



Using Conjoint Analysis to Predict Teachers' Preferences for Intervention Intensity

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Published online: 8 August 2020

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Abstract

Teachers play an important role in improving the emotional and behavioral problems of students. Intervention characteristics (e.g., frequency of student intervention) and teacher characteristics (e.g., mental health literacy) may influence teacher preferences for an intervention and impact service uptake. Conjoint analysis, a trade-off technique borrowed from marketing research, can authentically assess preferences by quantifying the compromises respondents make when selecting a product or a service and has been used to measure service preferences in the mental health field. A conjoint analysis technique called a “discrete choice experiment” was used to systematically arrange intervention components and subcomponents to assess teachers' preferences for the intensity of three common intervention attributes (i.e., frequency of student intervention, frequency of teacher consultation, and level of parental involvement). The sample consisted of 229 elementary school teachers recruited from Amazon's Mechanical Turk. Simulation analyses estimated teachers' preferences for a low-intensity intervention, medium-intensity intervention, high-intensity intervention or none of these. Differences in teacher characteristics (i.e., beliefs, mental health literacy, stress) were examined between teachers preferring each type of intensity. Results indicated that preferences for intervention intensity varied, with more teachers preferring a medium-intensity intervention than any other intervention. Mental health literacy was significantly greater among teachers preferring a medium-intensity intervention than teachers preferring no intervention. Interventions consisting of weekly options for teacher consultation and parental involvement may appeal to teachers with strong mental health literacy.

Keywords Teachers · School mental health · Teachers' preferences · Conjoint analysis · Intervention intensity

Introduction

Teachers play a crucial role in screening and treating children exhibiting impairment in the classroom environment. Indeed, 75% of educators report referring a student for mental health issues in the past 12 months (Reinke, Stormont, Herman, Puri, & Goel, 2011), and 70–80% of students referred receive aid in school settings (Williams, Horvath, Wei, Van Dorn, & Jonson-Reid, 2007). Teachers may be tasked with providing services within a multi-tiered system of support (MTSS), a framework that helps educators to provide supports to address the academic, behavioral, and emotional needs of students (Eagle, Dowd-Eagle, Snyder, & Holtzman, 2015; Fabiano & Evans, 2019). Because MTSS consists of multiple tiers of interventions, implementers can adjust the intensity and complexity of an intervention to match students' needs (Fabiano & Evans, 2019). Given that over 95% of teachers report implementing interventions in the classroom, and many of these teachers deliver

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interventions daily (Long et al., 2016), teachers must be prepared to participate in multi-tiered strategies.

Despite the prevalence of classroom-based interventions, research has found that teachers report significant barriers to intervention implementation, and one study found that up to 60% of barriers experienced by teachers involve aspects of the intervention itself (Long et al., 2016). One potential barrier to implementation adherence is the intensity, or dose, of the intervention. How often an intervention occurs, or the frequency of intervention components, may be metric of intensity. For example, the intensity of an intervention may be characterized by the frequency of teacher consultation, the level of parental involvement, and the frequency of student intervention. By identifying characteristics that predict teacher preferences for intervention intensity, we may understand how such services can be marketed to teachers to increase service uptake, and highlight areas where teachers need support to implement more intensive interventions to improve student outcomes.

School-Based Intervention Designs

MTSS consists of three tiers ranging from less intensive, universal services to more intensive, individualized services (August, Piehler, & Miller, 2018; Fabiano & Evans, 2019). Under the MTSS model, school personnel (e.g., teachers, counselors, school psychologists, administrators) undergo a data-driven problem-solving approach to assess students' needs and plan appropriate interventions to implement. Progress monitoring is used to determine the effectiveness of the intervention, allowing the opportunity to adjust the intervention intensity to match student needs. Tier 1 interventions are typically characterized by a schoolwide universal classroom management approach (e.g., moving a student's seat to the front of the classroom) to limit the emergence of problems (August et al., 2018; Fabiano & Evans, 2019). If a student displays a need for additional intervention efforts, school personnel may apply Tier 2 interventions, such as implementing a daily report card, using a check-in/check-out process, or referring a student to a school-based group to develop social or academic skills (August et al., 2018). Tier 3 interventions are more intensive and may consist of an individualized education plan, special education services, or services in more restricted environments or with collaboration with community agencies (August et al., 2018).

