & Horner, 2009). Positive behavior interventions and supports (PBIS), response to intervention (RTI), and social-emotional learning are integral components of MTSS and are used to provide universal, targeted, and intensive interventions that are responsive to the needs of students (McIntosh & Goodman, 2016). Multiple studies have assessed the positive impact of implementing MTSS with fidelity on academic and behavioral outcomes for individuals with disabilities (Bradshaw et al., 2010; Choi et al., 2017; Waasdorp et al., 2012).

Despite considerable evidence supporting tiered interventions within an MTSS framework, the field of special education continues to grapple with the research-to-practice gap (Carnine, 1997). Open science has been recommended as a way to improve this dilemma by increasing the openness, transparency, and credibility of research (Cook et al., 2018). Making research more available, consumable, and trustworthy for practitioners may help to bridge the divide between research findings and practice (Cook et al., 2022). Therefore, in the current dissertation, we examine how the implementation of school-wide and class-wide supports associated with an MTSS framework impact discipline, behavioral, and social outcomes for students with disabilities in the context of open science and scholarship.

School-Wide Positive Behavioral Interventions and Supports

School-Wide Positive Behavioral Interventions and Supports (SWPBIS) is a framework for supporting student academic and behavioral success by implementing evidence-based

practices throughout the school (Sugai & Horner, 2020). These practices typically are implemented within a three-tiered framework where students with greater support needs are provided with more individualized and intensive interventions. There is strong evidence for the effectiveness of SWPBIS for a variety of outcomes, such as fewer suspensions and expulsions (Bradshaw et al., 2010), lower rates of bullying and peer rejection (Waasdorp et al., 2012), and higher academic achievement (Horner et al., 2009). However, a major challenge within SWPBIS has been implementing the more intensive tiers (i.e., Tier 2 and 3) with fidelity. Indeed, many schools report Tier 1 fidelity but fail to do so for Tier 2 and 3 (Sugai & Horner, 2020).

The importance of implementing all three tiers of SWPBIS with fidelity has been highlighted in recent research. For example, Grassley-Boy et al. (2022) report that implementing higher tiers with fidelity is associated with a decrease in exclusionary practices for all students. However, exclusionary discipline outcomes specific to students with disabilities should also be explored. Students with disabilities are disproportionately suspended and expelled, and these exclusionary discipline practices can negatively impact academic and behavioral outcomes and even lead to dropping out of school or becoming involved with the juvenile justice system (Blake et al., 2020; Losen & Martinez, 2020).

Furthermore, given that many students with disabilities receive intensive interventions at Tier 2 and 3, and the federal government's recent emphasis on avoiding discriminatory discipline for students with disabilities (U.S. Department of Education, 2022), there is a need to examine how fidelity across tiers might impact exclusionary practices for students with disabilities. As such, we will conduct a conceptual replication of Grassley-Boy et al. (2022) to investigate if fidelity in higher tiers of PBIS are associated with decreases in exclusionary discipline outcomes for students with disabilities.

Class-Wide Interventions: Peer Education

Peer education or awareness interventions involve educating and training peers without disabilities in groups or as a class. Peer education is considered to be an indirect peer-mediated intervention where peers learn about disabilities, how disabilities might impact learning, and how to be more inclusive toward and accepting of peers with disabilities (Campbell, 2006). Multiple systematic reviews have highlighted the efficacy of peer education interventions for increasing knowledge of autism and improving attitudes toward autistic peers (Armstrong et al., 2017; Birnschein et al., 2021; Cremin et al., 2021; Lindsay & Edwards, 2012). However, little is known about the experiences of autistic individuals during and after these interventions, and few researchers have assessed the acceptability and feasibility of these interventions for students and teachers (Birnschein et al., 2021; Cremin et al., 2021). Therefore, we plan to investigate the social validity of a peer education intervention for students and teachers and highlight autistic preferences and needs relating to the intervention.

Open Science in Special Education Research

Special education practice and policy can and should be informed by research evidence. One of the principal goals of research in the field of special education is to improve outcomes for students, teachers, parents, and other stakeholders in the field (Cook & Odom, 2013). However, as in other fields, special education researchers are beginning to grapple with issues such as publication bias (Cook & Therrien, 2017; Gage et al., 2017), insufficient replication research (Makel et al., 2016; Travers et al., 2016), and the use of questionable research practices (Makel et al., 2021). These problems are compounded by the inaccessibility of research, as most published findings are behind a paywall and inaccessible to those without institutional access or the ability to pay (Fleming & Cook, 2022; Piwowar et al., 2018).

Open science, which emphasizes transparency and openness, has been suggested as a way to increase the credibility and accessibility of research in special education (Cook et al., 2018). Open science practices such as preregistration, data sharing, and publishing open access can make research more accessible and credible by making study plans, data, and findings available to the public and allowing research consumers to better evaluate and reproduce findings (Cook et al., 2022; Fleming et al., 2021). Despite extant literature highlighting the need for and relevance of open science practices in the field of special education, there is a dearth of research examining researcher attitudes, knowledge, and behaviors regarding open science practices. Therefore, in this dissertation, we plan to explore the perceptions and practices of special education researchers related to open science. Furthermore, each study in the dissertation will be informed by open science practices. For example, we plan to share materials and preregister study plans for manuscripts one and three; conduct a conceptual replication in manuscript two; and post preprints for all three manuscripts in the dissertation.

Problem Statement

In the field of special education, MTSS is a framework that is recommended as a way to improve academic, behavioral, and social outcomes for all students. As school leaders continue to implement academic, behavioral, and social supports within tiered frameworks, additional research is needed to examine how these practices impact students with disabilities. Specifically, supporting the inclusion of autistic students through peer education and assessing the impact of fidelity of implementation across PBIS tiers on exclusionary discipline outcomes for students with disabilities are two areas that warrant further exploration.

Furthermore, given the highly applied nature of MTSS, researchers must actively work to bridge the divide between research and practice. Despite translational efforts, most research in

special education is behind a paywall (Fleming & Cook, 2021), some practitioners mistrust research findings (Boardman et al., 2005), and many practitioners implement practices that are not evidence-based or do not implement evidence-based practices with fidelity (Cook & Odom, 2013; Sugai & Horner, 2020; Travers, 2017). Open science may be one way to improve the accessibility, credibility, and impact of this and other research in special education with practical implications and applications, but few studies have explored researcher perceptions or reported the use of open practices.

Purpose

Despite calls to change scholarly practice, few special education researchers engage in open practices (Cook et al., 2022; Makel et al., 2016) and there are few examples of how open science practices can be incorporated into the dissertation process (Kathawalla et al., 2021). Therefore, the purpose of this three-manuscript dissertation is to investigate PBIS and peer education interventions in the context of open science. Specifically, in this dissertation we will examine (a) the knowledge, attitudes, and practices of special education researchers regarding open science practices; (b) the effect of higher tier SWPBIS fidelity on exclusionary discipline outcomes for students with disabilities; and (c) the experience of autistic students' during a peer education intervention and the impact of the intervention on the knowledge and attitudes of typical peers. Ultimately, these three manuscripts are bound together by my interests and align with my future goals to conduct research in the areas of open science, equity, and social communication skills for autistic students.

Dissertation Proposal Format

This dissertation consists of three manuscripts, which are identified as chapters. The first manuscript is a descriptive study examining the knowledge, attitudes, and practices of special

education researchers regarding three open science practices: preregistration, open access, and open data. The second manuscript utilizes multi-level modeling techniques to examine the effects of fidelity in higher tiers of SWPBIS on exclusionary discipline outcomes for students with disabilities. The second manuscript is a conceptual replication of Grasley-Boy et al. (2022) and attempts to extend important findings on reducing exclusionary discipline outcomes through SWPBIS to students with disabilities. The third manuscript is an embedded mixed-method study where qualitative data collection is embedded into a pilot quasi-experimental study. More specifically, we will examine the effects of a peer education intervention on the knowledge and attitudes of peers without disabilities while simultaneously accounting for the experiences and preferences of autistic students. Taken together, these three manuscripts reflect my interests and goals as a researcher and may encourage future doctoral students to incorporate open science practices and principles in the dissertation process.

Manuscript 1

The first manuscript is a survey of the knowledge, attitudes, perceived norms, and behaviors of 155 special education researchers toward three open science practices: posting preprints, sharing data, and preregistering studies. The purpose of this study was to better understand the barriers to and context of open practice uptake in the field of special education: a topic that has not been systematically examined in the literature. In order to examine perceptions and behaviors of special education researchers, we asked the following research questions:

1. What are the knowledge, attitudes, perceived norms, and practices of special education researchers toward preprints, data sharing, and preregistration?

2. What factors (i.e., attitudes, knowledge, perceived norms, experience, career stage, preferred methods) predict special education researchers' intended use of preprints, data sharing, and preregistration?

For the survey, we adapted the Open Science Survey (OSS; Beaudry et al., 2022), which was developed by the Center for Open Science to assess the attitudes, perceptions, and behaviors of researchers across fields toward open science. We used multivariate linear regression to analyze the impact of years of experience, number of publications, career stage, attitudes, perceived norms, and knowledge on researchers' intention to engage in each of the three open science practices in the next two years.

Results suggested that special education researchers had little experience with implementing open science practice, yet generally believed that practices were important in the field. Results from the multivariate linear regression revealed attitudes and knowledge as significant predictors of intent to engage in behaviors. We recommend that the field continue to provide additional supports and incentives for researchers to engage in open practices.

Manuscript 2

The second manuscript is an analysis of the relationship between higher-tiered fidelity in SWPBIS and exclusionary discipline outcomes for students with disabilities. In this study, we use a series of two-level linear multilevel analyses to account for the nested nature of the dataset (i.e., schools nested in districts). We also frame the study as a conceptual replication of Grasley-Boy et al. (2022) with the goal of examining the robustness of their findings. In other words, we wanted to examine if the association between higher-tiered SWPBIS fidelity and exclusionary discipline outcomes extends to students with disabilities. To this end, we asked the following research questions:

1. Is there a statistically significant difference in exclusionary discipline outcomes for SWD in schools implementing only Tier 1 with fidelity compared with schools implementing Tier 1 and Tier 2, Tier 1 and Tier 3, or all three tiers with fidelity?
2. Do the findings from Grasley-Boy et al. (2022a) on the relationship between SWPBIS fidelity and exclusionary discipline outcomes replicate for SWD?

To measure fidelity, we used the Tiered Fidelity Inventory (TFI) which allows the school PBIS team to evaluate fidelity at each tier throughout the school year. For our outcome variables, we included data from the Department of Education's Office of Civil Rights for ten school-level discipline outcomes: (a) SWD with any ISS, (b) SWD with one OSS, (c) SWD with one or more OSS, (d) SWD with two or more OSS, (e) OSS incidents, (f) days of school missed due to OSS, (g) SWD expelled, (h) SWD referred to alternative schools for discipline issues, (i) SWD referred to law enforcement, and (j) SWD with school-related arrests.

We iteratively developed our models by first estimating the unconditional model, which did not include predictors. Next, we estimated random intercept models and random intercept and slope models. We used maximum likelihood estimation to determine the best-fitting model. Results indicated that higher-tiered fidelity was associated with a statistically significant decrease in exclusionary discipline outcomes for students with disabilities. Specifically, we found that the random intercept models fit better than the unconditional model for the following outcomes: instances of ISS, one instance of OSS, one or more instances of OSS, total instances of OSS, number of days missed due to OSS, and referrals to law enforcement per 100 SWD. We recommend that schools continue to implement SWPBIS with fidelity across all tiers to better support students with disabilities in K-12 schools.

Manuscript 3

The third manuscript is an evaluation of a peer-education intervention. In this study, we assess the impact of Kit for Kids, a peer education intervention for elementary and middle school students, on peer's knowledge of autism, peers attitudes toward autistic peers, and social validity outcomes of stakeholders. Specifically, we asked the following research questions:

1. Are the aims and objectives of the KfK intervention acceptable and relevant to stakeholders (i.e., students, parents, and teachers)?
2. Are the procedures of the KfK intervention acceptable and feasible for students and teachers?
3. Are the outcomes and perceived outcomes of the KfK intervention important and acceptable for stakeholders (i.e., students and teachers)?
4. What are the effects of the KfK intervention on the knowledge of autism and attitudes toward autistic students for peers without disabilities?

We used a quasi-experimental non-equivalent groups design on 66 middle school students without autism. We assessed differences across pre and posttests across groups for knowledge of autism and attitudes toward peers with autism. We also assessed the acceptability, importance, and feasibility of the intervention for stakeholders (i.e., students with autism, peers, parents, and teachers).

Results indicated that posttest scores for the intervention group were statistically significantly greater than the wait-list control group. Stakeholders also responded positively toward the goals, procedures, and outcomes of the intervention in the social validity assessments. Qualitative social validity responses revealed potential adaptations for future research, such as including real autistic perspectives and experiences in the intervention.

Organization of the Remainder of the Study

Chapter Two consists of the first manuscript, “Special Education Researcher’s Knowledge, Attitudes, and Reported Use of Open Science Practices”. Chapter Three is the second manuscript, “Effects of Tiered SWPBIS Fidelity on Exclusionary Discipline Outcomes for Students with Disabilities”. Chapter Four is the proposed third and final manuscript, “Assessing the Effects and Social Validity of a Class-Wide Peer-Education Intervention for Autistic Middle School Students and Their Peers”.

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Chapter II

Special Education Researcher's Knowledge, Attitudes, and Reported Use of Open Science Practices

Abstract

Despite calls for open science reforms in special education research, little is known about the perceptions or practices of special education researchers regarding open science. In this study, we modified the Open Science Survey (OSS) to examine the knowledge, attitudes, perceived norms, and behaviors of 155 special education researchers for three open science practices (posting preprints, sharing data, and preregistering studies). Researchers reported favorable attitudes toward each of the three practices, but low levels of implementation knowledge. Additionally, multiple linear regression revealed knowledge, attitudes, perceived norms, career stage, and methodological preference significantly predicted intent to engage in these open science practices. We provide recommendations for using findings to inform efforts to increase open science uptake in the field.

Introduction

Open science is an umbrella term encompassing a range of efforts to increase the credibility and accessibility of research through greater openness, transparency, and replicability (Cook et al., 2018). Within special education, researchers have begun to recognize the potential value of open science practices to complement ongoing efforts to improve the quality and impact of the research base (Cook et al., 2018; Cook et al., 2019; Fleming et al., 2021; Lloyd & Therrien, 2018; van Dijk et al., 2021). In 2018, special education stakeholders developed a roadmap for incorporating open science practices that included recommendations for funders, professional organizations, journals and publishers, and individual researchers (Adelson et al., 2019). Although calls for the application of open science practices in the field have increased, the attitudes toward, knowledge of, and reported use of open practices have not been empirically examined among special education researchers. In this study, we surveyed special education researchers, including early-career researchers (ECRs; i.e., doctoral students and post-doctoral researchers), to better understand their knowledge, attitudes, and practices concerning open science practices. This study extends current research on perceptions and use of open practices in other fields (Abele-Brehm et al., 2019; Beaudry et al., 2019; Soderberg et al., 2020; Toribio-Flórez et al., 2021) by conducting the first descriptive study on researchers' perceptions of open science practices in special education and will inform the field regarding potential implementation predictors and barriers for use of open science practices.

Open Science Practices in Special Education

Research in special education aims to improve the lives of children and youth with disabilities and their families by informing educational policy and practice (Odom et al., 2005). To do so, research should be accessible, trustworthy, and usable (Carnine, 1997). However, an

established research-to-practice gap persists within the field (Cook & Farley, 2019). Open science practices have been theorized to aid in ameliorating aspects of this gap.

Broadly, advocates of open science aim to promote transparency and accessibility at every stage of the research process to increase trust in, credibility of, and impact of research results (Banks et al., 2019; Nosek et al., 2012; van Dijk et al., 2021). To achieve these aims, open science encompasses several practices that augment conventional procedures for conducting, reporting, and disseminating research (Nosek et al., 2012), including preprints, preregistration, data sharing, materials sharing, and open peer review. Although open science is an umbrella term that includes many specific practices, in this paper we focus on three core open practices: preregistration, preprints, and data sharing.

Preregistration involves detailing research procedures and analytic methods before a study is conducted (Gehlbach & Robinson, 2018). Although multiple formats exist for preregistering studies (Fleming et al., 2022), preregistration typically requires researchers to specify, *a priori*, research questions, hypotheses, and planned analyses, among other elements of the planned study (Cook, Maggin, et al., 2021; Gehlbach & Robinson, 2018; Nosek et al., 2019). Prior to conducting the study, this plan is submitted to a public repository to enhance transparency and establish whether analyses are confirmatory (i.e., examining a priori hypotheses using predetermined procedures) or exploratory (i.e., examining research questions developed after the study was designed using flexible procedures). Deviations from the preregistered plan should then be noted in the write-up of the study. Preregistration helps address questionable research practices such as conflating confirmatory (or hypothesis-testing) and exploratory (or hypothesis-generating) research, which may result in biased and potentially misleading results (Gehlbach & Robinson, 2018; Makel et al., 2021).

Preprints are scholarly work posted to a public repository and made freely available to the public. Most journals allow for authors post preprint versions of their papers (e.g., author-formatted version of the paper that was submitted for review) to general (e.g., Advance; https://advance.sagepub.com) or discipline-specific (e.g., EdArXiv; https://edarxiv.org) preprint repositories (Fleming & Cook, 2022). If an article is ultimately accepted for publication, some journals also allow authors to submit postprint versions of the articles to these servers (e.g., author-formatted version of the accepted version of the paper). This practice is important as policymakers and practitioners often cannot access published scholarship (e.g., journal articles) that is behind a paywall (Cook, Fleming, et al., 2021). Posting freely accessible preprints can resolve this issue.

Data sharing involves making raw data and metadata from a study (e.g., survey responses) freely available for others to examine and use (Cook, Fleming, et al., 2021). Data can be shared directly between interested parties. To ensure that data are findable, accessible, interoperable, and reusable, data should be uploaded in non-proprietary formats (e.g., .txt) to an open access repository (e.g., LDbase; Logan et al., 2021). Openly sharing study data along with the code used to analyze these data increase the trustworthiness of study findings by providing other researchers the opportunity to replicate and reproduce the analyses and understand the analytic decisions made (Klein et al., 2018; Simmons et al., 2011; van Dijk et al., 2021).

Open Scholarship Survey

The Open Scholarship Survey (OSS) was designed to assess the attitudes, behaviors, and norms regarding open scholarship of researchers from multiple disciplines. The survey was developed by cross-disciplinary experts in open science practices and has been used in multiple studies (Beaudry et al., 2019; Soderberg et al., 2020). The Center for Open Science first used the

OSS in a sample of 3,619 researchers across multiple disciplines (Beaudry et al., 2022). Participants were recruited if they had published in an educational journal and 489 of the participants identified their primary discipline as education research. For those with education as their primary discipline, attitudes across practices were generally positive, with the majority of researchers indicating they were in favor of preprints and data sharing. Educational researchers were more neutral in their opinions of preregistration, with most indicating they were neither in favor nor against the practice.

The mean ratings of educational researchers for engagement in each of the three practices were in the bottom third of the nine disciplines surveyed. Educational researchers also reported that, on average, they shared open data for 13% of their studies, posted a preprint for 16% of their studies, and preregistered 3% of their studies. These results indicate that some researchers in the field of education engage in open science practices and that additional research exploring the factors that impact open scholarship engagement is warranted. Furthermore, because the OSS was only administered to publishing authors, relatively few ECRs were included in the sample, with only 7% of participating education researchers identifying as doctoral students. Therefore, additional research should examine the perspectives and experiences of ECRs, who will be the next generation of scientists.

Factors Associated with Open Science Practice Implementation

Researchers from different fields have examined the association of several potential predictors with the use of open scholarship practices, including researcher experience, career stage, attitudes toward open practices, knowledge of open practices, and methodological preferences or epistemological orientations. For example, reported attitudes and knowledge regarding open science strongly predicted reported practice (Toribio-Flórez et al., 2021), but

results are mixed on how methodological and epistemological preferences impact researchers' opinions and behaviors regarding open science in the social sciences and field of communication (Bowman et al., 2021; Christensen et al., 2020).

Additionally, multiple studies have highlighted the importance of career stage and experience on knowledge, attitudes, and implementation of open science practices (Abele-Brehm et al., 2019; Christensen et al., 2020; Houtkoop et al., 2018; Soderberg et al., 2020). For example, in a survey of 337 German psychological researchers, Abele-Brehm and colleagues (2019) found that ECRs held more positive opinions on data sharing and open science generally than senior researchers. Similarly, in a survey of 3,759 researchers from multiple disciplines on the credibility of preprints, graduate students and postdocs expressed the most favorable attitudes whereas full professors were least favorable (Soderberg et al., 2020). Interestingly, although ECRs were more likely to read and download preprints, professors were more likely to post a preprint. Furthermore, in a survey of 600 psychology researchers, Houtkoop et al. (2018) found senior researchers shared data at a lower rate and indicated they were less likely to share data in the future compared to their early-career counterparts. However, results are not entirely consistent, as Bowman and colleagues (2021) found that practices did not significantly differ between career stages within the communication field. It may be that the factors that predict open science knowledge, attitudes, and practices are dependent on the norms and traditions within each field (Christensen et al., 2020; Soderberg et al., 2020; Toribio-Flórez, 2021), thus requiring additional field-specific research.

Theoretical Framework

In this study, we use the theory of planned behavior (Azjen, 1985) as our theoretical framework. The theory of planned behavior posits an individual's intention to engage in a

particular behavior predicates their decision to engage in that behavior. Intentions to perform a behavior are assumed to encapsulate underlying motivational factors that influence behavior. These motivational factors are indicative of the extent to which a person is willing to put forth effort in accomplishing a behavior. The stronger the intention to enact a behavior, the more likely the behavior will occur (Ajzen, 1991).

Three critical factors in the theory of planned behavior are postulated to influence a person's intention to engage in a behavior: (a) personal attitudes, (b) subjective norms, and (c) perceived behavioral control. Personal attitudes refer to a person's positive and negative knowledge, attitudes, prejudices, and feelings about a behavior. For example, personal attitudes include a researcher's views of open science practices and their perceived benefits and limitations. Subjective norms are the perceived views of others around them. When considering adopting open science practices, a researcher might consider the views and expectations of their colleagues. Finally, perceived behavioral control is the extent to which a person believes they can control their own behavior, which is influenced by both internal factors such as self-efficacy and determination and external factors such as available resources and supports. For a researcher considering implementing an open science practice, perceived behavioral control might be based on their belief that their expertise or experience are sufficient for them to engage in the practice successfully.

We used the theory of planned behavior to guide adaptation of the OSS survey and provide a lens for understanding researcher intention to engage in open science practices. It has been argued that more holistic assessments of behavior are needed to better understand why some researchers engage in practices and why some do not (Köster et al., 2021; Norris & O'Connor, 2019; Robson et al., 2021). Indeed, given the complexity of behavior change in

academia, using theory may help parse out the active ingredients of open science uptake. For the current study, we measured personal attitudes by asking researchers their opinion of each of the three practices. We framed knowledge of completing the practice and experience with completing the practice as indicators of perceived behavioral control. And we estimated subjective norms by asking participants to estimate the percentage of researchers in their field that have completed the practice and hold favorable opinions toward the practice.

Purpose

As in other fields, scholars have suggested open practices may enhance the credibility, replicability, and accessibility of the special education research base (Cook, Fleming, et al., 2021; Cook et al., 2018; Fleming et al., 2021; van Dijk et al., 2021). However, special education researchers' adoption of, perceived norms toward, knowledge of, and attitudes toward open science practices have not been systematically examined. To better understand the barriers to and context of open practice uptake, we extended previous research by conducting the first descriptive examination of these constructs in the field of special education. The purpose of this study, then, is to examine the perceptions and behaviors of special education researchers, including ECRs, regarding three core open science practices using the OSS. Specifically, we aimed to answer the following research questions:

1. What are the knowledge, attitudes, perceived norms, and practices of special education researchers toward preprints, data sharing, and preregistration?
2. What factors (i.e., attitudes, knowledge, perceived norms, experience, career stage, preferred methods) predict special education researchers' intended use of preprints, data sharing, and preregistration?

Method

Participants and Recruitment

Following Institutional Review Board approval, we recruited participants in two waves from June to September 2021. The first wave of participants was recruited through three emails posted to the Council for Exceptional Children's Division of Research (CEC-DR) listserv over two months in the summer of 2021. CEC-DR is one of the special interest divisions of CEC, whose members are typically active special education researchers and therefore were considered an appropriate target group for responding to the survey. A total of 796 DR subscribers received invitations to complete the survey and 88 responded to the survey, for a response rate of 11%.

Because one of the goals of the study was to assess the knowledge, attitudes, perceived norms, and practices of ECRs, we conducted a second wave of recruitment targeting doctoral students and post-doctoral researchers. We contacted 53 institutions with doctoral-level programs in special education that were classified as having "very high research activity" (i.e., R1 universities). Of those invited, 28 programs forwarded the survey invitation to a total of 191 doctoral students and post-doctoral researchers. Sixty-seven ECRs responded in the second wave of recruitment for a response rate of 35%. Individuals recruited during both waves were offered the opportunity to enter a lottery to receive one of 10 $10 gift cards for their participation.

A total of 185 individuals responded to the survey. We removed one respondent because they were a small business owner (but not a special education researcher) and 29 respondents because they failed to complete at least one of the three randomly presented item blocks (one for each of the three targeted open science practices) in the survey (i.e., listwise deletion). If only one or two of the item blocks were completed, data from completed blocks were included in analyses (i.e., pairwise deletion or available case analysis). Thus, the final sample included in the

study analyses was 155, which included 80 ECRs (i.e., doctoral students or post-doctoral researchers; 52%) and 75 non-ECR researchers (i.e., assistant, associate, or full professors, including clinical and research faculty; 48%). A majority (77%) of participants identified as female (n=119) and White (n=119). The median number of years of special education research experience was six and the median number of articles published was nine. Participants most commonly identified single-case designs (30%) and group quantitative designs (28%) as the research designs they primarily used. Demographic characteristics of the sample are included in Table 1.

Instrument

For this study, we adapted the OSS (Beaudry et al., 2022), which was developed by the Center for Open Science to assess the attitudes, perceptions, and behaviors of researchers in a wide variety of fields toward open science. The 43-item survey used for the current study asked researchers to provide information about their (a) demographics; (b) knowledge, attitudes, and practices for three open science practices (i.e., preprints, open data, preregistration); and (c) perceived barriers, perceived norms, and future learning and practices for the three practices. Survey items included checklist, binary, estimation, and 5-point Likert-style questions. Survey questions were organized into blocks (one block for each open practice) and blocks were randomly presented to participants after the demographic items. The survey instrument is included as supplementary material (see Figure S1).

Instrument Development

We first adapted the OSS to align with the tenets of the theory of planned behavior (Azjen, 1985). The main constructs of the theory of planned behavior include attitudes, subjective norms, perceived behavior control, intention, and behavior. Given that the constructs

of subjective norms, attitudes, and behavior were well defined in the OSS, we did not add or remove items for these constructs. We added items for each practice relating to perceived behavioral control and intention. We examined perceived behavioral control by asking participants to rate their knowledge for posting a preprint, preregistering a study, and sharing data on a four-point Likert scale from "none" to "high". For intention, we asked participants to rate their intention to complete each of the open science practices in the next two years on a five-point Likert scale from "strongly disagree" to "strongly agree".

To improve face validity and limit response error, we piloted the survey with five researchers in education and the social sciences. Pilot participants also completed cognitive interviews including think-alouds and scripted questions while taking the survey to ensure coverage and clarity (Desimone & Le Floch, 2004). As a result of the cognitive interviews, we revised question phrasing and response options. For example, we added parenthetical definitions to the "neither in favor nor against" and "no opinion" to ensure clarity. We also added additional definitions at the start of each section. For example, we defined "scholarly work" as a completed paper or manuscript that one intends to submit or has submitted for publication in an academic journal. We also consulted two experts in open science to ensure coverage of relevant topics, remove extraneous information, and enhance content validity. As a result of feedback from open science experts, items relating to how researchers would like to learn more about open science and additional response options for how researchers plan to use open science in their future practice were added to the survey. Based on their feedback, we also decided to only examine three core open-science practices, instead of the five practices included on the full OSS, for brevity and relevance.

Table S1 in the supplemental materials includes an overview of the psychometric properties of the instrument, specifically highlighting the constructs of the theory of planned behavior, including attitudes, perceived behavioral control, perceived norms, behavior, and intention. Cronbach's alpha of .85 across all survey questions indicated a high level of internal consistency.

Analysis

We used the statistical software program R (R Core Team, 2020) to compile descriptive data and conduct analyses. For the first research question, we summarized the knowledge, attitudes, perceived norms, and practices of special education researchers for each of the three open science practices using descriptive statistics such as mean averages and proportions. Furthermore, we created graphs to visualize the distribution of responses across each practice.

To examine the second research question, multivariate linear regression in R was used to analyze the impact of the predictor variables (i.e., years of experience, number of publications, career stage, attitudes, methodological focus, perceived norms, and knowledge) on participants' intended future practices. The independent variables of attitudes, knowledge, and perceived norms were derived from the conceptual framework and the experience, number of publications, career stage, and methodological focus variables were derived from recent research examining researchers' perceptions of open science practices (Abele-Brehm et al., 2019; Soderberg et al., 2020; Toribio-Flórez, 2021; Zečević et al., 2020). For the career stage variable, tenured researchers were designated as the reference group, and for the methodological focus variable, group quantitative research was designated as the reference group.

Before conducting the multivariate linear regression, the assumptions of linearity, normality, multicollinearity, homoscedasticity, and independence were tested for each dependent

variable. Visual plots indicated the assumptions of linearity (scatter plot), normality of residuals (Q-Q plot), and homoscedasticity (scatter plot) were met. Variance inflation factor (VIF) revealed that although correlations between independent variables exist, VIF and tolerance scores were within acceptable limits (i.e., less than 5 and greater than 0.2; Miles, 2014). Furthermore, the Durbin-Watson test indicated residual values were independent as each test statistic was within acceptable limits (Durbin & Watson, 1950). Lastly, using Cook's Distance, no outliers were identified in the data (Cook, 1977).

Results

In this section, we report participants' attitudes, perceived norms, and practices related to preprints, preregistration, and open data, as well as predictions of intent to engage in open science practices in the future.

Knowledge, Attitudes, Perceived Norms, and Practices

When asked to report their knowledge of preprints, 57 participants (47%) reported high or moderate levels whereas 64 (53%) participants reported low or no knowledge of the practice; 38 (32%) reported high or moderate levels of knowledge of preregistration and 81 (68%) reported low or no knowledge; and 39 (29%) reporting high or moderate knowledge of data sharing and 94 (71%) reported low or no knowledge. The were no significant differences between the average knowledge of the three practices. See Figure 1 for a summary of researchers' knowledge regarding the three open science practices.

When asked to report their opinions of preprints, 76 participants (60%) reported favorable opinions, 16 (13%) reported unfavorable opinions, and 34 (27%) were neutral. For preregistration, 82 participants (66%) indicated favorable opinions, 6 (5%) indicated unfavorable opinions, and 37 (30%) were neutral. Participants indicated the most favorable opinions of data

sharing as 107 participants (78%) reported favorable opinions, 26 (19%) were neutral, and five participants (4%) reported unfavorable opinions. The average rating for opinion of data sharing was significantly higher than preprints, $t(118)= 3.26$, $p=.001$, and preregistration, $t(118)=2.79$, $p=.006$. The average opinion of preregistration was not found to be significantly greater than preprints. See Figure 2 for a summary of researchers' opinions.

Ten percent, 11%, and 15% of participants indicated that they posted a preprint, shared data, and preregistered their study, respectively, for their most recent publication. Across all their published research, the average number of times participants had engaged in each practice was less than one: $M=0.37$ ($SD=1.31$) for posting a preprint, $M=0.22$ ($SD=1.30$) for sharing open data, and $M=0.27$ ($SD=0.79$) for preregistering a study. Of those who reported engaging in the open practices, most (75%) indicated they first participated in one of the three practices in the last three years. There were no significant differences in average engagement between the three open science practices.

When asked what percentage of researchers in their field had posted a preprint, shared data, and preregistered a study, on average participants perceived that 16%, 16%, and 12% of their peers had, respectively. Perceived peer engagement for posting preprints, $t(122)=2.71$, $p=.007$, and data sharing, $t(121)=3.27$, $p=.001$, were significantly greater than preregistration. There was no statistically significant difference between perceived peer engagement for posting preprints and data sharing. See Figure S2 (supplementary materials) for a summary of actual and perceived practice.

When asked how colleagues perceive the three open science practices, on average participants indicated that 28% of colleagues oppose, 44% are neutral toward, and 28% favor preprints; 28% oppose, 38% are neutral toward, and 34% favor sharing data; and 25% oppose,

45% are neutral toward, and 30% favor preregistration. Participants' perceptions of peers' attitudes were significantly lower than their own reported attitudes toward each of the open practices: posting preprints, $t(125)=-18.77$, $p<.001$; preregistration, $t(124)=-15.88$, $p<.001$; and data sharing, $t(137)=-21.74$, $p<.001$. See Figure 2 for a summary of the differences between actual and perceived attitudes toward open science practices.

When asked if they would engage in each of the open practices in the next two years, 66 (51%) agreed that they intend to post a preprint and 97 (75%) agreed that they intend to read or download a preprint. Over half of the participants also indicated that they plan to share data (57%), access open data online (65%), preregister a study (55%), and read a preregistration online (59%). The were no significant differences between the average intention to engage in open science practices in the next two years. See Figure 3 for a summary of researchers' intent to engage in open science practices in the next two years.

Predictors of Intention

See Table 2 and Table S2 (supplemental materials) for the results of the regression analyses for all models. The overall model predicting intention to post a preprint—which included experience, number of publications, career stage, opinions of preprints, perceived norms for posting a preprint, methodological focus, and knowledge of preprints—was statistically significant, $F(11, 101)=8.89$, $p<.001$, explaining 44% of the variance in intentions. Attitudes toward ($b=0.56$, $p<.001$) and knowledge of preprints ($b=0.21$, $p=.04$) were significantly and positively associated with intention to post a preprint when holding all other variables constant. The overall model predicting intention to read or download a preprint online was also statistically significant, $F(11, 101)=3.89$, $p<.001$, explaining 22% of the variance. Similar to posting a preprint, attitudes toward ($b=0.29$, $p=.007$) and knowledge of preprints ($b=0.32$,

p=.004) were associated positively and significantly with intention to read or download a preprint online when holding all other variables constant.

The overall model predicting intention to make data open and accessible was statistically significant, $F(11, 110)=6.44$, $p<.001$, explaining 33% of the variance. Opinions of data sharing ($b=0.36$, $p<.001$), knowledge of data sharing ($b=0.37$, $p=.001$), and total publications ($b=0.05$, $p<.001$) were significantly and positively associated with intent to make data open and accessible when holding all other variables constant. Additionally, intent to make data open and accessible was greater for ECR researchers ($b=0.99$, $p=.005$) when compared to tenured researchers (the reference group), holding all other variables constant. Intent to make data open and accessible was significantly lower ($b=-0.39$, $p=.04$) for researchers who primarily use qualitative or mixed-method research designs than for group quantitative researchers, holding all other variables constant. The overall model predicting intention to access open data was also statistically significant, $F(11, 110)=3.01$, $p<.001$, explaining 16% of the variance. The predictor variables of opinions about ($b=0.28$, $p=.02$) and knowledge of sharing data ($b=0.34$, $p=.01$) were significantly and positively associated intent to access open data online.

The overall model predicting intention to preregister a project was statistically significant, $F(11, 100)=7.23$, $p<.001$, and explained 38% of the variance. The predictors of attitudes toward ($b=0.35$, $p=.003$), knowledge of ($b=0.27$, $p=.004$), and perceived norms regarding preregistration ($b=0.01$, $p=.04$) were positively and significantly associated with intent to preregister a project. Additionally, intent to preregister a study was lower for researchers who primarily use qualitative or mixed methods designs ($b=-0.43$, $p=.04$) than group quantitative researchers, holding all other variables constant. For intent to read a preregistration online, the overall model was not statistically significant, $F(11, 100)=1.17$, $p=.31$.

Discussion

The purpose of this study was to investigate (a) special education researchers' use of, knowledge of, perceived norms for, attitudes toward, and future intentions for three core open science practices (i.e., preprints, data sharing, and preregistration) and (b) what factors predict intent to use the practices in the future. Based on the current study, overall knowledge of the three practices was fairly low, with the majority of respondents reporting no or low knowledge of each practice. Although most researchers in the field of special education were not familiar with open practice implementation, most reported positive attitudes toward each of the three practices. Attitudes toward data sharing were significantly higher than the attitudes toward preprints and preregistration. Interestingly, despite the time and effort needed to publicly share data (Kathawalla et al., 2021; Logan et al., 2021), the perceived benefits of the practice (e.g., the ability to ask new research questions or run new analyses) may outweigh the challenges for many researchers. Given these findings, resources and supports for researchers to learn how to share their data might be a fruitful area of emphasis for open science advocates in the field moving forward.

Findings from the study also point to some, but not many, participants using open science practices. Twenty-three percent of researchers reported that they used at least one of the three practices in their most recent publication and the average number of times researchers had engaged in any of the three practices was less than one. Although low numbers of participants reported using open practices, there may be a trend toward increased engagement, as most researchers who reported that they engaged in open practices did so for the first time in the last three years. Furthermore, given the favorable opinions of most participants and the changing

norms surrounding the conduct and reporting of research in related fields such as psychology (Nosek & Lindsay, 2018), special education may see continued uptake in open science practices.

The perceived engagement of other researchers in the field in posting preprints, sharing data, and preregistering studies mirrored the low levels of actual engagement by participants. However, participants' own attitudes were significantly more favorable than the perceived attitudes of other researchers in the field toward each of the open practices. Whereas 60%, 66%, and 78% of participants indicated favorable attitudes toward preprints, data sharing, and preregistration, respectively, participants perceived that only 28%, 30%, and 34% of their peers held favorable attitudes toward the respective practices. This misalignment of attitudes and perceived norms may indicate that positive signals regarding these open practices are not prominently visible within the field and that future efforts should aim to close the gap between actual and perceived attitudes (Nosek, 2019).

Several factors emerged as statistically significant predictors of intention to engage in each of the three practices. Based on the theory of planned behavior (Azjen, 1985), we expected that participants' attitudes, views of subjective norms, and perceived behavioral control would impact intent to engage in the practices in the future. Both attitudes and perceived behavioral control (i.e., knowledge) were statistically significant predictors of intent to engage in each of the three open science practices. Perceived subjective norms significantly predicted intent to engage in preregistration, but not preprints or data sharing. Number of publications and methodological focus were also significant predictors for intent to share data and preregister a study in the future. Career stage was a statistically significant predictor for intent to share data. These findings align with results of previous studies and the theory of planned behavior (Campbell et al., 2019; Houtkoop et al., 2018; Toribio-Flórez et al., 2021). Given the important role of attitudes and

knowledge on behavioral intent, these findings can help guide future efforts to increase open scholarship practices in special education.

Recommendations for Practice and Research

Findings from this study suggest several recommendations for supporting increased engagement in open science in special education. Given that attitudes and intent to use open practices in the future are relatively high, but knowledge and current use are relatively low, it seems that increasing knowledge is an important first step toward increasing practice. Furthermore, given methodological focus and career stage were significant predictors of (a) data sharing and preregistration and (b) preprints, respectively, advocates of open science might consider how trainings and supports for adopting open practices can be adapted across levels of experience and preferred methodologies to meet the unique needs of different groups of special education researchers. A logical starting point for advocates may be developing training and supports for ECRs, as many fields have highlighted ECR enthusiasm for open practices (Abele-Brehm et al., 2019; Campbell et al., 2019; Houtkoop et al., 2018; Soderberg et al., 2020). This training could include opportunities to learn and apply open practices in doctoral seminars and mentors modeling and incorporating practices in current coursework. Doctoral programs might also consider including program milestones for engaging in open practices. For example, students could be required to post a preprint, submit a preliminary preregistration to their committee for feedback when proposing their dissertation, or share their dissertation data (to the degree it is ethically possible to do so) on an institutional repository. Future research could examine the feasibility of ECR training programs as well as their potential impact on perceptions and use of open science practices.

Another way to increase knowledge and implementation of open science practices is to make open science more accessible for researchers not engaging in quantitative approaches. Findings from the current study indicate that qualitative and mixed-method researchers are less likely than quantitative researchers to intend to share data or preregister their studies in the future. Although other fields have begun to address concerns of qualitative and mixed methods researchers regarding open science (Haven et al., 2020), many continue to perceive that open science is only for quantitative researchers (Tamminen & Poucher, 2018). Efforts to facilitate use of open practices among qualitative and mixed-method researchers might include developing a mixed-method preregistration template (Fleming et al., under review) and guidelines for qualitative and mixed-method special education researchers on how and where to share data.

Survey results also indicated a large gap between the perceived attitudes of others in the field (i.e., subjective norms) and researchers' own attitudes toward open practices. Given the influence of subjective norms on intention and behavior (Azjen, 1991), it may be important to consider how open science practices can be made more visible and normative in the field. Future efforts could include more special education journals recognizing and rewarding transparency through the use of open science badges, institutions of higher education recognizing and rewarding use of open science practices in promotion and tenure decisions, and professional organizations providing support and training on open science practices (see Adelson et al., 2019). As more individual researchers begin to implement open science practices, norms, policies, and incentives may shift to make open practices more standard and visible (Mellor, 2021).

Limitations

Limitations to this study should be considered when interpreting study findings. First, the generalizability of results is limited because of the convenience nature of the moderately sized

sample and the potential bias introduced from a self-report measure (e.g., socially desirable responding). We used a convenience sample because we did not have the contact information for all special education researchers in the United States, which impacted the precision of our estimates. Furthermore, our response rate from the DR listserv (11%) and ECRs (35%) may have resulted in oversampling from certain universities, thus making it difficult to generalize results to the population of special education researchers. Given the low response rate, results may reflect sampling bias (e.g., researchers who chose to participate may have held different views of open science practices than those who did not). We also did not include all relevant open science practices (e.g., registered reports, replication) nor all variables that may impact intended behavior such as perceived barriers to practice. Future research should further investigate these practices and variables.

Conclusion

Open science practices have the potential to improve the openness and transparency of research as well as the credibility and replicability of findings. Results from the current study indicate that many special education researchers are in favor of open science practices, but many have low levels of knowledge of the practices and experience implementing them. Efforts to increase the uptake of open science practices should consider effort to improve attitudes toward and knowledge of practices, as results indicate that both predict intent to engage in open science practices in the future. Supports for ECRs as well as additional applications for qualitative and mixed-method research designs should also be considered. Study findings provide an understanding of where the field is in terms of key open science practices and can help inform efforts to support increased engagement with open science practices in the field of special education.