As students progress through tiers, the level of intervention intensity presumably increases. Similarly, teachers may have differing needs for implementation supports to help them address the varying needs of students. Measuring teachers' needs, however, is challenging considering that intervention tiers may vary in the frequency of intervention implementation and teacher support involved. Depending on the intervention, evidence-based practices may occupy

multiple tiers and may consist of varying intensities (Fabiano & Pyle, 2019). For example, universal (e.g., Tier 1) interventions may consist of classwide instructions that are delivered as needed, weekly, or monthly (Jones, West, & Suveg, 2019). Targeted (e.g., Tier 2, Tier 3) interventions such as social support groups (Singer, Erbacher, & Rosen, 2019) or special education services may be delivered as needed or monthly, and more than likely, daily or weekly. Variations in the intensities of MTSS interventions highlight the varying needs for support among students with emotional and behavioral challenges. It also indicates the importance to evaluate teachers' needs for support to learn how to encourage their participation in school-based services.

The positive behavioral interventions and supports (PBIS) framework is perhaps the most prominent example of a MTSS (August et al., 2018; Benner, Kutash, Nelson, & Fisher, 2013). Following the core principles of MTSS, PBIS is a schoolwide data-driven approach to address students' behavioral and emotional challenges to encourage a positive learning environment for all students. These data drive the selection of appropriate evidence-based practices to implement, while continuous progress monitoring helps inform the effectiveness and efficiency of those evidence-based practices, thus allowing opportunities to adjust intervention components to sustain positive outcomes among students. Another defining feature of PBIS is the use of leadership teams to set goals and expectations, monitor teacher effectiveness, and offer resources to teachers requiring more training and support. One way to assess teachers' needs for support is to explore their service delivery preferences. If done in a systematic way, measuring teachers' preferences for various service delivery models presents the opportunity to modify intervention components to reduce potential barriers, increase contextual fit (Johnson et al., 2014), increase implementation fidelity (Ennis, Cho Blair, & George, 2016; Johnson et al., 2014), and improve behavioral outcomes in students (Ennis et al., 2016).

Using Conjoint Analysis to Predict Preferences

The assessment of preferences is largely based on traditional measurements such as Likert-type rating scales and interviews (Girio-Herrera & Owens, 2017). These methods are subject to social-desirability biases and halo effects (Reisberg, 2006), which may lead to less reliable, valid, and accurate preference estimates. Importantly, they fail to mimic complex decision-making processes that lead to service selection. Conjoint analysis—a quantitative method used in marketing research—allows for the authentic assessment of preferences by quantifying the trade-offs and compromises individuals make when selecting a product or a service (Orme, 2013). Discrete choice experiments (DCEs) are a type of conjoint analysis methodology that systematically

arranges common features (i.e., “attributes”) of a product/service, with each attribute defined by subcomponents (i.e., “levels”). Intervention attributes are characterized based on the type of content (e.g., supporting evidence base), processes (e.g., frequency of student intervention), and outcomes (e.g., effect on classroom environment) associated with an intervention. Service options or bundles, consisting of experimentally varied combinations of attributes and subcomponents, require participants to make trade-offs between hypothetical packages presented within a choice task. In comparison with other methods, conjoint methods are more likely to accurately predict consumer’s preferences and real-world decision-making processes (Orme, 2013).

In addition to addressing some potential limitations of traditional assessments, the primary strengths of utilizing conjoint analysis to assess preferences are threefold. First, conjoint analysis shows the relative importance respondents place on a specific intervention attribute (e.g., frequency of intervention), in addition to the value they place on each attribute level (e.g., daily, weekly, as needed). Second, conjoint simulations, or forecasting tools, can predict preferences for intervention packages at a “whole product” level, which allows for an examination of respondents’ preferences for entire intervention packages offered in the real world (Orme, 2013). This process allows researchers to more accurately predict overall preference for an intervention and help determine what features and subcomponents of an intervention are viewed as most desirable. Third, conjoint simulations can illuminate subgroups of respondents’ preferences for interventions, revealing whether subsets of individuals might prefer one package over another.