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Table 1

Demographic Information

Variable		*n*	%
Career Stage	Doctoral Student/Post-Doc	80	52%
	Assistant Professor	34	22%
	Associate Professor	15	10%
	Professor	16	10%
	Clinical or Research Faculty	10	6%
Race/Ethnicity	White or Caucasian	119	77%
	Hispanic or Latino	9	6%
	Asian or Pacific Islander	8	5%
	Black or African American	7	4%
	Multiracial or biracial	7	5%
	Other/Prefer not to say	3	2%
	Native American or Alaskan native	2	1%
Gender	Female	119	77%
	Male	33	21%
	Prefer not to say	2	1%
	Non-binary	1	1%
Research Method	Single case design	47	30%
	Group quantitative	43	28%
	Mixed methods	29	19%
	Qualitative	16	10%
	Systematic reviews and meta-analyses	10	6.5%
	Multiple	10	6.5%

Table 2

Linear Regression Analyses to Predict Intention to Engage in Open Science Practices

	Post a Preprint				Share Data				I
Variable	*B*	*SE B*	β	*p*	*B*	*SE B*	β	*p*	*B*
Experience (Years)	-0.01	0.02	-0.02	.52	-0.01	0.02	-0.07	.46	-0.2
Total Publications	0.02	0.02	0.18	.20	0.05	0.01	0.48	.001*	0.04
Pre/Non-Tenure	0.29	0.32	0.12	.37	0.35	0.27	0.17	.20	0.12
ECR	0.51	0.40	0.22	.21	0.99	0.35	0.52	.005*	0.63
Qual/Mixed Methods	-0.20	0.22	-0.08	.37	-0.39	0.19	-0.19	.04*	-0.43
Single Case	-0.26	0.21	-0.11	.22	-0.01	0.19	-0.00	.98	-0.15
Attitudes	0.56	0.10	0.51	.001*	0.36	0.10	0.31	.001*	0.35
Knowledge	0.21	0.10	0.17	.04*	0.37	0.11	0.28	.002*	0.27
Perceived Norm	0.01	0.01	0.10	.22	-0.01	0.003	-0.08	0.33	0.01
R^2	.49				.39				.44
Adjusted R^2	.44				.33				.38

Note. ECR= early career researcher.
* $p<.05$.

Table S2

Linear Regression Analyses to Predict Intention to Engage in Secondary Open Science Practices

	Read a Preprint				Access Shared Data				Read
Variable	*B*	*SE B*	β	*p*	*B*	*SE B*	β	*p*	*B*
Experience (Years)	0.01	0.02	0.03	.78	-0.001	0.02	-0.004	.97	-0.01
Total Publications	-0.01	0.02	-0.13	.44	0.001	0.02	0.01	.97	-0.002
Pre/Non-Tenure	-0.20	0.34	-0.09	.57	0.13	0.32	0.06	.69	-0.23
ECR	-0.21	0.43	-0.10	.63	0.47	0.41	0.24	.25	-0.17
Qual/Mixed Methods	-0.11	0.24	-0.05	.64	-0.24	0.23	-0.11	.30	-0.29
Single Case	-0.28	0.23	-0.13	.22	0.05	0.23	0.02	.82	-0.11
Attitudes	0.29	0.10	0.29	.007*	0.28	0.12	0.23	.02*	0.26
Knowledge	0.32	0.11	0.29	.004*	0.34	0.14	0.25	.01*	0.14
Perceived Norm	0.01	0.01	0.13	.17	-0.003	0.004	-0.08	0.38	-0.003
R^2	.30				.23				.11
Adjusted R^2	.22				.16				.02

Note. ECR= early career researcher.
* $p<.05$.

Table S1

Overview and Reliability of Revised Open Scholarship Survey

Construct (alpha)	Items	*M*(*SD*)
Intent (.83)	I plan to post a preprint within the next two years	3.48 (1.12)
	I plan to read a preprint online within the next two years	4.02 (1.03)
	I plan to make my data open within the next two years	3.62 (0.94)
	I plan to access open data online within the next two years	3.76 (1.00)
	I plan to preregister a project within the next two years	3.59 (1.00)
	I plan to read a preregistration online within the next two years	3.65 (0.99)
Behavior (.82)	Was your most recent scholarly work shared as a preprint in an independent repository?	0.10 (0.31)
	Were data from your most recent empirical scholarly work shared in an independent repository?	0.11 (0.32)
	Did you preregister your most recent empirical scholarly work?	0.15 (0.36)
Norms (.72)	In your estimation, what percentage of researchers across your discipline have shared a preprint in an independent repository?	15.95 (16.03)
	In your estimation, what percentage of researchers across your discipline have shared data in an independent repository?	15.66 (14.63)
	In your estimation, what percentage of researchers across your discipline have preregistered a study?	12.12 (11.31)
	In your estimation, what percentage of researchers are in favor of sharing preprints?	28.44 (20.29)
	In your estimation, what percentage of researchers are in favor of sharing data?	33.59 (21.87)
	In your estimation, what percentage of researchers are in favor of preregistration?	29.94 (19.72)
Opinions (.61)	What is your opinion of sharing preprints in an independent repository?	3.71 (1.04)
	What is your opinion of sharing data in an independent repository?	4.04 (0.83)

	What is your opinion of preregistration?	3.82 (0.82)
Perceived Behavior Control (.60)	How would you rate your knowledge of posting preprints in an independent repository?	2.50 (0.91)
	How would you rate your knowledge of sharing data to independent repositories?	2.29 (0.76)
	How would you rate your knowledge of preregistering a study?	2.34 (0.92)

Figure # 1

Knowledge of Open Science Practices

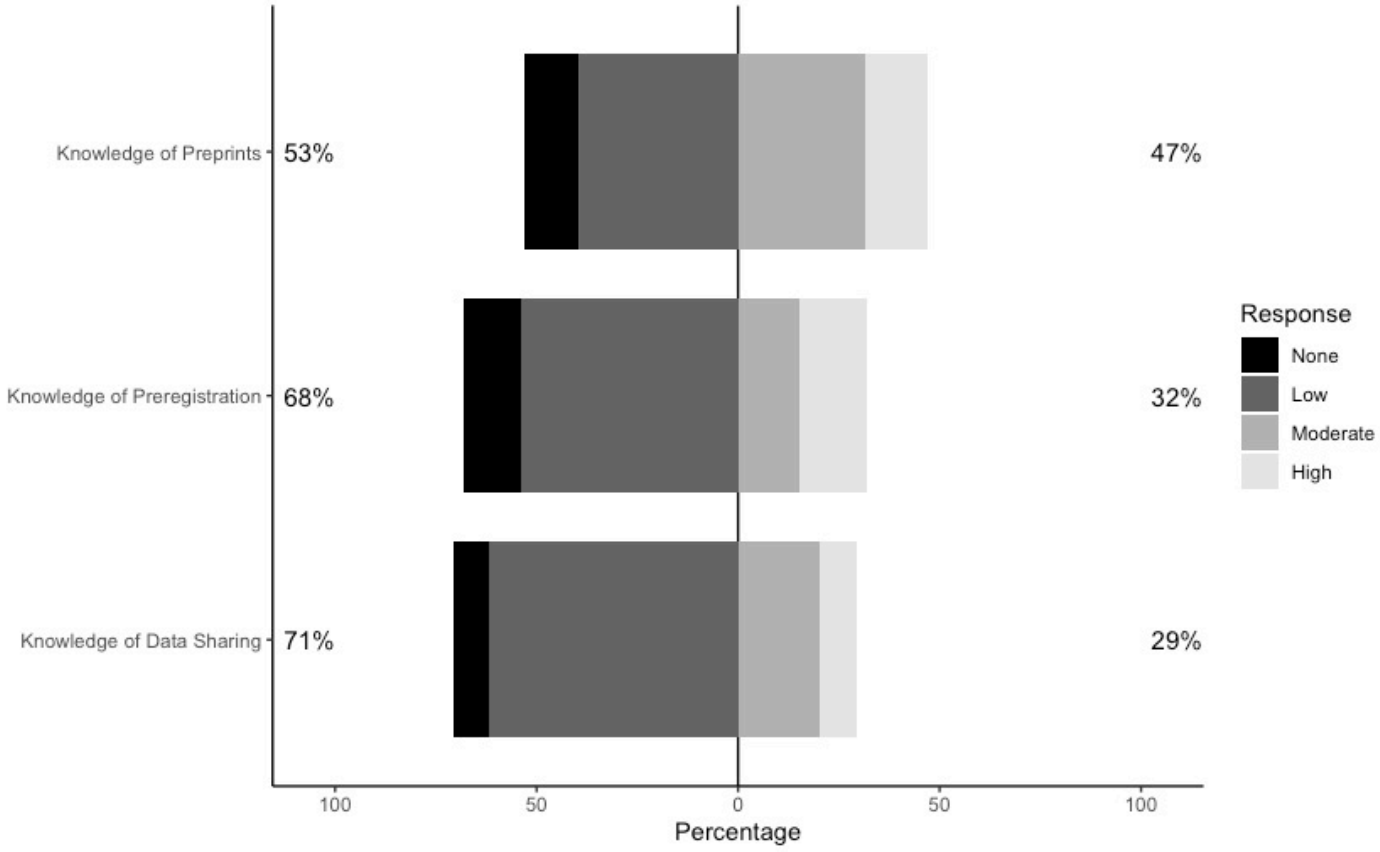


Figure # 2

Actual and Perceived Attitudes toward Open Science Practices

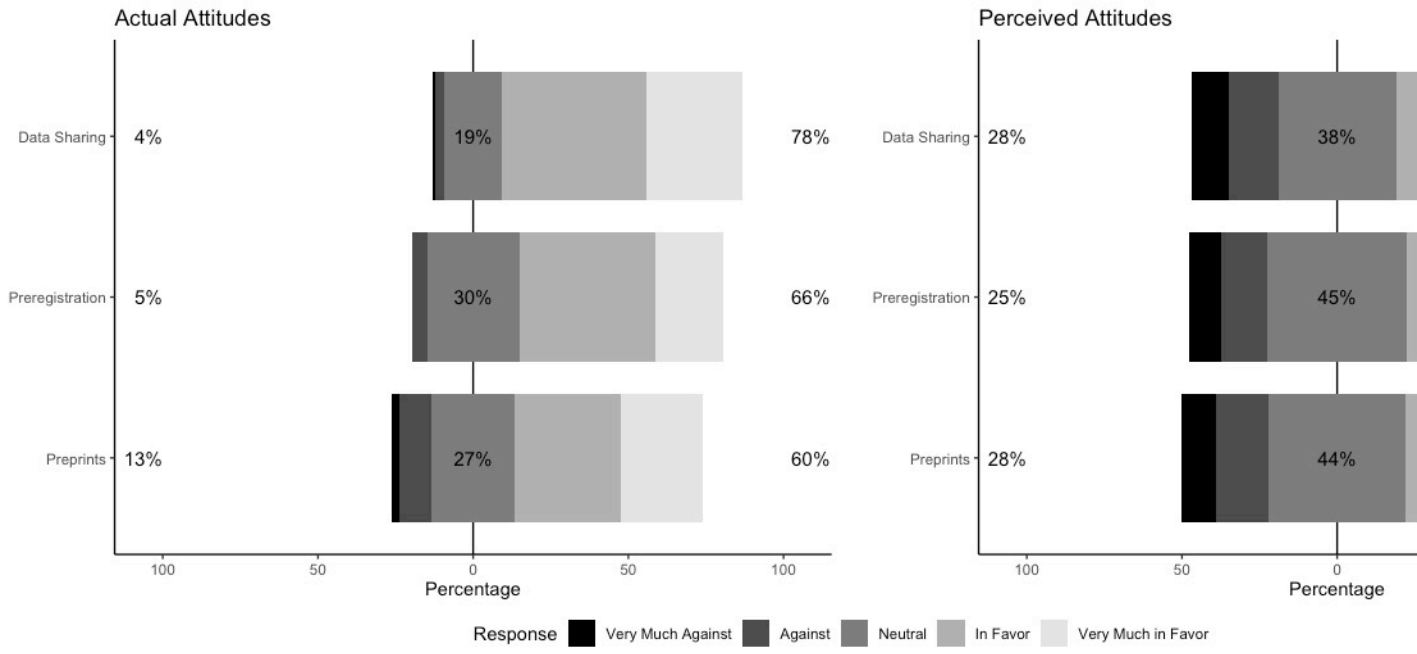


Figure # 3

Intent to Engage in Open Science Practices in the Next Two Years

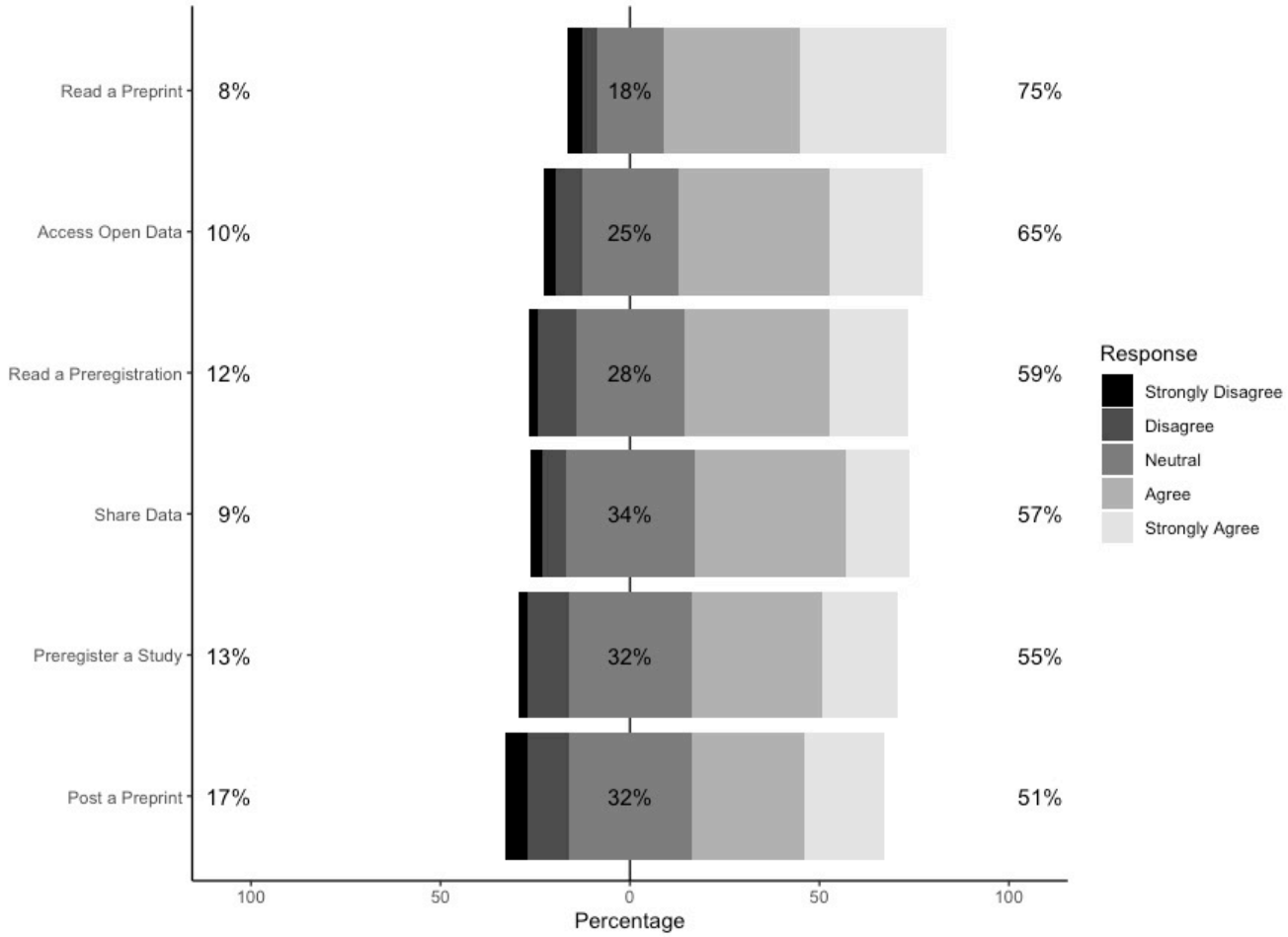
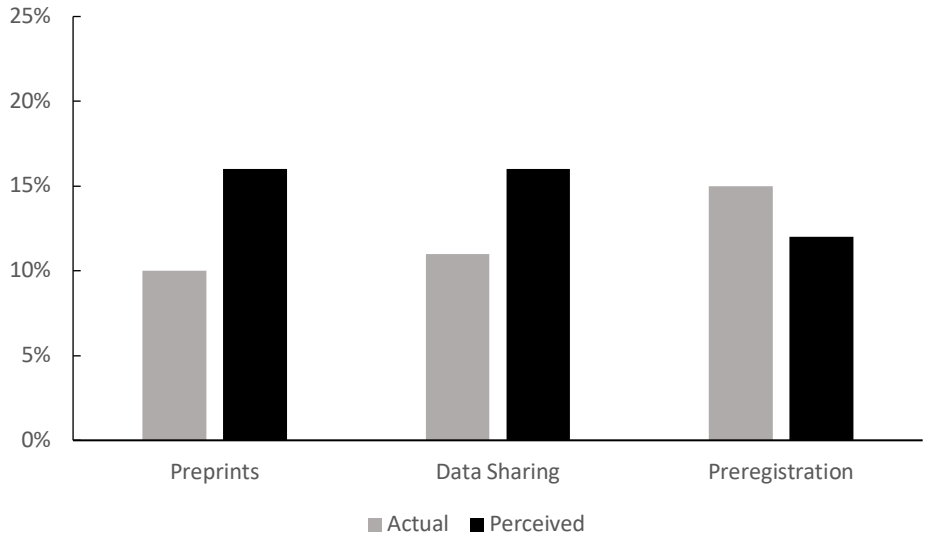


Figure # S2

Percentage of Researchers who Engage in Open Science Practices: Actual and Perceived



Chapter III

Effects of Tiered SWPBIS Fidelity on Exclusionary Discipline Outcomes for Students with Disabilities

Abstract

School-Wide Positive Behavior Interventions and Supports (SWPBIS) is a tiered framework that supports the academic, social, and behavioral needs of students. In this study, we use a series of two-level linear multilevel analyses to examine the impact of SWPBIS fidelity on 10 exclusionary discipline outcomes for students with disabilities. Specifically, we compare the impact of schools that implement multiple SWPBIS tiers with fidelity to schools that only implement Tier 1 with fidelity from a sample of 558 schools and 113 districts in California. Findings indicate a statistically significant decrease in multiple out-of-school suspension categories as well as referrals to law enforcement for students with disabilities in schools that implemented all tiers with fidelity. We provide recommendations for using findings to inform school efforts to reduce exclusionary discipline for students with disabilities.

Introduction

Schools often respond to challenging behavior by removing students from the educational environment in an attempt to reduce inappropriate behavior. Although exclusionary discipline is common for students with disabilities (SWD) within U.S. schools, exclusionary discipline can exacerbate academic, behavioral, and social difficulties by removing opportunities for SWD to receive academic and social skills instruction, receive feedback from teachers and peers, and practice appropriate behavior (Gregory et al., 2010; Losen & Martinez, 2020). Furthermore, exclusionary discipline such as suspensions and expulsions can contribute to lower academic achievement, increased dropout rates, and the school-to-prison pipeline (Cholewa et al., 2018; Morris & Perry, 2016; Skiba et al., 2011).

One potential solution to challenging behavior, while also reducing the use of exclusionary discipline, is school-wide positive behavior interventions and supports (SWPBIS). Multiple studies have highlighted the positive effects of Tier 1 or universal SWPBIS, but additional research is needed to better understand how implementing successive SWPBIS tiers with fidelity impacts exclusionary discipline outcomes for SWD (Gage et al., 2018; Lee & Gage, 2020; Noltemeyer et al. 2018; Sugai & Horner, 2020). In this study, we aim to replicate and extend the work of Grasley-Boy and colleagues (2022a) by comparing the impact of schools implementing multiple SWPBIS tiers with fidelity to schools only implementing tier one of SWPBIS with fidelity on exclusionary discipline outcomes for SWD.

Exclusionary Discipline

Exclusionary discipline is often narrowly defined as in-school suspensions (ISS), out-of-school suspensions (OSS), and expulsions (Skiba et al., 2014), but students can also be excluded from instruction by being transferred to an alternative school (i.e., expulsion with educational

services), being referred to law enforcement, or receiving a school-related arrest (Grasley-Boy et al., 2022a). When students are removed from the classroom, there are both short-term and long-term ramifications. One of the immediate consequences of exclusionary discipline is lost instruction. Students who miss more days of instruction will often learn less and are more likely to repeat a grade or dropout (Marchbanks et al., 2015). Lost instruction time from exclusionary discipline also impacts math and reading achievement, which are necessary for academic and post-secondary success (Whisman & Hammer, 2014). Additionally, exclusionary discipline may perpetuate stereotypes and bias, and is associated with increased antisocial behavior and depressive symptoms (Carter et al., 2017; Eyllon et al., 2022; Hemphill et al., 2006). Long-term consequences include a higher risk of receiving additional discipline, dropping out of school, and becoming involved with the juvenile justice system (Losen & Martinez, 2020).

SWD are affected disparately by punishment in schools. For example, Losen and Martinez (2020) found that secondary SWD lost about twice as many days of instruction as their peers without disabilities. Not only do SWD have more discipline encounters than their peers without disabilities, they are also given more severe punishment (Blake et al., 2020). Exclusionary discipline may be even more consequential for SWD than their peers without disabilities, as they lose access to important supports such as counselors, therapists, and special or individualized instruction, and making up missed instructional time may be more difficult (Losen & Martinez, 2020). Despite federal protections for SWD, such as manifest determination, the use of discriminatory discipline practices is an ongoing concern across districts and schools (Fisher et al., 2020). In response to these concerns, the federal government released new guidance for schools to support SWD and avoid discriminatory use of discipline in July 2022 (U.S. Department of Education, 2022a). A key component of the guidance from the U.S.