Preferences for Children’s Mental Health Services

Over the last decade, researchers have utilized conjoint analysis to examine preferences for children’s mental health services (Cunningham et al., 2014). Conjoint analysis has been used to explore treatment preferences of parents (Cunningham et al., 2013; Waschbusch et al., 2011; Wymbs, 2018), with many of these studies suggesting that caregivers display unique preference patterns. Waschbusch and colleagues (2011) identified subgroups of parents of medication naïve children with ADHD who were medication avoidant, while others were outcome oriented, suggesting that some parents may be more willing to adopt medication management services if they effectively treated their child’s behavioral problems. Parents with children at risk for ADHD displayed varying treatment preferences between group parent training, individual parent training, or a minimal information intervention alternative and found that parents who preferred the less intense (i.e., minimal information) option reported higher levels of parental depression (Wymbs, 2018).

Conjoint studies have also examined teacher preferences for school-based interventions (Cunningham et al., 2009, 2014; Egan et al., 2019). Cunningham and colleagues (2009, 2014) identified a subset of teachers who preferred a bullying prevention program that provides a range of support to facilitate the adoption and implementation of evidence-based practices, while others preferred an intervention that offered fewer opportunities for support. Egan and colleagues (2019) found that teachers considered optimal outcomes in students’ academic, social/emotional, and behavioral functioning as some of the most important features of a school-based intervention. However, a portion of teachers displayed a preference for an intervention that did not produce optimal outcomes in students (Egan et al., 2019). These findings are important because they suggest that a “one size fits all” approach for providing children’s mental health services may not be appropriate for some caregivers. Most importantly, findings obtained from conjoint studies highlight the unique patterns of preferences divergent from those identified when relying on Likert-type ratings and interviews (Girio-Herrera & Owens, 2017). Understanding teacher preferences would be beneficial to researchers and intervention developers working to uncover areas in which teachers may need more training or support in order to adopt a more intense intervention. Additional research, however, is necessary to further understand why teachers may be more likely to select one intervention over the other. One reason for these preference variations may be due to the limited time constraints of teachers.

Teacher Preferences for Intervention Intensity

The time and duration of an intervention are among the top teacher barriers to intervention implementation (Long et al., 2016). Teachers experience several competing demands throughout the school day, which may impact teachers’ likelihood of adhering to intervention components (i.e., training, consultation, implementation) that would require more of their time. While opportunities for teacher consultation (Coles, Owens, Serrano, Slavec, & Evans, 2015; Reinke et al., 2011) and adjustments to the services provided (e.g., increasing intervention intensity; Anyon, Nicotera, & Veeh, 2016; Long et al., 2016; Wood, Goodnight, Bethune, Preston, & Cleaver, 2016) may improve teacher skills, these additional modifications to interventions may be viewed as less preferable to some teachers. Further, understanding teacher preferences for intervention intensity may reveal the underlying needs of teachers who require additional support as well as how the intensity of common intervention components can be modified to improve intervention adherence and acceptability (Cunningham et al., 2009).

Studies examining teacher preferences for school-based services suggest that teachers have varying preferences for

intervention components (Cunningham et al., 2009, 2014; Egan et al., 2019) which may therefore influence their willingness to implement certain interventions. While past conjoint studies have acknowledged that teacher preferences may be influenced by common intervention components such as the frequency of an intervention (Cunningham et al., 2009, 2014; Egan et al., 2019), no published study has specifically focused on the degree to which intervention intensity may influence preferences. This is the first study to apply conjoint analysis to the study of teacher preferences for intervention intensity. This study further extends the literature by exploring how teacher characteristics may predict teacher preferences for intervention intensity.

Correlates of Teacher Characteristics and Teacher Preferences

Research examining teacher characteristics that may predict teacher preferences is limited. Nonetheless, teacher characteristics have been shown to predict intervention acceptability and may presumably influence teachers' preferences. For example, teacher beliefs predicted greater receptivity to teacher consultation efforts (Owens, Allan, Hustus, & Erchul, 2018) and informed the types of teacher consultation they would find more acceptable (Coles et al., 2015). Belief congruence with components of MTSS also predicted teachers' acceptability of the intervention (Donnell & Gettinger, 2015). Similarly, teachers who displayed positive beliefs of the value of technology were more likely to incorporate it in their teaching (Howard, 2011). Collectively, these findings suggest that teacher beliefs may influence their preference and overall decision to utilize intervention components.

Other teacher characteristics such as stress and mental health literacy may be associated with teacher preferences for intervention intensity. Work-related stress has predicted teacher acceptability of types of teacher consultation (Coles et al., 2015) and high levels of stress have been shown to predict poorer student outcomes, as highly stressed teachers are less likely to utilize effective teaching strategies and behavior management practices (Herman, Hickmon-Rosa, & Reinke, 2018; Owens et al., 2019). Mental health literacy, defined by the attitude and knowledge of mental disorders that aid their recognition, prevention, or management (Jorm et al., 1997), is understudied among teachers. However, there is speculation that low mental health literacy in a community contributes to the stigma and lack of treatment uptake for children with mental health concerns (Tully, Hawes, Doyle, Sawyer, & Dadds, 2019). Indeed, college teachers with greater mental health literacy are more likely to direct students to mental health services (Gulliver, Farrer, Bennett, & Griffiths, 2019). It can therefore be argued that mental health literacy, in addition to teacher beliefs and stress, may impact

teachers' preferences. Knowing whether these malleable characteristics are associated with preferences for intervention intensity presents two benefits. First, teacher characteristics may help inform the intensities of interventions teachers would prefer to implement. Second, it may reveal areas for teacher consultants to prioritize in order to enhance palatability of these interventions to teachers.

Current Study

Although teachers favor interventions that produce optimal student outcomes (Egan et al., 2019), they often report the time required as a barrier against intervention implementation (Long et al., 2016). It is therefore important to compare preferences for process attributes related to intervention intensity (i.e., frequency of student intervention, frequency of teacher consultation, level of parental involvement) to better understand the factors that contribute to teacher acceptability of common intervention components. Thus, the current study had two objectives. The first was to examine teachers' preferences for three different interventions varying in intensity. The second aim was to explore attributes and levels associated with a preferred intervention intensity (i.e., high-, medium-, or low-intensity intervention or none of these as well as their preferred level of implementation (e.g., as needed, daily, weekly, monthly). In addition, given findings showing that teacher characteristics are related to acceptability for MTSS components (Donnell & Gettinger, 2015), it is possible that teacher characteristics are associated with intervention preferences. For these reasons, our second aim is to identify teacher characteristics (i.e., beliefs, mental health literacy, stress) predictive of preferences for intervention intensities. We used conjoint analysis, namely a discrete choice experiment, to further understand teachers' preferences and the relationships of these preferences with teacher characteristics.

Methods

Participants

Participants ($N = 229$) were general education elementary school teachers recruited from Amazon.com's Mechanical Turk (MTurk; www.mturk.com). MTurk is an online crowdsourcing marketplace that provides a means for researchers to recruit eligible individuals to complete tasks for monetary compensation (Berinsky, Huber, & Lenz, 2012). Evidence suggests that it is a cost-effective tool that can feasibly streamline the recruitment of nationally

Table 1 Demographic characteristics of study sample of teachers

	Service preferred					<i>X</i> ² / <i>F</i>
	<i>n</i>	<i>N</i> (<i>N</i> =26)	<i>L</i> (<i>N</i> =78)	<i>M</i> (<i>N</i> =86)	<i>H</i> (<i>N</i> =39)	
Total	229					
Age		34.1 (5.9)	32.8 (5.7)	32.2 (6.9)	30.6 (4.8)	1.93
Gender						2.02
Male	105	12.4%	33.3%	31.4%	22.9%	
Female	124	10.5%	34.7%	42.7%	12.1%	
Race						0.78
American Indian/Alaska Native	2	0.0%	50.0%	50.0%	0.0%	
Asian	18	5.6%	50.0%	38.9%	5.6%	
Black/African American	36	16.7%	25.0%	38.9%	19.4%	
White	173	11.0%	34.1%	37.0%	17.9%	
Ethnicity						0.49
Hispanic/Latino	20	10.0%	45.0%	35.0%	10.0%	
Current grade taught						0.70
Kindergarten	48	8.3%	37.5%	35.4%	18.8%	
First	21	4.8%	23.8%	57.1%	14.3%	
Second	37	8.1%	32.4%	48.6%	10.8%	
Third	39	17.9%	41.0%	23.1%	17.9%	
Fourth	37	10.8%	21.6%	37.8%	29.7%	
Fifth	47	14.9%	40.4%	34.0%	10.6%	
Years teaching		7.4 (4.7)	6.3 (4.2)	5.9 (4.1)	5.62 (4.2)	1.08
Years teaching current grade		5.1 (4.3)	4.8 (3.2)	4.63 (3.3)	4.3 (3.2)	0.31
Highest degree earned						17.7*/5.61
Pre-graduate education	138	5.8%	31.2%	46.4%	16.7%	
Post-graduate education	91	19.8%	38.5%	24.2%	17.6%	