Department of Education (DOE) was the implementation of SWPBIS (U.S. Department of Education, 2022b, 2022c).

SWPBIS

SWPBIS is a framework for delivering school-wide and evidence-based practices to support academic, social, and behavioral outcomes for all students, especially SWD or high risk for failure (Sugai & Horner, 2020). SWPBIS uses a three-tiered prevention model to support positive behavior. In Tier 1, schools establish school-wide social and behavioral expectations, reinforcers for expected behaviors, a system to correct and redirect inappropriate behavior, and data collection methods and routines. It is expected that Tier 1 interventions addresses the needs of most students and typical problem behaviors. Tier 2 supports are designed to address the needs of a smaller number of students who require additional instruction or support. In addition to Tier 1 interventions, these students may require increased opportunities for positive reinforcement, social skills instruction, or pre-corrections. Tier 3 supports students with the most intensive needs who have not responded to Tier 1 and Tier 2 interventions. Tier 3 supports are developed and implemented by a team of experts and include interventions such as functional-behavioral assessments and person-centered planning (Horner & Sugai, 2015).

The effects of SWPBIS implementation have been evaluated by numerous studies and investigators. Researchers posit that SWPBIS is associated with several positive student outcomes such as higher academic achievement (Horner et al., 2009), fewer suspensions and expulsions (Bradshaw et al., 2010), improved mental health (Cook et al., 2015), and lower rates of bullying and peer rejection (Waasdorp et al., 2012). Multiple reviews and meta-analyses corroborate these findings and highlight that SWPBIS is an effective tool to reduce disciplinary

problems and limit the use of exclusionary discipline (Gage et al., 2018; Lee & Gage, 2020; Noltemeyer et al., 2018).

SWPBIS Fidelity

To date, multiple studies have assessed the impact of SWPBIS fidelity on student outcomes. Childs and colleagues (2016) assessed the impact of Tier 1 fidelity, measured with the Benchmarks of Quality (BoQ), on office discipline referrals (ODR), ISS, and OSS. The researchers found that greater Tier 1 fidelity was associated with a significant decrease in ODR and OSS. Additionally, Gage et al. (2017) assessed the impact of Tier 1 fidelity (measured by BoQ) on academic outcomes of elementary students and found a significant and positive association between Tier 1 fidelity and reading and mathematics scores. Similarly, Grasley-Boy et al. (2019) assessed the impact of Tier 1 fidelity on ten exclusionary discipline outcomes for students with and without disabilities. Researchers found a statistically significant decrease in OSS and days missed due to OSS for all students when schools implemented universal SWPBIS with fidelity, but no significant differences were found for other types of exclusionary discipline. Other studies have similary found that implementing Tier 1 with fidelity is associated with positive student outcomes (Kim et al., 2018; Simonsen et al., 2012, 2021; Noltemeyer et al., 2019), but few studies have assessed the impact of Tier 2 and 3 SWPBIS fidelity on student outcomes (Grasley-Boy et al., 2022a).

Tier 2 and 3 SWPBIS Fidelity

Gage and colleagues (2019) assessed the impact of Tier 1 fidelity on suspensions and expulsions using a quasi-experimental study design and found a significant and negative relationship between fidelity and suspensions. The researchers also conducted an exploratory analysis of how higher tier fidelity impacts suspensions, but did not account for the potential

impact of clustered data and higher-level predictors. Furthermore, the researchers did not assess the impact of fidelity on additional measures of exclusionary discipline such as referrals to law enforcement and school-related arrests.

Grasley-Boy et al. (2022a) assessed the additive effects of implementing higher tiers of SWPBIS with fidelity on exclusionary discipline. The authors found that implementing all three tiers of SWPBIS with fidelity had a significant impact on reducing multiple disciplinary outcomes compared to only implementing Tier 1 with fidelity. However, these researchers did not assess how implementing advanced tiers of SWPBIS may impact exclusionary discipline outcomes specifically for SWD. Given disparate discipline outcomes for SWD are well established in the literature, additional research is warranted to better understand how fidelity across SWPBIS tiers may impact exclusionary discipline outcomes for SWD. Therefore, the purpose of this study is to conduct a conceptual replication of Grasley-Boy et al. (2022a) and assess the additive effects of SWPBIS Tier 2 and Tier 3 fidelity on exclusionary discipline outcomes for SWD. Specifically, we seek to answer the following research questions:

3. Is there a statistically significant difference in exclusionary discipline outcomes for SWD in schools implementing only Tier 1 with fidelity compared with schools implementing Tier 1 and Tier 2, Tier 1 and Tier 3, or all three tiers with fidelity?
4. Do the findings from Grasley-Boy et al. (2022a) on the relationship between SWPBIS fidelity and exclusionary discipline outcomes replicate for SWD?

Method

Sample

The sample for the current study was obtained from the California PBIS Coalition (CPC) and represents SWPBIS implementation fidelity data from the 2015-2016 school year. The goal

of the CPC is to establish a statewide network to support PBIS implementation. The CPC supports local schools and districts through regional assistance centers that provide training, coaching, and professional development to schools and districts to promote fidelity and data-based decision making. The CPC dataset included 1,384 schools that reported fidelity based on the Tiered Fidelity Inventory (TFI). We then identified 558 schools from 113 districts that met fidelity for Tier 1, Tiers 1 and 2, Tiers 1 and 3, or all three tiers. As recommended by the TFI developers (Algozzine et al., 2012) and consistent with previous studies (Gage et al., 2020; Grasley-Boy et al., 2022a), we defined fidelity as 70% for each tier of the TFI.

In addition to the CPC data, we also collected discipline data from the 2015-2016 U.S. Department of Education's Civil Rights Data Collection (CRDC) survey (https://ocrdata.ed.gov) and demographic data from the National Center for Education Statistics Common Core of Data (CCD) for the included schools (https://necs.ed.gov/ccd/). Data from the three sources were then merged using schools' state and national ID numbers. School-level characteristics and summary data for each of the three tiers can be found in Table 1.

Measures

Tiered Fidelity Inventory

The purpose of the TFI is to measure the extent to which school personnel are correctly applying the core elements of SWPBIS. The TFI can be used as an initial assessment or as a guide for the implementation of practices at each of the SWPBIS tiers and can be completed multiple times throughout the school year. The measure contains 45 questions divided across Tier 1 (15 questions), Tier 2 (13 questions), and Tier 3 (17 questions). The school PBIS team completes the TFI and each item is assessed on a 3-point scale (i.e., 0 = no implementation, 1= partial implementation, 2 = full implementation). The TFI has strong evidence of reliability and

validity (McIntosh et al., 2017; Grasley-Boy et al., 2022b). In a recent evaluation of the TFI using data from California schools in 2018-2019, Grasley-Boy et al. (2022b) found an internal consistency of $\alpha = 0.94$ for Tier 1, $\alpha = 0.95$ for Tier 2, and $\alpha = 0.97$ for Tier 3. In the current study, fidelity is coded as a categorical variable with fidelity at Tier 1, Tier 1 and Tier 2, Tier 1 and Tier 3, and all three tiers as the categorical levels. Fidelity was used as a level-1 predictor of exclusionary discipline outcomes.

School Demographics

We gathered school-level covariates from the CCD website. The CCD is collected annually by the Department of Education and includes information on school, student, and staff characteristics. For the current study, we controlled for four school-level covariates: (a) a categorical variable for urbanicity (i.e., city, suburb, town, rural), (b) a categorical variable for school level (i.e., primary, middle, high, other), (c) a continuous variable for percentage of students receiving free/reduced lunch, and (d) a continuous variable for the percentage of White students at the school. The percentages for free/reduced lunch and White students were calculated by dividing the student count variable by the total enrollment at each school.

Discipline Outcomes

The CRDC was accessed for data related to the 10 exclusionary discipline outcome variables used in the analyses. The CRDC is a biennial survey administered by the Department of Education's Office of Civil Rights, which collects information from schools to monitor cases of discrimination. Replicating the outcome variables from Grasley-Boy et al. (2022a), we included the following school-level discipline outcomes in our analyses: (a) SWD with any ISS, (b) SWD with one OSS, (c) SWD with one or more OSS, (d) SWD with two or more OSS, (e) OSS incidents, (f) days of school missed due to OSS, (g) SWD expelled, (h) SWD referred to

alternative schools for discipline issues, (i) SWD referred to law enforcement, and (j) SWD with school-related arrests. All outcome variables from the CRDC are reported as counts, so we transformed all variables to be the number of incidents per 100 SWD. This was achieved by dividing the total count for each outcome variable by the total school enrollment of SWD and multiplying this by 100.

Data Analysis

First, we estimated both univariate and bivariate descriptive statistics. Next, a series of two-level linear multilevel analyses were conducted to account for the clustered nature of the data (i.e., schools clustered in districts) and to examine the effect of SWPBIS fidelity on the 10 exclusionary discipline outcomes for SWD. Although no level-2 (district) predictors were included in the models, a multi-level analysis is appropriate when iteratively building and assessing models for clustered data. We first estimated the unconditional model, which does not include predictors, using the following equation:

$$y_{ij} = \gamma_{00} + u_{0j} + \varepsilon_{ij}$$

This first model evaluated how much of the variance in exclusionary discipline outcomes is accounted for by district-level variation. The district-level variance in exclusionary discipline outcomes is quantified through the intraclass correlation (ICC), which is computed with the following equation:

$$\text{ICC} = \frac{\tau_{00}}{(\tau_{00} + \sigma^2)}$$

In this equation, τ_{00} is the residual variance at level 2 (i.e., between districts) and σ^2 is the residual variance at level one (i.e., within schools). ICC values above .10 indicate that a multi-level model may be appropriate to account for data clustering and reduce the likelihood of committing a Type 1 error (Lee, 2000).

To assess the additive effects of higher tier fidelity on exclusionary discipline outcomes (Research Question 1), we included the categorical school-level predictor for SWPBIS tiers of fidelity (Fidelity_Tiers) and controlled for the four school-level covariates (i.e., urbanicity, school level, percentage of free and reduced lunch, and percentage of white students). Schools that only implemented Tier 1 with fidelity served as the reference group. In this random intercept model (i.e., Model 2), we allowed for the intercept of the level-one predictor to vary across level-two units (i.e., districts), but the slope did not vary. The equation for the random intercept model is as follows:

$$y_{ij} = \gamma_{00} + \gamma_{10}(Fidelity\_Tiers_{ij}) + u_{0j} + \varepsilon_{ij}$$

For Model 3, we allowed both the intercepts and slopes to vary across level-two units in a random slope model. In other words, we allowed for SWPBIS fidelity to have a different effect for each district. We used the following question for Model 3:

$$y_{ij} = \gamma_{00} + \gamma_{10}\left(Fidelity\_Tiers_{ij}\right) + u_{1j}\left(Fidelity\_Tiers_{ij}\right) + u_{0j} + \varepsilon_{ij}$$

To determine the best fitting fixed effects model, we compared the unconditional model (i.e., Model 1), random intercept model (i.e., Model 2), and random slope model (i.e., Model 3) using maximum likelihood (ML) estimation. To determine if changes in model fit were significant, we examined changes in the -2LL and applied the chi-square likelihood ratio test. The likelihood ratio test evaluates the likelihood that a set of parameters produces the observed data for each model. In addition to the likelihood ratio test or Deviance test, Akaike Information Criterion (AIC) and pseudo-R^2 were also calculated for each model. Lastly, we assessed the variance structure to determine if both variances and covariances would be included in the model. This process revealed best-fitting models for each of the 10 outcome variables, which are

discussed in greater detail in the Results and Discussion sections. We conducted all analyses in R 4.1.3 (R Core Team, 2017) using the *lme4* package (Bates et al., 2015) for multi-level modeling.

Results

The sample for the current study includes 558 schools in 113 districts. Descriptive statistics and demographic characteristics of all schools are provided in Table 1. The majority of participating schools served elementary students in city or suburban settings and reported fidelity in Tier 1 only. Schools with fidelity for Tiers 1 and 3 contained the highest percentage of White students and schools with fidelity in Tier 1 only contained the highest percentage of SWD and students receiving free or reduced-price lunch.

Assumptions

Statistical assumptions of independence, homogeneity of variance, and normality were tested for the main effect models. We also assessed the effects of unusual data points. Using a scatter plot and the Durbin Watson test, both revealed independence of level-one residuals. Histograms and Q-Q plots also revealed normality and homogeneity of variance. Homogeneity of variance for level 2 was assessed using Levene's test. Results were not significant, indicating that the variance of the residuals is equal and the assumption of homogeneity of variance is met. Using Cook's distance, we also investigated unusual data points. Several data points were found outside the expected range at both level 1 and level 2. An analysis of these points revealed that they did not have an impact on the overall results of the fitted model. Skew and kurtosis levels were found to not be within appropriate ranges for disciplinary outcomes. Replicating the procedures done by Grasley-Boy (2022a), we applied square root transformations to the 10 exclusionary discipline outcome variables to normalize their distributions. See Table 2 for the raw and squared values of skew and kurtosis for the outcome variables.

Model Fit

We calculated ICC and iteratively developed best-fitting models for all 10 exclusionary discipline outcomes. Tables are presented for outcomes in which the random intercept or random slope models fit better than the unconditional model (i.e., Model 1). We report model development and estimated effects for the following outcomes in Tables 3-8: instances of ISS, one instance of OSS, one or more instances of OSS, total instances of OSS, number of days missed due to OSS, and referrals to law enforcement per 100 SWD.

ICC

We calculated the ICC for each of the 10 exclusionary discipline outcomes and report the ICC for the six outcomes in which the random intercept or random slope models fit better than the unconditional model. The ICC is the amount of variance in the outcome variables explained or accounted for by district-level variation. The ICC for each variable is reported at the bottom of Tables 3-8. The largest ICC was .52 for the model predicting one or more instances of OSS per 100 SWD. In other words, 52% of the variability in this disciplinary outcome is accounted for at the district level.

Model Selection

Model fit statistics are displayed in Tables 3-8 for the reported exclusionary discipline outcome variables. We used the chi-square LR test or Deviance test, AIC, and pseudo-R^2 to compare model fit between the unconditional, random intercept, and random slope models. A significant chi-square LR test indicated the best model fit. For instances of ISS (LR= 56.5 , $p <$ .05), one instance of OSS (LR= 134.3 , $p < .05$), one or more instances of OSS (LR= 145.3 , $p <$ .05), total instances of OSS (LR= 55 , $p < .05$), number of days missed due to OSS (LR= 203.96 , $p < .05$), and referrals to law enforcement per 100 SWD variables (LR= 49.3 , $p < .05$), we

selected the random intercept model (i.e., Model 2). For each of the models, we used unstructured variances.

Discussion

In this analysis, we conducted 10 two-level linear models to assess the effect of SWPBIS fidelity on exclusionary discipline outcomes for SWD. This study extends the work of Grasley-Boy et al. (2022a) and provides evidence that fidelity in advanced tiers of SWPBIS, in addition to Tier 1, may further decrease the use of exclusionary discipline practices for SWD.

Research Question #1

To answer research question one, we compared schools implementing Tier 1 with fidelity to schools implementing Tiers 1 & 2, Tiers 1 & 3, and all three tiers with fidelity while controlling for urbanicity, school level, percentage of students receiving free or reduced lunch, and the percentage of White students. Model estimates indicated statistically significant decreases in the number of total days missed due to OSS, rate of OSS incidents, rate of students with one instance of OSS, rate of students with one or more instances of OSS, and referrals to law enforcement per 100 SWD for schools that implemented all three tiers with fidelity. The model predicting one or more ISS per 100 SWD was significant only for schools that implemented Tiers 1 & 3 with fidelity. For the remaining variables (i.e., two or more OSS, expulsions, transfers to alternative settings, arrests per 100 SWD), there was not a statistically significant decrease in these outcomes for SWD.

These findings are important as the use of exclusionary discipline continues to disproportionately impact SWD (Welsh, 2022) and often results in fewer opportunities to learn and interact with peers as well as the removal of or limited access to individualized services and supports (Losen & Martinez, 2020). Furthermore, considering the negative impact of the Covid-

19 pandemic on exclusionary discipline, mental health outcomes for SWD, and the widening discipline gap between students with and without disabilities (Asbury et al., 2021; Welsh, 2022; U.S. Department of Education, 2022a), SWPBIS fidelity, across tiers, should be a priority for schools and districts.

As is reflected in the sample used for the current study, as well as national data (Sugai & Horner, 2020), schools are more likely to implement Tier 1 with fidelity than Tiers 2 or 3. Schools often report that Tier 2 and 3 are more challenging to implement as interventions become more complex and individualized (Sugai & Horner, 2020). However, findings from the current study should encourage schools to implement all three tiers with fidelity to limit exclusionary discipline incidents as well as to better support the individualized and sometimes intensive needs of SWD.

Findings from the current study also have important implications for disrupting the school to prison pipeline. Results indicated that there was a statistically significant decrease in referrals to law enforcement for SWD in schools that implemented all three SWPBIS tiers with fidelity. This findings is especially relevant for secondary schools where fewer high and middle schools implement SWPBIS with fidelity, yet refer students to law enforcement at higher rates than elementary schools (Grasley-Boy et al., 2022a; Sugai & Horner, 2020).

Research Question 2

For research question two, the results from the study indicate that the three outcomes from Grasley-Boy et al. (2022a) for all students were replicated in the current study specifically for SWD. That is, Grasley-Boy and colleagues also found a statistically significant decrease in the rate of OSS incidents, rate of students with one instance of OSS, and referrals to law enforcement for all students in schools that implemented all three tiers of SWPBIS with fidelity.

Interestingly, the models for SWD from the current study also indicate a statistically significant decrease in the number of days missed because of OSS and the rate of students with one or more instances of OSS. Although not directly replicated in Grasley-Boy et al. (2022a), evidence of similar findings is reported in previous research (e.g., Grasley-Boy et al., 2019). Replicating Grasley-Boy and colleagues (2022a) reinforces the claim that SWPBIS is an effective framework to support both students with and without disabilities (Sugai & Horner, 2020), and that fidelity of intervention at all three tiers can lead to improved disciplinary outcomes for all students.

Implications for Research and Practice

The findings from the current study suggest multiple implications for future research and practice. As suggested by the 2022 guidance from the DOE (U.S. Department of Education, 2022b, 2022c), schools and districts should ensure that leaders, educators, and support staff are trained in best practices (e.g., SWPBIS) to support the educational and behavioral needs of all students. Ideally, this training should begin during pre-service preparation and continue in the form of professional development and ongoing coaching for in-service practitioners (U.S. Department of Education, 2022c). Knowing that fidelity at Tier 2 and 3 is not as prevalent as Tier 1 (cirtation), training and coaching in upper tiers should be a priority for schools and districts. Researchers partnering with school leaders is one approach to explore and address the barriers to implementation of Tiers 2 and 3 with fidelity (Sugai & Horner, 2020).

Top-down direction or training from a state or district may also support SWPBIS implementation (McIntosh et al., 2016). For example, in the current study, the nested nature of schools in districts allowed us to account for the variability in exclusionary discipline outcomes at the district level. Given that a considerable amount of variance in the outcome variables was

explained at the district level, future research should continue to explore the impact of top-down (e.g., district-level) support and training on school-level fidelity.

Finally, future researchers should continue to conduct replication studies related to outcomes associated with SWPBIS. Replication research in special education is important to the development of evidence-based and high-leverage practices for SWD (Cook, 2014). Indeed, replications help researchers and practitioners better understand how, for whom, and under what conditions a practice or intervention is effective (Travers et al., 2016). Despite this need, replication research is uncommon in the field and future research should continue to replicate and refine findings to better support students, practitioners, and schools (Makel et al., 2016).

Limitations

Several limitations should be considered when interpreting the findings from the current study. Because this was a secondary-data analysis, we were limited to analyzing variables in the data set and could not control for all variables of interest. For example, we were unable to control for the number of years implementing SWPBIS with fidelity or quantify the types of supports that schools are receiving from the regional offices when implementing SWPBIS. Furthermore, the dataset may not include all California schools implementing PBIS. The dataset only contains data from schools that have completed the TFI, but there could be other schools implementing the SWPBIS framework that did not report to the regional offices. Finally, this study did not account for how intersectional identities or other individual factors may impact exclusionary discipline for SWD (Fisher et al., 2020; Morgan et al., 2019). Previous studies have indicated that SWD, who are also members of culturally or linguistically diverse populations, may be more likely to receive exclusionary discipline (Losen, 2018; Losen et al., 2014). Future

research should consider how SWPBIS fidelity and the intersection of identities for these students impact exclusionary discipline outcomes.

Conclusion

SWD receive exclusionary discipline at a higher rate than their peers without disabilities. As recommended by the DOE, SWPBIS may help to combat the discipline gap for SWD as it is an evidence-based framework that supports the academic and behavioral needs of all students. Results from the current study indicate that lower levels of exclusionary discipline outcomes, such as OSS and referrals to law enforcement, for SWD are associated with schools implementing all three tiers of SWPBIS, and not just Tier 1, with fidelity. As schools and districts continue to search for effective and equitable practices to reduce exclusionary discipline and disrupt the school-to-prison pipeline for SWD, increased efforts to implement each tier of SWPBIS with fidelity may equip teachers and schools with the tools necessary to reach this goal.