The highest degree earned variable was dichotomized to ease interpretation of results. Teachers who earned a high school diploma or bachelor’s degree were assigned to the pre-graduate education group. Teachers who earned a master’s or doctorate’s degree were assigned to the graduate education group. Chi-square analyses indicated significant differences between groups

N No intervention, *L* low-intensity intervention, *M* medium-intensity intervention, *H* high-intensity intervention

**p* < 0.01

diverse samples (Berinsky et al., 2012; Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012) and the collection of high-quality data (Buhrmester et al., 2011; Casler, Bickel, & Hackett, 2013).¹ Table 1 presents the demographic information of respondents. The sample consisted of teachers (45.8% male, 75.5% White) with a mean age of 32 years and an average of six years teaching experience. Most participants had a bachelor’s degree or lower (60.26%), with a generally dispersed number of individuals teaching grades K-5.

Measures

Demographics

Teachers reported their age, gender, race, ethnicity, years of teaching experience, grade taught, years spent teaching, years spent teaching their current grade level, and highest degree earned.

Conjoint Survey

Twelve common attributes of school-based interventions were generated based on a review of the literature and discussion with experts in the field of school-based mental health interventions (see Egan et al., 2019). Study attributes included a mix of content, process, and outcome attributes as well as implementation supports, each defined by four levels

¹ We included two attention check questions on the MTurk survey and excluded 30 participants who provided inaccurate information on either of these attention check questions.

Table 2 Comprehensive list of intervention attributes and their zero-centered part-worth utility values

Attributes		
Content of attribute level	<i>M</i>	(SD)
<i>Student's social/emotional outcomes</i>		
Does not help with my student's social/emotional problems	− 87.0	(39.2)
Helps me understand reasons for my student's social/emotional problem	34.0	(24.7)
Gives me information about ways to solve my student's social/emotional problems	22.4	(19.2)
Gives me information and skills to solve, step-by-step, my student's social/emotional problems	30.7	(24.9)
<i>Student's academic outcomes</i>		
Does not help with my student's academic problems	− 84.1	(32.7)
Helps me understand reasons for my student's academic problems	22.7	(16.6)
Gives me information about ways to solve my student's academic problems	25.9	(21.1)
Gives me information and skills to solve, step-by-step, my student's academic problems	35.6	(29.1)
<i>Effect on feeling informed</i>		
Makes me feel confused	− 60.2	(41.0)
Does not change how informed I feel	− 23.1	(24.1)
Helps me feel a little more informed	27.4	(34.1)
Helps me feel much more informed	55.8	(28.3)
<i>Student's behavioral outcomes</i>		
Does not help with my student's behavioral problems	− 71.2	(48.4)
Helps me understand reasons for my student's behavioral problems	12.1	(26.5)
Gives me information about ways to solve my student's behavioral problems	19.8	(29.8)
Gives me information and skills to solve, step-by-step, my student's behavioral problems	39.3	(27.0)
<i>Classroom environment</i>		
Does not help with classroom environment problems	− 60.9	(42.1)
Helps me understand reasons for classroom environment problems	13.8	(24.4)
Gives me information about ways to solve classroom environment problems	18.9	(19.3)
Gives me information and skills to solve, step-by-step, specific classroom environment problems	28.2	(30.7)
<i>Effect on teacher stress</i>		
Increases my stress, anxiety, or guilt	− 56.4	(25.6)
Does not change my stress, anxiety, guilt	− 10.4	(21.3)
Reduces my stress, anxiety, guilt a little	26.6	(25.0)
Reduces my stress, anxiety, guilt a lot	40.2	(21.8)
<i>Effect on teacher feeling confident</i>		
Makes me feel less confident	− 57.5	(25.7)
Does not change how confident I feel	− 6.2	(21.7)
Helps me feel a little more confident	24.6	(18.7)
Helps me feel much more confident	39.2	(22.3)
<i>Supporting evidence base</i>		
Is not supported by researchers or educators for a student like mine	− 38.1	(25.3)
Is supported by scientific research for a student like mine	6.9	(20.2)
Is supported by other teachers for a student like mine	2.8	(20.2)
Is supported by mental health practitioners for a student like mine	28.4	(18.1)
<i>Level of parent involvement</i>		
Does not include any intervention-related contact with the student's parents	− 33.1	(28.8)
Involves monthly contact with the student's parent	15.0	(24.7)
Involves weekly contact with the student's parent	17.2	(24.2)
Involves daily contact with the student's parent	0.9	(28.6)
<i>Frequency of teacher consultation</i>		
Involves teacher consultation as needed	8.3	(23.7)
Involves teacher consultation monthly	− 9.7	(21.1)