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Table 1

Descriptive Statistics for Schools

School-level Characteristics	All schools (n=558)		Tier 1 only (n=350)		Tiers 1 & 2 (n=113)		Tiers 1 & 3 (n=15)		Tiers 1, 2, & 3 (n=80)	
	M	SD	M	SD	M	SD	M	SD	M	SD
FRPL (%)	67.6	27.6	68.8	26.2	67.0	27.8	55.7	34.1	65.1	31.3
White (%)	18.9	20.6	18.6	20.2	20.7	21.3	21.9	21.6	17.3	21.6
SWD (%)	11	0.04	11	0.04	10.8	0.04	9.3	0.02	9.7	0.04
School level										
Primary	74.4%		75.1%		78.8%		73.3%		65.0%	
Middle	16.7%		16.0%		14.2%		20.0%		22.5%	
High	7.7%		7.7%		6.2%		13.3%		6.3%	
Urbanicity										
City	46.1%		43.7%		55.8%		46.7%		42.5%	
Suburb	37.6%		43.1%		26.5%		26.7%		31.3%	
Town	10.4%		7.7%		11.5%		13.3%		6.3%	
Rural	5.9%		5.4%		6.2%		13.3%		6.3%	
Discipline Outcomes										

ISS	2.4	4.73	2.61	4.90	2.07	4.17	0.54	1.20	2.26	5.06
One OSS	5.76	6.45	5.89	6.52	5.27	6.53	9.06	9.30	5.22	5.17
One or more OSS	39.82	42.61	41.3	46.0	36.1	37.0	44.8	42.1	37.5	33.0
Two or more OSS	4.53	5.8	4.69	6.23	4.42	5.15	4.13	5.72	4.06	4.63
OSS incidents	14.11	19.69	15.5	22.5	11.3	13.0	11.5	11.4	12.0	13.9
Days missed due to OSS	26.21	39.7	28.9	45.1	19.3	24.3	23.8	34.6	24.2	30.0
Expulsion	0.48	2.59	0.63	3.06	0.38	1.89	0.09	0.33	0.07	0.31
Referral to alt. setting	0.08	0.43	0.07	0.43	0.10	0.46	0.18	0.66	0.08	0.32
Law enforcement referral	0.7	2.17	0.94	2.55	0.23	1.00	0.22	0.83	0.34	1.40
School-related arrest	0.08	0.59	0.10	0.65	0.04	0.20	0.09	0.33	0.09	0.74

Note. School-level percentages do not all sum to 100% due to other configurations (e.g., K-12 schools). FRPL = free or reduced lunch; SWD = students with disabilities; ISS = in -school suspension; OSS = out-of-school suspension.

Table 2

Skew and Kurtosis Transformation for Outcomes

	Raw				Square Root			
Outcome	M	SD	Skew	Kurtosis	M	SD	Skew	Kurtosis
ISS	2.4	4.73	2.98	10.87	0.86	1.29	1.31	3.85
One OSS	5.76	6.45	2.19	9.23	1.88	1.49	0.14	1.34
One or more OSS	39.82	42.61	2.41	11	5.44	3.2	0.49	3.38
Two or more OSS	4.53	5.8	2.2	7.93	1.55	1.46	0.39	2.26
OSS incidents	14.11	19.69	3.46	20.88	2.9	2.39	0.70	3.63
Days missed due to OSS	26.21	39.7	2.85	11.12	3.82	3.41	0.90	3.58
Expulsion	0.48	2.59	7.55	64.36	0.17	0.68	4.77	24.99
Referral to alt. setting	0.08	0.43	5.96	37.6	0.06	0.28	5.04	24.68

Law enforcement referral	0.7	2.17	4.11	20.2	0.3	0.78	2.62	9.06
School-related arrest	0.08	0.59	8.89	86.77	0.05	0.28	6.69	47.08

Note. Outcomes are provided as rates per 100 students with disabilities. ISS = in-school suspension; OSS = out-of-school suspension.

Table 3

Estimates from Two-level Linear Models Predicting ISS per 100 SWD

	Model 1			Model 2		
Model parameter	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Fixed Effects						
Intercept	0.97 ***	0.09	10.27	0.45	0.31	1.45
Tiers 1 & 2				-0.20	0.13	-1.52
Tiers 1 & 3				-0.82**	0.30	-2.72
Tiers 1, 2, & 3				-0.15	0.17	0.38
Model Fit						
-2LL	-866.8			-837.57		
AIC	1739.5			1703.1		
BIC	1752.4			1763.2		
ICC	31%					
Error Variance						
Residual	1.19			1.07		
Intercept	0.53			0.50		

Note. Implementing Tier 1 is the reference group for fidelity. AIC = Akaike information criterion; BIC = Bayesian information criterion; ICC = intraclass correlation coefficient. *p< .05. ** p< .01. ***p< .001.

Table 4

Estimates from Two-level Linear Models Predicting One Instance of OSS per 100 SWD

	Model 1			Model 2		
Model parameter	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Fixed Effects						
Intercept	1.89 ***	0.11	17.7	0.91**	0.32	2.83
Tiers 1 & 2				0.11	0.14	0.75
Tiers 1 & 3				0.57	0.33	1.71
Tiers 1, 2, & 3				-0.43*	0.18	-2.34
Model Fit						
-2LL	-963			-885		
AIC	1932			1797.7		
BIC	1945			1857.8		
ICC	27%					
Error Variance						
Residual	1.73			1.33		
Intercept	0.63			0.41		

Note. Implementing Tier 1 is the reference group for fidelity. AIC = Akaike information criterion; BIC = Bayesian information criterion; ICC = intraclass correlation coefficient. *p< .05. ** p< .01. ***p< .001.

Table 5

Estimates from Two-level Linear Models Predicting One or More Instances of OSS per 100 SWD

	Model 1			Model 2		
Model parameter	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Fixed Effects						
Intercept	5.69 ***	0.29	19.86	2.58***	0.66	3.9
Tiers 1 & 2				0.14	0.24	0.59
Tiers 1 & 3				-0.19	0.55	-0.35
Tiers 1, 2, & 3				-1.0**	0.32	-3.1
Model Fit						
-2LL	-1334.6			-1189.3		
AIC	2675.3			2406.5		
BIC	2688.2			2466.6		
ICC	52%					
Error Variance						
Residual	5.97			3.46		
Intercept	6.46			4.23		

Note. Implementing Tier 1 is the reference group for fidelity. AIC = Akaike information criterion; BIC = Bayesian information criterion; ICC = intraclass correlation coefficient. *p< .05. ** p< .01. ***p< .001.

Table 6

Estimates from Two-level Linear Models Predicting Total Instances of OSS per 100 SWD

	Model 1			Model 2		
Model parameter	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Fixed Effects						
Intercept	2.92 ***	0.18	16.17	0.77	0.52	1.49
Tiers 1 & 2				0.02	0.21	0.08
Tiers 1 & 3				-0.17	0.50	-0.35
Tiers 1, 2, & 3				-0.66*	0.28	-2.35
Model Fit						
-2LL	-1210.9			-1108		
AIC	2427.8			2244		
BIC	2440.7			2304.1		
ICC	32%					
Error Variance						
Residual	4.21			2.87		
Intercept	1.99			1.50		

Note. Implementing Tier 1 is the reference group for fidelity. AIC = Akaike information criterion; BIC = Bayesian information criterion; ICC = intraclass correlation coefficient. *p< .05. ** p< .01. ***p< .001.

Table 7

Estimates from Two-level Linear Models Predicting Days Missed Due to OSS per 100 SWD

	Model 1			Model 2		
Model parameter	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Fixed Effects						
Intercept	3.80***	0.36	14.53	1.47*	0.73	2.02
Tiers 1 & 2				-0.03	0.29	-0.12
Tiers 1 & 3				-0.28	0.68	-0.42
Tiers 1, 2, & 3				-0.87*	0.39	-2.25
Model Fit						
-2LL	-1392.5			-1281.4		
AIC	2791			2590.8		
BIC	2803.8			2650.9		
ICC	35%					
Error Variance						
Residual	8.10			5.32		
Intercept	4.37			3.36		

Note. Implementing Tier 1 is the reference group for fidelity. AIC = Akaike information criterion; BIC = Bayesian information criterion; ICC = intraclass correlation coefficient. *p< .05. ** p< .01. ***p< .001.

Table 8

Estimates from Two-level Linear Models Predicting Law Enforcement Referrals per 100 SWD

	Model 1			Model 2		
Model parameter	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Fixed Effects						
Intercept	0.23***	0.05	4.77	0.41*	0.17	2.37
Tiers 1 & 2				-0.18*	0.08	-2.338
Tiers 1 & 3				-0.25	0.18	-1.43
Tiers 1, 2, & 3				-0.35***	0.10	-3.62
Model Fit						
-2LL	-594.7			-545.4		
AIC	1195.5			1118.8		
BIC	1208.4			1178.9		
ICC	18%					
Error Variance						
Residual	0.47			0.38		
Intercept	0.10			0.13		

Note. Implementing Tier 1 is the reference group for fidelity. AIC = Akaike information criterion; BIC = Bayesian information criterion; ICC = intraclass correlation coefficient. *p< .05. ** p< .01. ***p< .001.

CHAPTER IV

Assessing the Effects and Social Validity of a Class-Wide Peer-Education Intervention for Autistic Middle School Students and Their Peers

Abstract

Peer-education interventions can be used to improve peer knowledge of autism and attitudes toward students with autism. In this study, we assess the impact of Kit for Kids – a peer education intervention for elementary and middle-school students. We use a quasi-experimental non-equivalent groups design on 66 middle school students without autism. Differences in post-test scores on knowledge and attitudes were statistically different and changes persisted over a 1-week period. Social validity assessments from stakeholders (i.e., students with autism, peers, parents, and teachers) indicated generally positive feedback for the goals, procedures, and outcomes of the intervention. Qualitative social validity responses revealed potential adaptions for future research. We discuss the implications of our work for educators and provide recommendations for future research to support students with autism in inclusive settings.

Introduction

Autistic students across the country are increasingly included in general education classrooms. About 40% of autistic students attend general education for more than 80% of the day and almost 60% attend general education classes for more than 40% of the day (U.S. Department of Education, 2022). As the inclusion of autistic adolescents has become more prevalent, there is a pressing need to understand how to support these students' academic, behavioral, and social needs in inclusive settings with interventions that are acceptable and important to the autistic community (Hume & Campbell, 2019; Pellicano & den Houting, 2022). Of particular interest is supporting social interactions and friendships between autistic adolescents and their neurotypical peers (Odom, 2019). Peer-mediated instruction and interventions (PMII) is an evidence-based practice (EBP; Wong et al., 2015) in which neurotypical peers are trained to initiate interactions or support the development of academic, social, or communication skills. Recent reviews of the PMII literature suggest it is a promising intervention for promoting social skill development for autistic individuals (Chang & Locke, 2016; Watkins et al., 2015).

Despite positive outcomes for both autistic students and their peer partners in the extant PMII literature, there continues to be a need to develop acceptable and important interventions that support the social and communication skills of autistic students and their peers in general education settings (Bellini et al., 2007; Camargo et al., 2014). For example, many secondary autistic students report higher levels of bullying than their typical peers as well as fewer opportunities to interact with peers and develop friendships (Humphrey & Hebron, 2015; Kasari et al., 2011). Autistic students are often found on the periphery of their school and classroom social networks and many neurotypical students hold low opinions of their autistic peers

(Chamberlain et al., 2007). These negative assumptions and beliefs toward autistic peers are likely impacting how autistic students interact, communicate, and develop friendships in general education settings.

One approach to addressing these problems is engaging all students in a classroom or school by teaching them about the common traits of individuals on the autism spectrum, to be more accepting of autistic peers, and to value diverse partners by engaging in conversations and establishing friendships with autistic peers. Peer education, one of the many interventions that fall under the umbrella of PMII, can help entire classrooms or schools improve knowledge of autism and attitudes toward autistic peers (Campbell et al., 2019). However, few studies of peer education have investigated the effects of these interventions, established the social validity of the intervention for stakeholders, or explored the experiences of autistic students during peer education interventions (Cremin et al., 2021; Odom, 2019). Indeed, researchers have pointed to the need to further investigate how peer education interventions impact social outcomes for autistic students, as well as to explore the importance and acceptability of the intervention (Birnschein et al., 2021; Cremin et al., 2021). Therefore, the purpose of this study is to use a quasi-experimental design to (a) examine the acceptability, importance, and feasibility (i.e., social validity) of a class-wide peer-education intervention and (b) assess the impact of the intervention on the knowledge of autism and attitudes toward autistic individuals of peers without disabilities.

Social Validity

Social validity is the social importance and acceptability of the goals, procedures, and outcomes of an intervention as described by participants and other stakeholders (Wolf, 1978). Although many studies in special education provide cursory and informal attempts to assess

social validity, researchers often fail to rigorously explore and answer questions regarding the acceptability and feasibility of interventions (Snodgrass et al., 2018). The rigorous examination of social validity outcomes is important to intervention research as teachers are unlikely to implement an intervention if it is not perceived as feasible, acceptable, and appropriate– regardless of efficacy (Carter, 2010; Marchant et al., 2013; McNeill, 2019). Likewise, interventions may not be effective or appropriate if students do not consider them acceptable.

For interventions such as PMII, student preferences and experiences are important as they may impact social and academic outcomes as well as students' willingness to participate in the intervention. Furthermore, student input before, during, and after the intervention can assist teachers and researchers as they develop and refine interventions that are tailored to meet individualized needs and preferences (Bottema-Beutel et al., 2016). The acceptability of interventions may be particularly important for autistic students as autism researchers have historically ignored the research priorities and preferences of autistic individuals (Pellicano & den Houting, 2022).

An increased emphasis on rigorous examinations of social validity may facilitate the consideration and prioritization of autistic individuals' preferences and needs in research studies (Schuck et al., 2021). In addition to considering autistic students' preferences and input in developing and implementing interventions, scholars have advocated for autism researchers to more broadly reorient the goals and priorities of their scholarship such that they are based in the identities and values of individuals with autism. Specifically, many researchers argue that autism research should be conducted from a neurodiversity perspective, which emphasizes the importance of autistic identities and values autism as a valuable minority identity that does not need to be cured (Dawson et al., 2022; Kapp et al., 2013).

Social validity measures that assess individual participant values and preferences at different stages of the intervention (i.e., goals, procedures, outcomes) are one way researchers can conduct research from a neurodiversity paradigm. Such measures acknowledge that autistic perspectives and values should guide research questions, inform research methods, and ensure that the ultimate goal of autism research is to improve the quality of life for individuals on the autism spectrum (Dawson et al., 2022).

Neurodiversity

Neurodiversity implies that everyone has a unique brain and a unique set of behavioral traits that stem from neurobiological diversity (Bertilsdotter Rosqvist et al., 2020; Kapp et al., 2013). The neurodiversity paradigm challenges the conceptualization of autism as a deficit-based disability by accepting and celebrating different ways of thinking, acting, and communicating. Neurodiversity is closely aligned with the social model of disability, which argues that disability is best understood in the context of a society where individual differences are not accommodated. In other words, many of the "disabling" traits of autism are the result of autistic individuals living and interacting in physical and social environments that are not designed to meet their needs. As a result, many autistic individuals face physical and social challenges that require appropriate supports and services (Bertilsdotter Rosqvist et al., 2020; Kapp et al., 2013).

As the neurodiversity movement has become more prevalent, many researchers have begun to advocate for autism research informed by the principles of neurodiversity (Dawson et al., 2022; den Houting, 2019). For example, advocates have called for an end to interventions that target autistic traits, such as self-stimulatory behaviors, simply because they are stigmatized by society (Ne'eman, 2021). Additional recommendations include exploring autistic experiences and perspectives regarding intervention effectiveness and prioritizing interventions that will

improve an individual's quality of life and are informed by individual needs and preferences (Beechey, 2022; Keates, 2022). Neurodiversity may be a useful frame when developing social and communication interventions for autistic students as well as when assessing the social validity of interventions for all stakeholders. Both social validity and neurodiversity can be used to inform the development and implementation of PMII.

Peer-Mediated Instruction and Interventions

PMII encompasses a variety of interventions such as peer modeling, peer networks, peer support arrangements, and peer education (Hume & Campbell, 2019). PMIIs often include a peer education component where typical peers learn about students with disabilities. During these trainings, peers may be provided, for example, with an introduction to the autism spectrum and information on the strengths and needs of the focal student(s). Many PMIIs also include training on specific strategies that peers can use to prompt, initiate, or reinforce their partners with autism. Because of the variety of interventions that fall under the umbrella of PMII, researchers have further categorized PMII into direct and indirect interventions (Odom, 2019).

Direct Peer-Mediated Instruction and Interventions

Direct PMII incorporates adults who train neurotypical peers and facilitate interactions between trained peers and autistic students. Adult training and facilitation are important because inclusion alone does not always improve academic, social, or communication outcomes for autistic students (Campbell et al., 2019; Odom, 2019). These interventions often emphasize autistic students learning and practicing important social and academic skills to help them be successful in inclusive settings. Examples of direct PMII include peer initiation and response interventions, peer networks, and peer support arrangements (Odom, 2019). Researchers report myriad benefits of direct PMII interventions, such as improved social and communication skills,

opportunities to develop friendships, and academic learning (Odom, 2019). Furthermore, these interventions often occur in natural settings with natural partners, which can improve the generalization and maintenance of skills (Camargo et al., 2014; Wilson et al., 2021).

Despite its potential benefits, there are important limitations to direct PMII interventions. Although neurotypical peers often report the development of new friendships and increased comfort around students with disabilities as benefits of participating in PMII interventions (Travers & Carter, 2022a), most direct PMII interventions only involve one to four peers per student with disabilities (Wilson et al., under review). Utilizing one-on-one or small-group support with exemplar peers is an effective strategy to improve social, academic, or communication outcomes for autistic students (Wilson et al., under review), but skills must also generalize to new settings to maximize benefits for students (Bellini et al., 2007). This is especially relevant in middle and high school, where students are asked to interact with peers in a variety of settings and learning environments. For students who struggle with social communication in secondary school, having a few peer partners who provide support in a specific setting may not be sufficient to ensure that academic or social success generalizes to new settings or with untrained partners (Hochman et al., 2015; Watkins et al., 2019).

Furthermore, peers for PMII studies are often hand-picked by researchers and facilitators because they have had (a) experience with students with disabilities in the past, (b) are interested in working with students with disabilities, (c) demonstrate high levels of academic engagement and appropriate social skills, or (d) have experience interacting with the focal student (Travers & Carter, 2022b). Given that extant literature has described some students as being more inclusive toward autistic peers than others (Dillenburger et al., 2017), it may be that researchers are

teaching and training peers who are already predisposed to and interested in interacting with, supporting, and developing relationships with autistic students.

Considering that many autistic students experience bullying and loneliness in school (Humphrey & Hebron, 2015; Kasari et al., 2011), targeting students who are not predisposed to working with autistic peers or believe inaccurate or offensive views of autism for training could be a strategic priority for schools. Peer training may create additional opportunities to practice social skills and develop friendships with peers who would otherwise avoid such interactions and friendships. This could lead to more positive learning and social experiences for autistic individuals and allow them to share their diagnoses in a comfortable and safe environment, which often leads to improved acceptance and positive peer experiences (Sreckovic et al., 2019). Indeed, addressing inappropriate and hurtful behavior from peers could improve the confidence of autistic students and alleviate the anxiety that many feel in social situations with unfamiliar or ignorant peers (Wilson & Fleming, 2022). Educating and involving students who may not be open to or have experience with autistic peers in relevant training may, then, help those peers become more open-minded and inclusive.

Despite the strong evidence base supporting PMII, some researchers have criticized the field for placing the responsibility to improve social, communication, and friendship outcomes primarily on autistic students (Beechey, 2022). Social and communication instruction for autistic students may improve social proficiency, but these skills are only beneficial in school settings if peers are willing to listen and reciprocate (den Houting, 2019). An emphasis on all students, with and without disabilities, improving social and communication skills should be an important element of PMII interventions (Bambara, 2022). These criticisms do not suggest that direct PMII should be avoided or that autistic students do not benefit from peer-mediated interventions.

Rather, when implementing direct PMII, practitioners should also consider how to educate those students who are not involved in the intervention but will interact with autistic classmates regularly. In other words, it may be helpful to consider incorporating both individual or small group (i.e., direct PMII) and class-wide (i.e., indirect PMII) approaches when supporting autistic students in general education settings. For example, a peer network intervention, where a small number of peers receive intensive training, could be combined with class-wide or school-wide neurodiversity instruction so that all students have the opportunity to learn about perspective-taking, neurodiversity, and inclusivity. Giving students with and without disabilities opportunities to learn how to better interact with each other may result in decreased victimization and bullying and increased opportunities to interact and build friendships (Cook et al., 2020). One way that teachers and schools may be able to reach the goal of educating and training all students is through indirect PMII.

Indirect Peer-Mediated Instruction and Interventions

Indirect PMIIs are interventions that target the knowledge and attitudes of peers as well as the physical or social ecologies of classrooms and schools that impact peer interactions (Odom, 2019). In other words, an indirect PMII intervention does not directly train peers to interact or engage with a particular student. Rather, researchers focus on the ecological features of classrooms or schools that support positive interactions between autistic students and neurotypical peers. For example, researchers have explored how structured versus unstructured activities or adult-initiated versus peer-initiated play impact interactions (Odom, 2019).

For peer education and awareness interventions, researchers emphasize the importance of changing the knowledge and attitudes of peers without disabilities (Campbell, 2006). In these interventions, teachers or researchers provide instruction on autism, how it might manifest in

students, and how neurotypical students can be more accepting of autistic peers. Peer education interventions often include three types of instruction: descriptive, explanatory, and directive (Campbell, 2006).

Descriptive messaging is information that highlights similarities between autistic students and neurotypical peers. As students begin to recognize similarities with each other and that they are not as dissimilar as they may have believed, they tend to hold more positive opinions about each other (Campbell, 2007). Explanatory information provides peers with education as to why autistic peers may communicate or interact in certain ways. Explanatory education is provided to peers to help them be more accepting and inclusive of diverse modes of communication. For example, peers may be taught that not all students prefer to maintain eye contact during interactions. Finally, directive information provides neurotypical peers with guidance on how to appropriately interact and respond to autistic students. For example, neurotypical peers may be taught how to prompt or include autistic peers in classroom activities (Campbell, 2006).

Utilizing descriptive, explanatory, and directive information, researchers have established the efficacy of peer education interventions in changing the knowledge, attitudes, and behavioral intentions of neurotypical peers (Armstrong et al., 2017; Birnschein et al., 2021; Cremin et al., 2021; Lindsay & Edwards, 2012). However, researchers have highlighted the need to better understand the impact of peer education programs on autistic individuals (Campbell et al., 2019; Hume & Campbell, 2019; Odom, 2019). In other words, although peer education programs have been successful at changing the knowledge and attitudes of neurotypical peers, few researchers have explored autistic student experiences or assessed the social validity of these interventions for students with autism.

For example, in Birnschein and colleagues' (2021) review of autism training interventions, the authors found that of the 10 peer education studies included in the review, not a single study reported outcomes (qualitative or quantitative) for autistic students. Similarly, Cremin and colleagues (2021) report that only one of 11 studies reported social validity findings in their scoping review on autism awareness interventions. In both reviews, none of the included studies explored the perceptions of autistic students regarding the acceptability and importance of the intervention. Given the paucity of research exploring the social validity of autism awareness interventions for key stakeholders, there is a need for further research investigating the acceptability, feasibility, and importance of curricula and interventions. One intervention that is free for teachers, can be completed in 30-45 minutes, and has preliminary evidence of effectiveness is the Kit for Kids (KfK) intervention (Campbell et al., 2019; Scheil et al., 2017).

Kit for Kids

The KfK intervention was designed to educate elementary and middle school students about their peers with autism (Organization for Autism Research, 2012). The updated intervention includes a lesson plan, multiple videos with multimedia depictions of a student with autism, and workbooks differentiated by grade. The curriculum is often delivered in a single class period and all materials are freely available for schools and practitioners. The curriculum includes a multi-media depiction of a student named Nick who has autism. The videos and workbooks help peers better understand Nick and his needs (i.e., explanatory information), how to find commonalities with autistic peers (i.e., descriptive information), and how to interact and be friends with autistic peers (i.e., directive information).

To date, two studies have examined the effects of the original KfK intervention on peers without disabilities. Scheil and colleagues (2017) qualitatively assessed peers' initial impressions

of the KfK program using a Grounded Theory methodology. The KfK curriculum was delivered by researchers in two 8th grade classrooms and three 5th grade classrooms, and a total of 16 students rated materials and participated in semi-structured interviews. No autistic students participated in the intervention. Participant feedback was generally positive with students indicating that instruction and materials were helpful and informative. Participants also expressed a desire to learn more about Nick, how to better connect with him, and how they could better assist Nick in the classroom. Many participants also expressed a desire for a more interactive lesson that allowed students to engage in conversation.

A second study (Campbell et al., 2019), used a quasi-experimental design to assess the impact of KfK on the knowledge of autism and attitudes toward autistic peers for 234 4th and 5th grade students without autism. Similar to previous study, no autistic students participated in the study and researchers presented the KfK intervention to students. Researchers reported that knowledge of autism improved for all students, and attitudes toward autistic peers improved for students who were unfamiliar with autism at the start of the intervention. These effects persisted as participant knowledge and attitudes did not change after one week, but long-term maintenance of effects was not assessed. Interestingly, gender was a significant predictor of attitudes as girls reported more favorable attitudes toward autistic students. The researchers did not report social validity outcomes.

Given the accessibility of materials, short intervention length, and preliminary findings, the KfK has the potential to be implemented by teachers and improve outcomes for autistic students and their peers. However, further examination of the KfK is needed as autistic students were not involved in the evaluation of the intervention in previous studies. Furthermore, it is

unclear if all stakeholders perceive the intervention to be acceptable and feasible. Therefore, additional research addressing these limitations in the extant literature is needed.

Purpose

Indirect PMII has been suggested as a way to improve the knowledge, attitudes, and behavioral intentions of students without disabilities toward autistic peers (Birnschein et al., 2021). These interventions may improve social standing in the classroom and increase social opportunities for autistic students by educating all students, including those who hold unfavorable or uninformed opinions about autism, on how to be more accepting and inclusive (Cook et al., 2020). However, despite calls to better understand the experiences of autistic students (van Schalkwyk & Dewinter, 2020) and the social validity of special education research (Snodgrass et al., 2018), many peer education interventions fail to report social validity outcomes and the experiences of autistic students are absent from the indirect PMII literature (Birnschein et al., 2021; Cremin et al., 2021). Therefore, the purpose of this study is to assess the social validity of the KfK intervention for key stakeholders (i.e., students, parents, and teachers) and describe the experiences of students with autism throughout the intervention. Specifically, we aim to answer the following research questions:

1. Are the aims and objectives of the KfK intervention acceptable and relevant to stakeholders (i.e., students, parents, and teachers)?
2. Are the procedures of the KfK intervention acceptable and feasible for students and teachers?
3. Are the outcomes and perceived outcomes of the KfK intervention important and acceptable for stakeholders (i.e., students and teachers)?

4. What are the effects of the KfK intervention on the knowledge of autism and attitudes toward autistic students for peers without disabilities?

Method

In this study, we explored the efficacy and social validity of the KfK intervention for students, teachers, and parents using a quasi-experimental non-equivalent groups design with an emphasis on social validity outcomes. Quasi-experimental designs have been recommended as a way to conduct experimental research with extant groups (e.g., classrooms) in real-world settings (Creswell, 2014). In the current study, we used a quasi-experimental non-equivalent control group design in which intact groups were randomly assigned to the KfK intervention or comparison group. Researchers have called for increased rigor and depth in how social validity is examined in special education research (Snodgrass et al., 2018). In this study, both qualitative and quantitative data were used to comprehensively examine the social validity of the intervention for all stakeholders (Leko, 2014). Qualitative data, collected through interviews and open-ended social validity questions, allowed for additional exploration of the intervention and allowed stakeholders to provide rich descriptions of their perceptions of the goals, procedures, and outcomes of the intervention.

As is often the case in settings where students are already grouped into classrooms, random assignment of students is not feasible, which is why a quasi-experimental design was selected. To minimize threats to internal validity (e.g., history, confounding variables), classrooms were randomly assigned to the KfK intervention or comparison group conditions. Furthermore, attitudes toward autistic peers, experience with autistic individuals, and knowledge of autism was given to students in both groups to examine any group differences. All

participating classes were from the same school and all students were in grades 6-7 (i.e., middle schoolers).

Setting

The setting for the study was a middle school that served students in grades 6-8 in the eastern United States. The district is primarily rural, with a blend of suburban and urban settings. The school used in the current study is considered suburban with a school population of about 550 students. The intervention was delivered in middle school language arts classrooms that received push-in support from special education teachers. Language arts classrooms were selected for the intervention as the classes were reading a book about a student with cerebral palsy and teachers wanted to extend student learning by discussing autism and students with autism. The same general education teacher taught the three participating classes.

Participants and Recruitment

Six students with autism were recruited to participate in the study. In order to participate, students needed a school or clinical diagnosis of autism, to attend at least one general education class, to be in grades 6-8, to be interested in making new friends or improving social interactions with peers, and to consent to participate. Students were recruited through the cooperating special education teacher. Three autistic students and their parents agreed to participate in the study. The parents of the three additional students did not consent to participate as their children were not aware of their diagnosis. Students without disabilities, who attend the same class as an autistic peer, were also recruited to participate. Students without autism were recruited through the participating general education teachers. A total of 78 students were invited to participate in the study and 67 students consented to participate. Two students were absent for the pretest,

intervention, or post-test and were removed from the analysis. See Table 1 for a summary of the demographic characteristics of student participants.

Recruitment materials were sent home via the general or special education teacher. To participate, parents and students completed an informed consent form. Students without parent permission or who did not want to participate remained in the classroom during the study, but worked quietly on homework and did not participate in data collection. Study procedures and materials were reviewed and approved by the university institutional review board.

One general and two special education teachers consented to participate in the study by providing their perspective related to social validity. The special education teachers were the autism-based teachers for the school. These teachers specialize in supporting autistic students in both general and special education settings. The special education teachers provided feedback on the intervention as well as supported its implementation in the general education setting. The general education teacher taught all of the participants (both with and without autism) and was the lead teacher for the participating classes. Three additional general education teachers were recruited for the study but did not participate.

Intervention Materials

KfK is a peer-education intervention where students learn about autism and how to be more inclusive toward autistic peers. The curriculum includes descriptive, explanatory, and directive information. For example, students learn about how to find similarities, the causes of autism, and how to be more inclusive and embrace differences. Materials are freely available on the Organization for Autism Research's website (see https://researchautism.org/resources/kit-for-kids/). As previously described, the materials include two online videos, a storybook, a poster, student workbooks, and a lesson plan template.

Procedures

We conducted the study over a three-week period. During the first week, we collected social validity data on the goals of the intervention from students with autism, parents, and teachers. We also collected pre-test data on the CATAQ and KOA across intervention and wait-list control groups (timepoint 1 or pretest). During the second week, we implemented the intervention in the two classes that comprised the intervention group and collected post-intervention social validity data from the intervention group. Researchers implemented the intervention but general and special education teachers were present during the lesson. We also collected a second round of data for the KOA and CATAQ from both the intervention and wait-list control groups (timepoint 2 or posttest for intervention group). One week later, we implemented the intervention for the wait-list control group and collected post-intervention social validity data in that classroom, and collected a final round of KOA and CATAQ data from both intervention and wait-list control groups (timepoint 3 or post-test for wait-list control and 1-week follow-up for intervention). Students who did not consent to participate were allowed to work in an alternative setting or remain in the classroom but not be involved in the intervention or study evaluations.

Data Sources

Demographic Questionnaire

The demographic survey form was sent home to parents with the informed consent form. Parents of students with and without disabilities were asked to provide information on student age, grade, gender, race, and ethnicity. See Appendix E for a copy of the demographic questionnaire.

Knowledge of Autism Questionnaire

The Knowledge of Autism questionnaire (KOA; Campbell et al., 2019) is a 16-item scale that was used to measure peers' knowledge of autism. The scale has been used in previous studies on peer education and researchers report moderate internal consistency when using the measure (Campbell et al., 2019). Questions include topics such as causes of, common traits of, and misconceptions about autism. Students were also asked if they knew anyone with autism (i.e., familiarity with autism) and to provide a definition of autism. Correct responses are summed to yield a total score. Internal consistency was measured using Cronbach's alpha. The KOA was administered before and after the intervention. A copy of the measure can be found in Appendix A.

Children's Attitudes Toward Autism Questionnaire

The Children's Attitudes Toward Autism Questionnaire (CATAQ; Derguy et al., 2021) is a 24-item scale that measures the attitudes of children toward their autistic peers. The CATAQ is a rating scale and each question has five options ranging from 'totally disagree' to 'totally agree'. The questionnaire was developed and validated to evaluate attitudes across three dimensions: cognitive, affective, and behavioral. Cognitive attitudes relate to beliefs and knowledge about individuals with autism, affective attitudes relate to feelings or emotions, and behavioral attitudes refer to the effect of attitude on behavior. Mean responses are averaged across the entire scale as well as across each of the three dimensions. Derguy and colleagues (2021) report strong psychometric properties with good internal consistency across the three dimensions of attitudes. Internal consistency was measured using Cronbach's alpha in this study. Like the KOA, the CATAQ was administered before and after the intervention. A copy of the CATAQ can be found in Appendix B.

Social Validity

Social validity was evaluated in two phases: before and after the intervention to assess the goals, procedures, and outcomes of the intervention. Qualitative and quantitative methods, informed by the neurodiversity paradigm; Wolf's (1978) framework on social validity; and current peer-education literature informed the investigation of the acceptability, feasibility, and importance of the intervention for stakeholders. Reliability for all quantitative rating items on each of the social validity questionnaires was assessed through Cronbach's alpha. Social validity questionnaires can be found in Appendices C and D.

Goals. Before the intervention, students with autism, teachers, and parents were asked to complete the Goals Questionnaire. The Goals Questionnaire was tailored to each group and asked participants if peer education is important, needed, and relevant at their school. The Goals Questionnaire contained Likert-style multiple-choice questions as well as open-response, qualitative questions.

Procedures. Immediately following the completion of the intervention, all participating students and teachers were asked to complete the Procedures Questionnaire. The questionnaire included Likert-style questions where participants rated their agreement with statements as well as short-answer questions. Students were asked if the lesson was enjoyable and if the material was easy to learn. Students were also asked to rate the acceptability and effectiveness of different activities such as the videos and workbook. Teachers were asked about the feasibility of the intervention and the acceptability of procedures and materials.

Outcomes. All participants were also asked to complete the Outcomes Questionnaire to assess their perceptions of outcomes and the degree to which they were satisfied with those outcomes after the completion of the intervention. The questionnaire includes Likert-style

questions where participants will rate their agreement with statements as well as short-answer questions. See Tables 2 and 3 for a summary of social validity questions and responses.

Data Analysis

Quantitative Data

Results from each of the social validity questionnaires, the KOA, and CATAQ were summarized using descriptive statistics. Responses to social validity questionnaires were examined for patterns and scores were compared across groups (i.e., teachers, students, parents) Responses to the KOA and CATAQ were compared across demographic variables (i.e., gender, age) using t-tests. Changes across pre- and post-test scores of knowledge (KOA) and attitudes (CATAQ) were assessed using Analyses of Covariance (ANCOVA) with Two Groups. The ANCOVA model is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + e$$

X_1 is the dichotomous variable for group assignment (i.e., intervention or comparison) and X_2 is the variable representing pretest scores across groups. The slope, β_1, represents the average difference between the intervention and wait-list groups when controlling for pretest knowledge or attitudes. Partial eta squared (η_p^2) is an effect size measure often used in ANCOVA models and was used to measure the proportion of variance explained by the random group assignment variable (X_1) while accounting for the variance explained by the pretest score variable (X_2). Finally, statistical assumptions associated with an ANCOVA test (i.e., linearity, normality, homogeneity of variance) were tested.

Qualitative Data

Qualitative data were derived from responses to questions on the social validity assessments for parents, teachers, and students. Using the methods proposed by Miles and

Huberman (1994), we engaged in a three-step process of data analysis: (a) data reduction, (b) data display, and (c) drawing conclusions. During data reduction, we used codes developed inductively as well as deductively from Wolf's (1978) social validity framework and the peer education literature. Deductive codes from Wolf's social validity framework were organized around goals, procedures, and outcomes. Deductive codes from the peer education literature included descriptive, explanatory, and directive messaging (Campbell et al., 2019). Inductive codes were developed through consensus between the first author and another doctoral student. We first read through each interview and individually coded line by line. We then compared codes and came to a consensus. Once consensus was reached, initial codes were organized into categories and subcategories and we analyzed findings for emergent themes across qualitative data sources.

During the second step, we organized categories and subcategories into tables and figures to make sense of patterns in the data. A key component of this step was to identify relationships between categories and subcategories. During the third step, we summarized key findings, conclusions, and relationships across all participants while also making note of evidence contrary to the main findings.

Openness and Transparency

Similar to the previous two papers in this dissertation, the current study will be guided by the principles of open scholarship. To improve the openness and transparency of this research, we preregistered the study on the Open Science Framework (OSF), will share any adapted materials from the KfK intervention, and post all written findings as preprints.

Results

Knowledge of Autism

Prior to the intervention, pre-test data was collected from students assigned to both the intervention and wait-list control (timepoint 1). Participants indicated some knowledge of autism prior to the start of the intervention as the average pretest score for the KOA was 66% or 10.6 correct out of 16. The questions with the highest average scores were "Autism is caused by bad parenting" (*M*= 94%, *SD*= 0.2), "Some students with autism might have trouble talking or expressing themselves" (*M*= 89%, *SD*= 0.3), "Most people with autism have low intelligence" (*M*= 83%, *SD*= 0.4), and "Students with autism are generally not interested in making friends" (*M*= 83%, *SD*= 0.4). The questions with the lowest average scores were "Autism is a learning disability" (*M*= 30%, *SD*= 0.5), "All students with autism need the same types of supports to be successful" (*M*= 33%, *SD*= 0.5), "With the proper help, most people with autism grow out of the condition by the time they are adults" (*M*= 38%, *SD*= 0.5), and "Students with autism often cannot do normal activities that other people do" (*M*= 48%, *SD*= 0.5). Similar to previous findings, the internal consistency for the knowledge assessment was low (*a*= .4). See Figure 1 for a summary of knowledge outcomes.

Attitudes Toward Students with Autism

Pre-test data was also collected from students in both the intervention and wait-list control groups for the CATAQ (timepoint 1), which used a five-point scale to measure student attitudes toward autistic peers. Many participants indicated positive or neutral attitudes toward peers with autism before the start of the intervention (*M*= 3.8, *SD*= 0.6). Participants indicated the most positive attitudes for the following items: "Students with autism are not very smart" (reverse coded; *M*= 4.1, *SD*= 0.9), "I would defend a student with autism if they were bullied" (*M*= 4.2, *SD*= 1.0), "I would be annoyed if I had to eat at the same table as a student with autism during lunch (reverse coded; *M*= 4.1, *SD*= 0.8), and "I would be concerned if a student with

autism sat next to me in class" (reverse coded; *M*= 4.0, *SD*= 0.9). On average, participants reported the most negative attitudes for the "I would hesitate to tell a secret to a student with autism" (*M*= 2.9, *SD*= 0.9), "I would invite a student with autism to my house for a party" (*M*= 3.28, *SD*= 0.9), "I would share a snack with a student with autism" (*M*= 3.28, *SD*= 1.1), and "Students with autism are fun" (*M*= 3.3, *SD*= 0.9) items. Finally, participants reported an average response of 3.9 (*SD*= 0.7) for affective, 3.9 for cognitive (*SD*= 0.6) and 3.6 for behavioral (*SD*= 0.7) attitudes. The Cronbach's Alpha indicated strong internal reliability (*a*=.9) for overall attitudes. See Figures 2 and 3 for a summary of attitude outcomes.

Differences Across Demographic Variables

Results were also analyzed for differences across demographic variables such as familiarity with autism and gender at timepoint 1. Unpaired t-tests revealed that participants who were familiar with autism or knew someone with autism had higher knowledge (*M*=11.3, *SD*= 2.1) and attitudes (*M*=3.9, *SD*= 0.6) scores on the pretest compared to the knowledge (*M*= 5.9, *SD*= 0.8), and attitudes (*M*=3.2, *SD*= 0.8) of participants who were unfamiliar with autism $t(63) = -13.2$, $p = <.001$; $t(63) = -3.4$, $p<.001$ respectively. Furthermore, female participants exhibited more positive attitudes (*M*=3.9, *SD*= 0.6) toward autistic students than male participants (*M*=3.9, *SD*= 0.6), $t(63) = -2.3$, $p=.02$, but no statistically significant difference was found in their knowledge of autism.

Differences Across Group Assignment

Differences between groups at baseline were assessed using unpaired t-tests. Results from the t-tests indicate that there were no statistically significant differences between the intervention and wait-list control groups prior to the start of the intervention (timepoint 1). Two one-way ANCOVAs were conducted to determine if there was a statistically significant difference

between the intervention and wait-list control groups on knowledge of autism and attitudes toward peers with autism while controlling for pretest scores (timepoint 2). Results from the one-way ANCOVA revealed a significant effect of group assignment on attitudes, $F(1, 61) = -3.5$, $p < .001$, while controlling for pretest scores.

While checking assumptions for the one-way ANCOVA, a violation of heteroskedasticity was discovered for the knowledge of autism outcome variable. To account for the heteroscedasticity present in the model, a multiple-regression analysis was conducted with robust standard errors or Huber-White standard errors. In this new model, the outcome variable was the knowledge of autism post-test and the predictors were group assignment and the knowledge of autism pre-test. The model predicting posttest knowledge of autism was statistically significant $F(1, 62)=96.4$, $p<.001$, explaining 60% of the variance in knowledge. Group assignment ($b=4.5$, $p<.001$) was statistically significant and assignment to the intervention group was positively associated with increased knowledge of autism when controlling for pre-test scores.

A final unpaired t-test was conducted to assess differences at timepoint 3 (i.e., post-test for the wait-list control group and 1-week follow-up for intervention). Weighted t-test results revealed that there were no statistically significant differences between the intervention and wait-list control groups at timepoint 3 for knowledge or attitudes, indicating that treatment effects maintained for the intervention group and intervention effects were similar across the intervention and wait-list control group. See Figures 4 and 5 for a summary of treatment effects across timepoints 1, 2, and 3.

Social Validity

Social validity data were collected both before and after the intervention in order to assess the social validity of the goals, procedures, and outcomes. Interviews are currently being

conducted with stakeholders, but because of time limitations, are not included in the dissertation. The internal consistency across the social validity assessments was measured through Cronbach's Alpha and indicated strong internal consistency (a= .8).

Goals

Teachers, parents, and students with autism provided feedback on the goals of the intervention. All three teacher participants strongly agreed that the intervention was important and potentially beneficial for peers to learn about autism and their autistic peers (M=5.0, SD=0.0). They also noted that many students with autism struggle to have friends (M=5.0, SD=0.0) in class and often feel different from other students in the classroom (M=5.0, SD=1.0). Parents also reported that their children enjoy school (M=4.5, SD=0.6) and that they would like more opportunities for their child to make friends with students who accept and understand them (M=5.0, SD=0.0). Focal students also indicated that they enjoyed school (M=4.7, SD=0.6), that their peers do not know they have autism (M=2.3, SD=0.6), and that they would like more opportunities to make friends (M=4.3, SD=1.1).

Procedures

Teachers, peers, and students with autism provided feedback on the acceptability of intervention procedures. Overall, peers enjoyed the videos (M=4.2, SD=0.8) in the lesson but were less enthusiastic about the activities in the workbook (M=3.7, SD=0.9). Teachers and students with autism also reported that they liked the workbook (M=4.3, SD=0.6; M=4.3, SD=0.6), activities, and videos (M=4.0, SD=0.0; M=3.7, SD=1.1) from the lesson respectively. No stakeholders found the lesson to be boring.

Outcomes

Teachers, peers, and students with autism reported satisfaction with outcomes as they reported that they enjoyed learning about autism and that other students at their school should receive this lesson as well ($M > 4.0$). Peers also reported that they learned more about autism (M=4.4, SD=0.6), the lesson helped them to be more accepting of students with autism (M=4.06, SD=0.8), and that what they learned in the lesson was important (M=4.3, SD=0.6). Both teachers (M=3.7, SD=0.6) and students with autism (M=3.7, SD=0.6) were less positive that peers learned the skills necessary to develop friendships with autistic students at their school. See Table 2 for a summary of quantitative social validity results.

Qualitative Feedback on Social Validity Outcomes

Teachers, peers, and students with autism also provided feedback on social validity outcomes through short-answer responses. Participant responses were coded deductively and inductively and codes were organized into themes through consensus among researchers. Participants were asked to describe the most important thing they (or peers/students) learned, what they wished they (or peers/students) learned more about, and their suggestions for improving the lesson and materials.

Procedures. Qualitative feedback on the procedures of the intervention was organized into two overall themes: learning directly from autistic people and critiquing lesson materials. Many participants indicated that they were interested in learning from and interacting with individuals with autism. One student said that they "think it would've been beneficial if someone with autism had helped with the lesson as well, to help out and answer questions based on firsthand experience". Multiple students also asked to "talk to a real person with autism". Students also expressed a desire to watch videos that were not based on a hypothetical person. For example, one student commented that they wished researchers did not use "a fake video" and

another wanted more “real videos about kids with autism”. Others also expressed a desire to consume additional media such as books, movies, or shows that portray the real-life experiences of autistic students “in their perspective”. These desires may have been impacted by their recent class reading of a novel about an adolescent girl with cerebral palsy.

Despite indicating overall positive findings in the multiple-choice portion of the social validity assessments, many participants also indicated areas where lesson elements and materials could be improved. Multiple students and teachers questioned the age appropriateness of the intervention. One student mentioned that “some things felt like they were for little kids” and other students asked for more information on “teenagers” or “older people”. Students also asked for more examples that resonated with them and were more applicable to middle school. Participants also highlighted some challenges with the materials. Multiple teachers and students thought the packet was “too long” and wanted a “digital version” instead of paper. Additionally, participants desired additional “activities”, “interaction”, “games”, and “differentiation to keep the students engaged”. Participants also expressed a desire for more videos in the lesson, but specifically indicated that they wanted videos from “real” people with autism.

Goals and outcomes. Qualitative feedback on the goals and outcomes of the intervention was organized into three categories: descriptive, explanatory, and directive information. Almost all of the codes were organized under explanatory and directive information. Under explanatory information, salient themes included understanding autistic experiences and the diversity within the autism spectrum. Understanding autistic experiences was a common theme as many participants indicated that they were interested in more deeply understanding autism and “what it’s like to have autism”. For example, many students were interested in understanding sensory differences and “what sensory overload feels like”. Participants were also interested in different

modes of communication, social challenges students with autism may experience, and how their experience changes "as people grow up". Many students were interested in the life experiences of autistic individuals as adults and how the portrayals of autism they have seen in media accurately reflect these lived experiences. One student even suggested that we "maybe zoom an adult with autism" to better understand lived experiences.

Similarly, teachers and students with autism were concerned that peers were not provided opportunities to "connect autism to real people". Autistic students noted that students may not understand them because they are "different from Nick" or because "Nick is a boy and I am a girl". Teachers were similarly concerned that because of the "invisible" nature of autism, students would not apply their new knowledge to the autistic students in their classroom because they are unaware their peer has autism. In other words, teachers believed students would "assume the student with autism is weird and judge the student rather than being inclusive".

A second theme that emerged under goals and outcomes was a desire to understand the diversity within the autism community. Peers learned that because autism exists on a spectrum, autistic individuals may be very different in their interests, strengths, and needs. Specifically, students were interested in understanding the diversity in communication styles, ways of thinking, and support needs in the autism community. Peers conceptualized these interests by asking about the "different severities of autism", the "different stages of autism", the "different types of autism", and "differences between autistic people". Peers were also curious about autism in other countries and how autism is different for teenagers and adults. See Table 3 for the thematic categories and focused codes from the qualitative analysis.

Discussion

In this study, we implemented a quasi-experimental non-equivalent groups peer-education intervention on 66 middle school students without autism. Differences in post-test scores on the KOA and CATAQ between intervention and wait-list control were statistically different while controlling for pretest scores. Changes in knowledge and attitudes persisted over a 1-week period. Social validity assessments for stakeholders also revealed generally positive feedback for the goals, procedures, and outcomes of the intervention.

Pretest Knowledge and Attitudes

Pre-test results for the knowledge of autism and attitudes toward students with autism questionnaires revealed that many peers had generally positive attitudes toward autistic students and moderate knowledge of autism. Most peers understood that autism is not caused by bad parenting, some students with autism may struggle with social communication, most students with autism do not have low intelligence, and autistic students are often interested in making friends. However, it is concerning that few participants knew that different individuals with autism require different supports, that individuals do not grow out of autism as they grow older, and that autistic students can participate in normal activities like other middle schoolers. These incorrect notions have implications for how peers perceive and interact with autistic students in and outside of the classroom. For example, if peers believe an autistic student cannot engage in normal middle school activities, autistic students could be excluded from social and academic opportunities or be perceived as less desirable partners or friends (Chamberlain et al., 2007). For participants in the current study, it seems that these knowledge deficits aligned with the qualitative social validity findings. Specifically, peers desired to learn more about the diversity within the autism spectrum, how autism impacts individuals in adulthood, and the lived experiences of autistic individuals.

The pretest for attitudes toward autistic individuals also revealed that peers held generally positive attitudes toward students with autism prior to the intervention. Most peers believed that students with autism were smart, they would defend an autistic student who was being bullied, they wouldn't mind eating at the same table as a student with autism during lunch, and they wouldn't be concerned if a student with autism sat next to them in class. However, many peers also indicated that they were unsure if they would tell a secret to a student with autism, invite a student with autism to their house for a party, and share a snack with a student with autism. These results are concerning as these attitudes have implications for friendship, social opportunities, and learning in the classroom.

For example, recent research has highlighted that students often use the sharing of secrets as a way to define close and intimate friendships (Liberman & Shaw, 2018). If students are unwilling or unsure about sharing secrets with autistic students, these attitudes may portend an unwillingness to develop deeper and more personal friendships. Furthermore, in middle and high school, friendships are often defined by shared interests and activities done together outside of school, such as being invited to a friend's house or participating in an extracurricular activity (Schaefer et al., 2011). It may be that many peers hold positive cognitive and affective attitudes toward students with autism, but never develop meaningful friendships as they fail to engage in shared activities that develop and reinforce friendship (Dovgan & Mazurek, 2019). Therefore, additional support and training may be required to improve the behavioral attitudes and intentions of adolescent peers and provide opportunities to engage in shared activities.

Demographic Differences

Demographic differences at baseline also revealed differences across gender and familiarity with autism. Results indicate a statistically significant difference between boys and

girls in attitudes toward autistic students but not knowledge of autism. These findings replicate previous findings that girls generally hold more favorable attitudes toward students with autism (Campbell et al., 2019). However, given that most children on the autism spectrum are boys and that middle school and preadolescent students often affiliate more with students of the same gender (Mehta & Strough, 2009), this may be a significant hurdle for many students with autism as they seek to develop friendships with peers who do not empathize with or understand them (Milton, 2012).

Additionally, a significant difference in both knowledge of autism and attitudes toward autistic peers was found between students who were and were not familiar with autism at baseline. As seen in extant literature, familiarity with autism and exposure to autistic individuals can improve knowledge and attitudes (Campbell et al., 2019; Dachez & Ndobo, 2018) and provides justification for peer education interventions– particularly for those without prior familiarity. For many peers, learning about an autistic student may help them relate to, find similarities with, and develop empathy for autistic peers. However, many researchers argue that long-term attitude change cannot be achieved through education programs alone and that personalized contact is necessary to reduce prejudice and discrimination (Ensari & Miller, 2006).

Social Validity

Given the importance of social validity data to the field of special education and that no social validity data have been collected on the Kit for Kids intervention, an important goal of this study was to assess the acceptability, importance, and feasibility of the goals, procedures, and outcomes of the intervention. Social validity data were collected before and after the intervention and on each element of Wolf's (1978) social validity framework. As with most social validity questionnaires in the field of special education, our quantitative findings were generally positive

(Ledford et al., 2016; Machalicek et al., 2007). In an attempt to better understand the nuances of quantitative social validity findings, we also solicited qualitative feedback and specifically asked participants how they would adapt or modify the goals, procedures, and outcomes of the intervention. Although quantitative data was generally positive, the qualitative analysis revealed additional insights into the quantitative data, particularly into how the intervention can be adapted for middle school participants.

For example, general thematic analysis of qualitative data revealed that teachers, students with autism, and peers wanted the lesson to include more information about autistic experiences and the diversity of the autism spectrum from real individuals with autism. The Kit for Kids intervention provides a hypothetical individual who could theoretically represent any number of individuals with autism, but students expressed a desire to learn from actual autistic individuals. Indeed, it seemed that many students understood the spectral nature of autism, yet they struggled to conceptualize how individual experience would differ across individuals on the autism spectrum. These issues may reflect the limited experience of middle school students with autistic individuals, as well as the narrow depiction of autism in the Kit for Kids intervention from a hypothetical individual who represents a singular perspective and experience. Indeed, these challenges may portend that peers will struggle to generalize their improvements in knowledge and attitudes–a concern expressed by both teachers and autistic students in the current study. It may be that autistic students must disclose that they are on the autism spectrum to peers in order for peers to (a) recognize how experience differs across the autism spectrum and (b) empathize with and accept all neurodiverse peers.

Furthermore, most students responded positively to the videos in the social validity survey, yet a common theme in the qualitative data was that participants desired videos from

"real kids with autism" that were "not fake". Stakeholders also reported that the video content may not be age appropriate and would have liked more examples from teenagers and adults. For younger students, the information presented in the Kit for Kids may be appropriate, but as students grow older, they may want more substantive examples and portrayals of autistic individuals in order to better understand and relate to their autistic peers. This desire may reflect the growth and change that occurs from elementary to middle school as middle schoolers begin to rely more on their peers, desire more social connection, and develop friendships characterized by similarity (Brown & Larson, 2009). Despite overall positive feedback for the intervention and lesson videos, qualitative social validity data revealed areas where the intervention can be improved, thus highlighting the importance of collecting qualitative social validity data alongside typical quantitative surveys and questionnaires.

Implications for Practice

One of the benefits of a peer-education intervention such as the Kit for Kids is that it can be conceptualized as a Tier 1 intervention for teachers and schools (Campbell et al., 2019). In other words, when teachers and schools are planning school-wide and class-wide instruction on social-emotional learning or diversity, equity, and inclusion, peer education interventions can be used to support both students with and without autism in inclusive settings. For schools interested in building inclusive high school communities for autistic students, peer education interventions may also be used during neurodiversity celebration week or autism acceptance month to promote awareness, acceptance, and inclusion (Rentschler et al., 2022). Furthermore, peer education interventions can also be combined with direct PMII to educate more students on acceptance and inclusion while also teaching discrete skills to autistic students and their peer partners. Multicomponent interventions, such as combining PMII and video modeling (Dueñas et

al., 2021) or self-management (Hughes et al., 2013), have resulted in positive effects for students with and without autism.

Middle school teachers interested in implementing a peer education intervention for students with autism and their peers might consider adapting the Kit for Kids lesson to be responsive to the social validity outcomes in the current study. Multiple stakeholders, particularly peer participants, desired additional information on the perspectives and experiences of autistic individuals. Lesson modifications could include videos of adolescents with autism describing their experiences or a discussion with an adolescent or adult with autism who is willing to share their perspective. Additional modifications could also include more examples of the inherent diversity of autistic experience within the autism community. Showing the breadth of the autism spectrum may also address concerns from teachers and students with autism, that peers will not be able to generalize their learning to specific students within their classroom.

Recommendations for Future Research

Future research should continue to explore the effects of peer education interventions. Multiple studies, including the current study, demonstrate that peer-education interventions can improve both knowledge of autism and attitudes toward peers with autism. However, it is unclear if peer-education interventions influence peer behavior, particularly behavior toward autistic students (Odom, 2019). Future researchers should evaluate this relationship to determine if peer-education interventions are improving opportunities to interact, develop friendships, and improve social status for students with autism.

Future researchers should also explore important issues related to peer-education and student disclosure. Although self-disclosure of being on the autism spectrum is an individual decision that should be supported by families and IEP teams, disclosure is often associated with

more positive peer attitudes and interactions (Sreckovic et al., 2019). Future research should consider how peer-education interventions can be used in combination with self-disclosure to promote positive attitudes, challenge stereotypes, and teach inclusive behaviors.

Finally, future research should extend the findings of this study by evaluating the effects of recommended modifications to the Kit for Kids intervention through rigorous experimental research. Future studies could develop an adolescent-centered intervention that includes more examples and material relevant to secondary students or compare the effects of a modified version of the Kit for Kids intervention to the original. These studies should also continue to evaluate if intervention effects maintain over time and how knowledge, attitudes, and behavior change as students mature.

Limitations

Important limitations for the current study should be considered. The quasi-experimental non-equivalent groups design was appropriate given that students were already grouped into classrooms. However, non-equivalent group designs do not allow researchers to control for group differences that may threaten internal validity and affect study outcomes. More robust designs such as randomized-controlled trials should be used in the future to further evaluate the effects of peer-education interventions. Results should also be interpreted with caution given that outcomes were self-reported, the sample size was small and unrepresentative, and there was a possibility of sampling bias given that all participants attended a language arts class with the same general education teacher. Middle school students in different schools, districts, or regions may have different experiences and perspectives when participating in this intervention. Additionally, despite the importance of including qualitative data in social validity assessments, the qualitative data component of the current study was one-dimensional. Future studies should

continue to expand on qualitative and mixed-method evaluations of social validity and utilize multiple data sources to triangulate findings. Finally, in the current study, we used a hypothetical child to teach students about autism and autistic students, and it is unclear if changes in knowledge and attitudes generalize to real life individuals with autism.

Conclusion

With the results of the current study, we provide additional support for the claim that peer-education interventions can improve peer knowledge of autism and attitudes toward autistic students. Social validity assessments also indicated that participants found the intervention to be acceptable, important, and feasible. Qualitative social validity assessments also revealed important areas where future peer-education interventions can be modified to be more acceptable for middle school students such as including videos from actual individuals with autism and portraying the breadth of experiences and perspectives on the autism spectrum. We recommend that peer education interventions be utilized as Tier 1 interventions to support the social and academic inclusion of students with autism. Future research should continue to explore the effects of peer-education interventions and how they can be utilized to teach all students about the importance of acceptance and inclusion.

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Table 1

Student Demographic Information

Variable		*n*	%
Age	11	35	52%
	12	32	48%
Race/Ethnicity	Asian	10	15%
	Black or African American	7	10%
	Hispanic or Latino	8	12%
	Multiracial or biracial	1	1%
	Native Hawaiian or other Pacific Islander	1	1%
	White	40	60%
Gender	Female	34	51%
	Male	33	49%
Student on autism spectrum	Yes	3	4%
	No	64	96%

Table 2

Average Social Validity Quantitative Responses

Social Validity Element	Question	Autistic Students *n*= 3	Teachers *n*=3	Peers *n*=64	Parents *n*=4
Goals	*I/My student/My child*				
	…enjoy going to school/ class	4.7 (0.6)	3.3 (0.6)	-	4.5 (0.6)
	…have/has friends	5.0 (0.0)	3.0 (1.0)	-	3.5 (0.6)
	… feel different from other students	2.7 (0.6)	3.0 (1.0)	-	2.3 (0.5)
	Other students like me the way I/my student/my child am	4.3 (1.2)	4.3 (0.6)	-	3.5 (0.6)
	Peers know about autism	3.0 (0.0)	1.3 (0.6)	-	3.3 (0.5)
	Peers know I/my child have autism	2.3 (0.6)		-	2.8 (0.5)
	…would like more opportunities to make friends	4.3 (0.6)	5.0 (0.0)	-	5.0 (0.0)
	…would like more friends that understand me	4.3 (0.6)	5.0 (0.0)	-	5.0 (0.0)
	…classmates would benefit from learning more about autism	-	5.0 (0.0)	-	4.8 (0.5)
	…could benefit from their classmates learning more about autism	-	5.0 (0.0)	-	4.8 (0.5)
	What percent of peers do you think are familiar with autism?	-	21.67%	-	-
Procedures					-
	I liked the activities in the workbook	4.3 (0.6)	4.3 (0.6)	3.7 (0.9)	-
	I liked the videos from the lesson	3.7 (1.2)	4.0 (0.0)	4.2 (0.8)	-
	The lesson helped me/my students to learn more about autism	4.3 (0.6)	4.7 (0.6)	4.4 (0.7)	-

	The lesson on nick and autism was boring	1.7 (0.6)	2.0 (1.0)	2.0 (0.8)	-
Outcomes					-
	I/my students enjoyed learning about Nick	5.0 (0.0)	4.7 (0.6)	4.0 (0.8)	-
	I think other students at our school should receive this lesson	5.0 (0.0)	5.0 (0.0)	4.4 (0.6)	-
	Learning about Nick was a waste of time	1.0 (0.0)	1.0 (0.0)	1.7 (0.7)	-
	This lesson helped me/peers/students to learn more about Nick and autism	5.0 (0.0)	5.0 (0.0)	4.4 (0.6)	-
	The information in this lesson was important	5.0 (0.0)	5.0 (0.0)	4.3 (0.6)	-
	I would like my teachers to teach me/others more about Nick and autism *OR* I would recommend this intervention to a colleague	4.3 (0.6)	5.0 (0.0)	3.7 (0.9)	-
	The information in this lesson will help students/me be more accepting of autistic students	3.7 (0.6)	4.0 (1.0)	4.1 (0.8)	-
	This lesson will help students/me know how to be friends with autistic students	3.7 (0.6)	3.7 (0.6)	4.1 (0.8)	-
	I am now more confident in my/my students' ability to be friends with students with autism	-	4.0 (1.0)	4.1 (0.8)	-
	This lesson taught me/my students strategies that will help me develop friendships with students with autism	-	4.0 (0.0)	4.0 (0.9)	-
	I would need specialized training to implement this intervention	-	1.3 (0.6)	-	-
	I have the skills needed to implement this intervention	-	4.7 (0.6)	-	-

The amount of time required to use this intervention is reasonable	-	5.0 (0.0)	-	-

Table 3

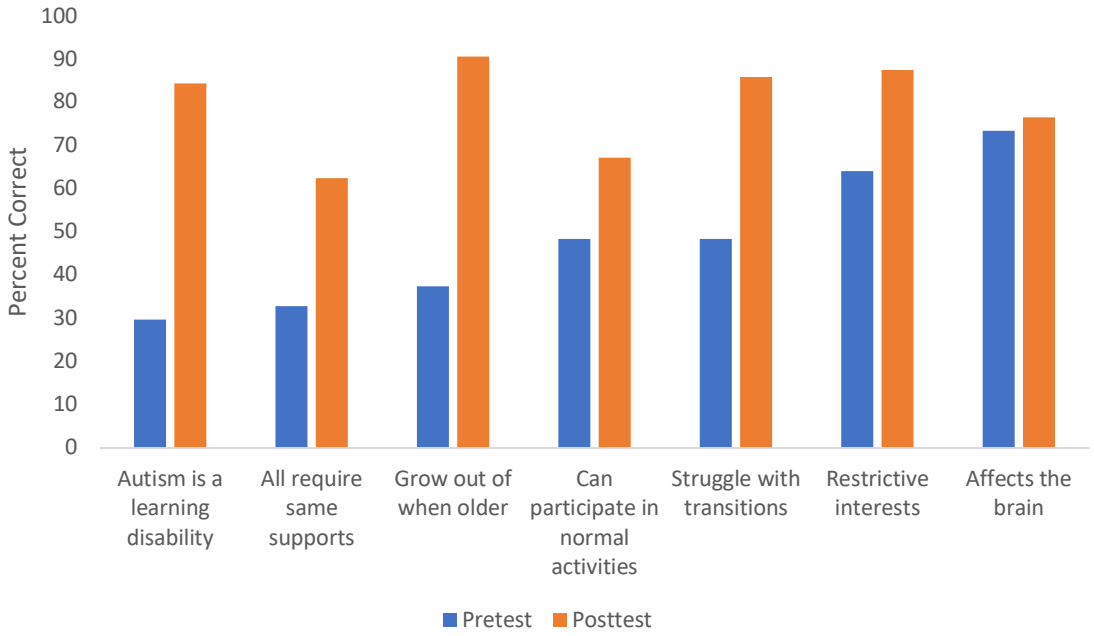
Thematic Categories and Focused Codes

Framework	Thematic categories	Focused codes	Examples from data
Procedures			
	A. Learning from individuals with autism	A1. Autistic perspective	"Talk to a real person with autism" "More videos of info about autism in their perspective" "Give more examples of what kids with autism may do"
		A2. Autistic experience	"I think it would've been beneficial if someone with autism had helped with the lesson as well, to help out and answer questions based on firsthand experience."
		A3. Examples in media/real life	"Harmful stereotypes about autism/both good and bad portrayals of autism in media" "Watch a move or show with autistic people" "Read a book like *Out of Mind* but for autism"
	B. Critiquing lesson materials	B1. Age appropriate	"Some things felt like they were for little kids" "More examples for us"
		B2. Student workbook	"Packet was long" "Make packet more interaction"
		B3. Videos depicting autistic experience	"Show a few more videos about kids with autism" "More videos about people's lifestyles that have autism" "Have more videos about people with autism and hear about their experiences"
Goals and Outcomes			
	C. Explanatory messaging	C1. Understanding adults and adolescents with autism	"Autism as people grow up or people who have autism that have gotten big achievements or are famous" "As people grow up how does autism change"

		C2. Diversity of the autism spectrum	"I wanted to learn if there were different severities of autism, like if two people have autism, but one of them shows more symptoms of the disability."
	D. Directive messaging	D1. Interacting and identifying with real individuals with autism	"How do I know they want to talk to me" "How to tell them flapping hands is ok" "How can you tell if someone has autism if it is only mild"

Figure 1

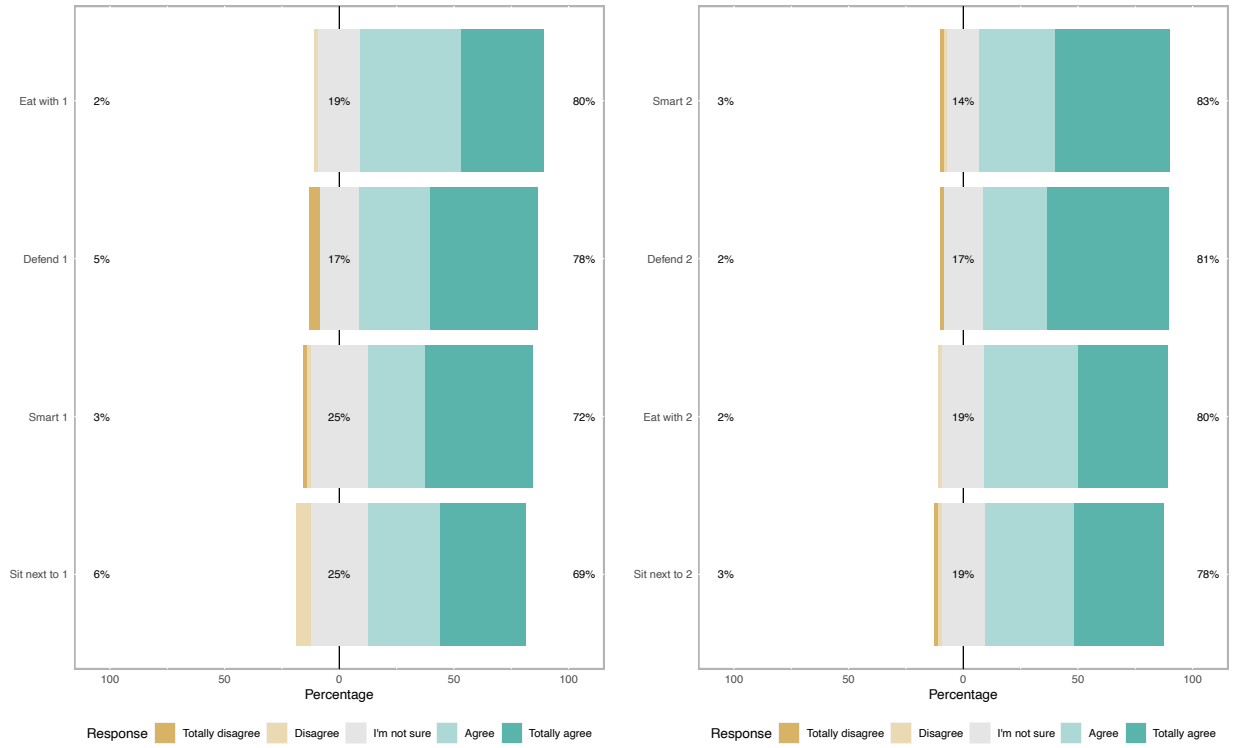
Peer Knowledge of Autism at Pretest and Posttest



Note. These are the lowest-scoring items from the pretest.

Figure 2

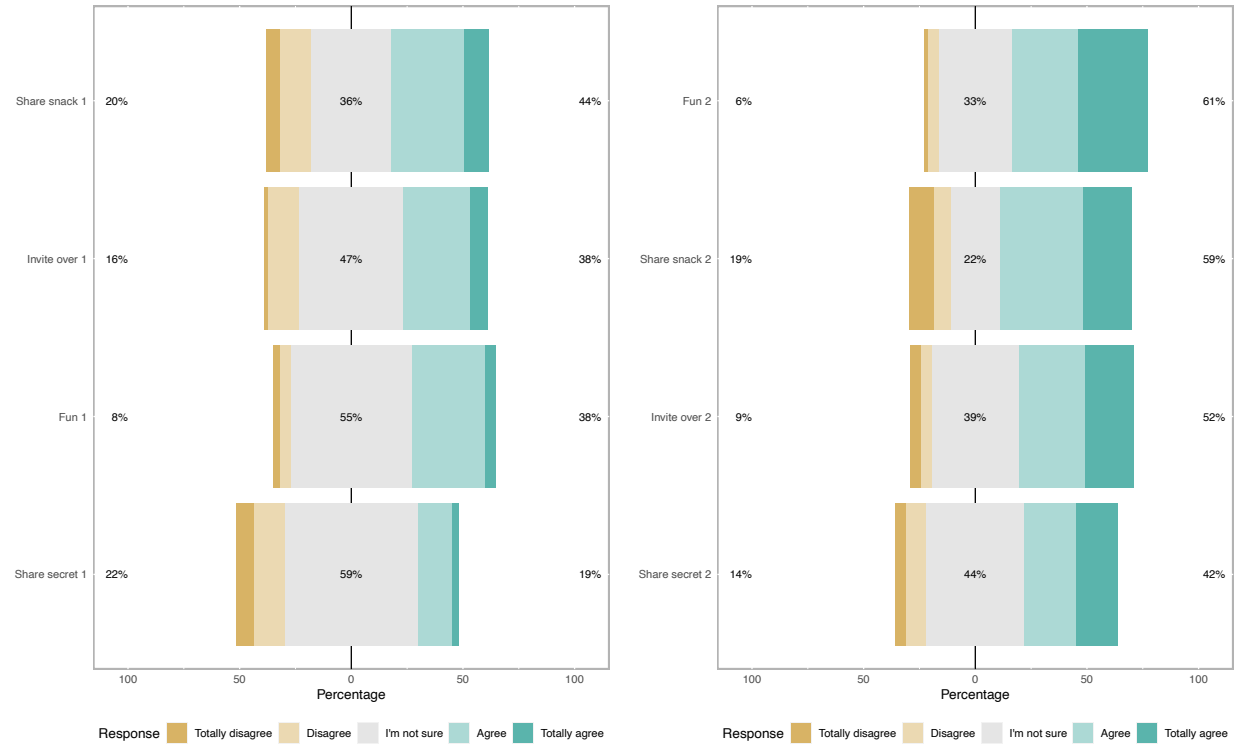
Highest Peer Attitudes for Pre and Post Tests



Note. 1= Pretest. 2=Posttest.

Figure 3

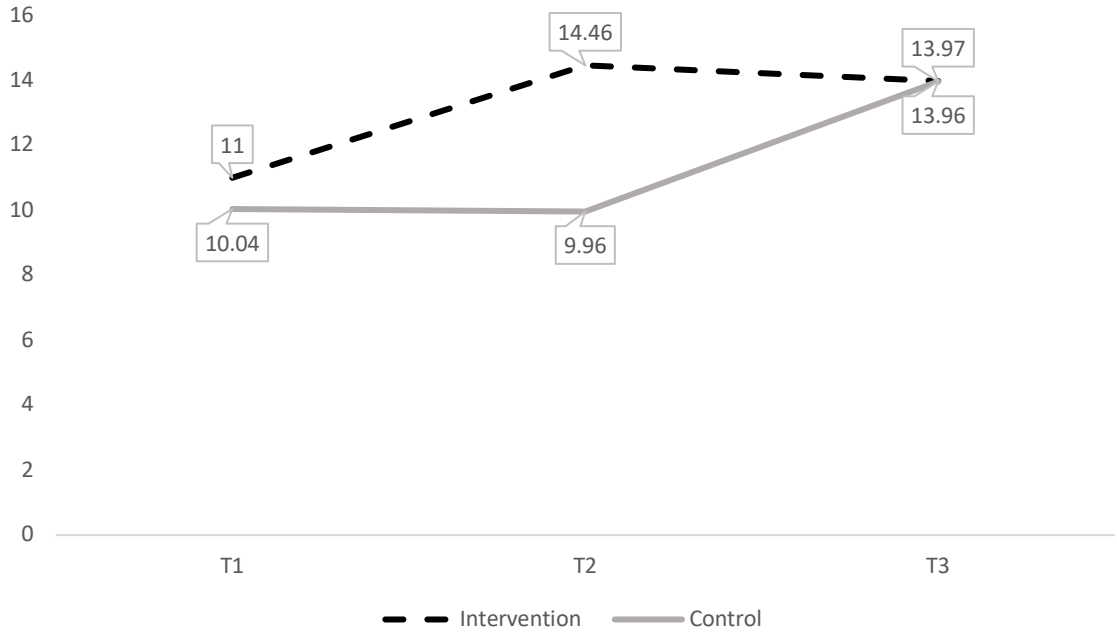
Lowest Peer Attitudes for Pre and Post Tests



Note. 1= Pretest. 2=Posttest.

Figure 4

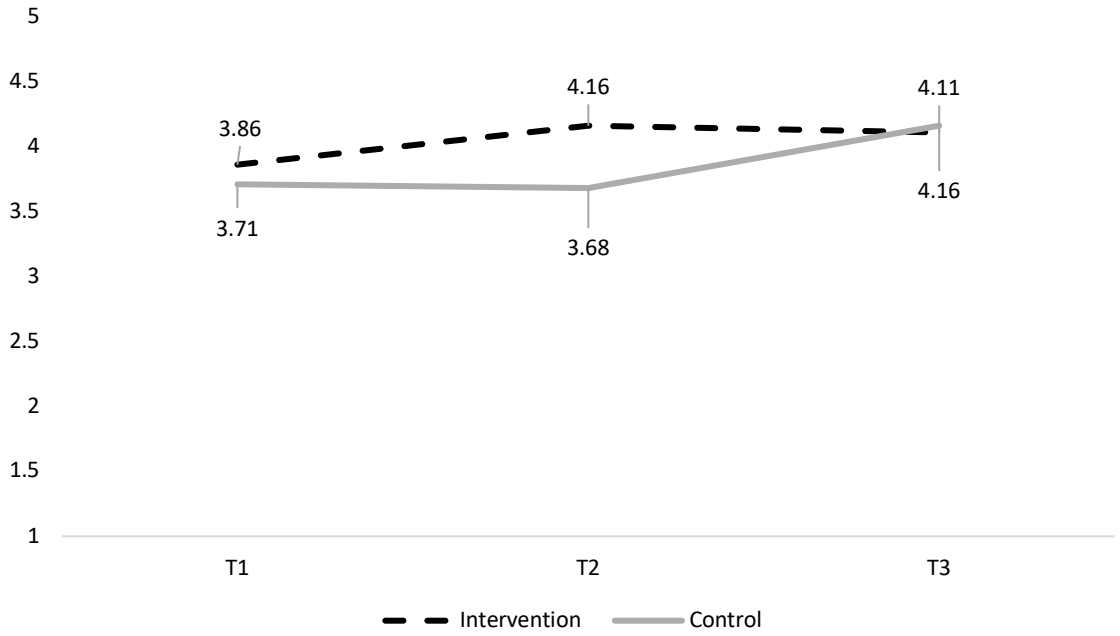
Knowledge of Autism for Intervention and Wait-List Control Groups



Note. T1= Pretest. T2=Intervention. T3= Follow-up. Intervention group received the intervention prior to T2 and the wait-list control group received the intervention prior to T3.

Figure 5

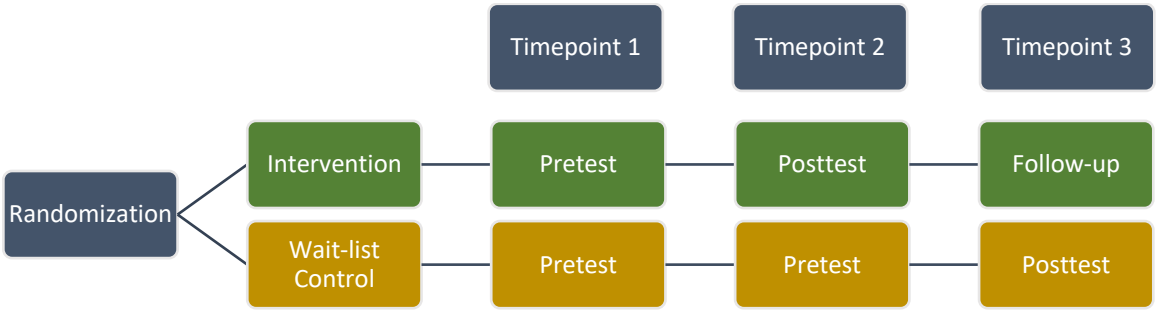
Attitudes Toward Autistic Peers for Intervention and Wait-List Control Groups



Note. T1= Pretest. T2=Intervention. T3= Follow-up. Intervention group received the intervention prior to T2 and the wait-list control group received the intervention prior to T3.

Figure 6

Intervention Procedures for Intervention and Wait-list Control Groups



Appendix A

Knowledge of Autism (KOA) Modified

Please read each of the questions carefully and answer the following questions using true or false. If you believe the statement is true, please circle **T**. If you believe the statement is false, please circle **F**. Even if you are not sure of the answer, please answer **all** the questions as best as you can.

1.	With the proper help, most people with autism grow out of the condition by the time they are adults.	T	**F**
2.	Students with autism often have a difficult time looking at other people in the eyes.	**T**	F
3.	Autism does not affect a person's brain.	T	**F**
4.	Students with autism often cannot do normal activities that other people can do.	T	**F**
5.	Students with autism sometimes repeat what is said to them.	**T**	F
6.	Students with autism sometimes rock back and forth and wave their hands around.	**T**	F
7.	Some students with autism might have trouble talking or expressing themselves.	**T**	F
8.	Students with autism do not have difficulty changing activities and can easily move from one activity to another.	T	**F**
9.	Most people with autism have low intelligence	T	**F**
10.	Autism is sometimes caused by bad parenting	T	**F**
11.	Students with autism are bullied more frequently than other students without autism	**T**	F
12.	Students with autism may like to only talk to you about one thing that they like	**T**	F
13.	Autism is a learning disability that affects things like math and reading	T	**F**
14.	Students with autism might get upset sometimes because their senses work differently than others	**T**	F
15.	All students with autism need the same types of supports to be successful.	T	**F**
16.	Students with autism are generally not interested in making friends	T	**F**

Appendix B

Children's Attitudes Toward Autism Questionnaire (CATAQ) Modified

Please read the following questions carefully. After reading each question, you will be given statements to which you will have to agree or disagree with. Read each statement carefully and choose which answer **best** suits your feelings.

Example: "I like vegetables"

a. Totally disagree
b. Disagree
c. I'm not sure
d. Agree
e. Totally agree

If you hate vegetables you would choose "a"

If you don't like vegetables you would choose "b"
If you don't know if you like vegetables, you would choose "c"
If you like vegetables a bit you would choose "d"
If you really love vegetables you would choose "e"

1. Students with autism are nice
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

2. Students with autism are good students
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

3. Students with autism are cool
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

4. Students with autism are not very smart
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

5. Students with autism are fun
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

6. Students with autism are intelligent
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

7. Students with autism are lazy
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

8. Students with autism are friendly
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

9. I would be concerned if a student with autism sat next to me in class
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

10. I would be happy to work on a project with a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

11. I would feel embarrassed to go to the school dance with a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

12. I would be happy if a student with autism offered to do homework together after school
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

13. I would be annoyed if I had to eat at the same table as a student with autism during lunch
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

14. I would feel good if I got to play with a student with autism during P.E.
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

15. I would feel uncomfortable if a student with autism was assigned as my partner during a learning activity
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

16. Being next to a student with autism makes me nervous
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

17. I would share a snack with a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

18. I would defend a student with autism if they were bullied at school
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

19. I would share my computer with a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

20. I would like to be in the same after-school club as a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

21. I would invite a student with autism to my house for a party
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

22. I would hesitate to tell a secret to a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

23. I would hang out with a student with autism
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

24. I would eat next to a student with autism in the cafeteria
    a. Totally disagree
    b. Disagree
    c. I'm not sure
    d. Agree
    e. Totally agree

Appendix C

Social Validity: Goals

Focal Students

Social Significance

1. I enjoy going to school
2. I have friends at school
3. I feel different from other students here.
4. Other students like me the way I am.
5. My classmates know about autism.
6. My classmates know I have autism.

Participant Values

7. I would like more opportunities to make friends.
8. I would like more friends that understand and accept me

Teachers

Social significance

1. Autistic students enjoy my class
2. Autistic students have friends in my classroom
3. Autistic students feel different from other students in my classroom
4. Autistic students are accepted by their peers in my classroom.
5. The students in my classes know about autism
6. What percentage of your students do you think are familiar with autism?

Participant values

7. It is important that students have opportunities to develop friendships with students who may be different from themselves
8. It is important that students are accepting of differences in my classroom

Parents

Social significance

1. My child enjoys going to school
2. My child has friends at school
3. My child feels different from other students at school
4. My child feels accepted at school.
5. My child's classmates know about autism.
6. My child's classmates know my child has autism

Participant Values

7. I would like more opportunities for my child to make friends.
8. I would like more students to understand and accept my child

Appendix D

Social Validity: Procedures and Outcomes

Focal Students

Acceptability of intervention procedures

1. I liked the activities in the workbook
2. I liked the videos from the lesson
3. The lesson on Nick and autism was boring

Satisfaction with outcomes

4. I enjoyed learning about Nick
5. I think other students at our school should receive this lesson.
6. Learning about Nick was a waste of time

Importance of outcomes

7. This lesson will help students learn more about autism
8. The information in this lesson is important
9. I would like my teachers to teach students more about autism
10. The information in this lesson will help students be more accepting of autistic students.
11. This lesson will help students know how to be friends with autistic students
12. What is the most important part of this lesson?
13. What information would add to this lesson that wasn't covered?
14. What suggestions do you have to improve the lesson and material?
15. Is there anything else you would like to share?

Peers

Acceptability of intervention procedures

1. I liked the activities in the workbook.
2. The workbook helped me learn more about autism.
3. I liked the videos from the lesson.
4. The videos helped me learn more about autism.
5. The lesson on Nick and autism was boring.

Satisfaction with outcomes

6. I enjoyed learning about Nick and autism.
7. I think other students at our school should learn about autism.
8. Learning about Nick and autism was a waste of time

Importance of outcomes

9. This lesson helped me to learn more about autism.
10. What I learned in this lesson about Nick and autism is important.
11. I would like my teachers to teach me more about autism
12. This lesson helped me to be more accepting of autistic students
13. I am now more confident in my ability to be friends with autistic students
14. This lesson taught me strategies that will help me develop friendships with autistic students
15. What is the most important thing you learned in this lesson?
16. How will the information from the lesson change how you treat your classmates at school?
17. How can you be a better friend to a classmate with autism?
18. What is something you wished you learned more about?
19. What suggestions do you have to improve the lesson and materials?
20. Is there anything else you would like to share?

Teachers

Acceptability of Intervention Procedures

1. I liked the activities in the workbook
2. The workbook helped students learn more about autism
3. I liked the videos from the lesson
4. The videos helped students learn more about autism
5. The intervention materials were boring for students

Satisfaction with Outcomes

6. The students enjoyed learning about Nick and autism
7. Other students at our school should learn about autism
8. Teaching the students this lesson was a waste of time

Importance of Outcomes

9. This lesson helped students learn more about autism
10. What students learned in this intervention about Nick and autism is important
11. I would recommend this intervention to a colleague
12. This intervention helped my students be more accepting of autistic students
13. I am now more confident in my students' ability to be friends with autistic students
14. My students learned strategies that will help them develop friendships with autistic students
15. What is the most important thing your students learned in this lesson?
16. How will this intervention change how students treat classmates at school?
17. What additional information do you think students without disabilities should know about autism that wasn't presented in this intervention?
18. What adaptations would you make to the intervention if you were to use it again in the future (procedures, content, materials)?
19. Are there any other interventions or strategies that you would use instead of Kit for Kids to change the knowledge and attitudes of peers?

Feasibility

20. I would need specialized training to implement this intervention
21. I have the skills needed to implement this intervention?

22. The amount of time required to use this intervention is reasonable
23. Is there anything else you would like to share

Appendix E

Demographic Questionnaire

What is your child's name (first and last)?

_____

How old is your child?

- ○ 9
- ○ 10
- ○ 11
- ○ 12
- ○ 13
- ○ 14
- ○ Prefer not to say

What is the race/ethnicity of your child?

- [ ] Asian
- [ ] Black or African American
- [ ] Hispanic or Latino
- [ ] Indigenous or Native American
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] White
- [ ] Other _____
- [ ] Prefer not to say

What is your child's gender?

- ○ Female
- ○ Male
- ○ Non-binary
- ○ Prefer not to say