Table 2 (continued)

Attributes		
Content of attribute level	<i>M</i>	(SD)
Involves teacher consultation weekly	2.7	(18.6)
Involves teacher consultation daily	–1.3	(32.1)
<i>Frequency of student intervention</i>		
Is provided to the student as needed	7.3	(20.6)
Is provided to the student monthly	–15.7	(21.9)
Is provided to the student weekly	–2.9	(18.8)
Is provided to the student daily	11.4	(23.9)
<i>Delivery of teacher consultation</i>		
Involves teacher consultation in a one-on-one, in person setting	11.7	(17.3)
Involves teacher consultation over the phone	–16.0	(16.7)
Involves teacher consultation through email or online	–2.4	(21.4)
Involves teacher consultation in a group setting with other teachers	6.7	(17.0)

Intervention attributes and attribute levels were selected based on a review of the literature conducted by a preliminary study (Egan et al., 2019). The three intervention attributes of interest are bolded. All other attributes were held constant in the conjoint simulation. Positive part-worth utility values indicate a desirable feature of an attribute. Negative values indicate an attribute feature that was not chosen. The utility value associated with the preferred level for each attribute is bolded

(Table 2). A partial profile discrete choice experiment (DCE; Orme, 2013) was applied to strategically arrange study attributes with varying levels to generate three intervention packages to be presented in a choice task. Because a partial profile version was used, each choice task did not include a level from all of the attributes examined in the survey. Instead, the presentation of attributes and levels between choice tasks within the survey was balanced to predict preferences for seen and unseen combinations of intervention characteristics to maximize statistical and informant efficiency (for fuller description of the design of discrete choice experiments, please see Orme, 2013).

The conjoint questionnaire was comprised of 15 choice tasks displayed by Sawtooth Software’s Lighthouse Studio program (Sawtooth Software, 2013). Choice tasks contained an additional “none” option that asked “If the option you selected was the only option available, would you use it?” and was designed to model the real-world likelihood that educators can often decline their participation in school-based services. Choice tasks were therefore comprised of three intervention packages that systematically varied in the levels of three intervention attributes in addition to the option to select “none” to opt out of services given the presented combinations. Each choice task appeared on a new screen, and teachers were instructed to only consider the three options within each specific choice task. Teachers selected the column containing the combination of attributes that was most preferred for a student with emotional and behavioral problems (e.g., inattention, interrupting, out of seat, and/or oppositional behavior). Figure 1 represents a sample of a choice task.

Teacher Beliefs

The Teacher Beliefs Inventory (11 items; Owens et al., 2018) assessed teachers’ beliefs about (a) student behavior, (b) the use of intervention to address maladaptive classroom behaviors, and (c) teacher consultation. Participants were instructed to rate the extent to which they agreed or disagreed with a statement (e.g., “*Behavioral classroom interventions are likely to improve children’s behavior*”). Items were ranked on a 6-point Likert-type scale, with responses ranging from “disagree a lot” to “agree a lot.” Agreement and disagreement scores were averaged to reflect teachers’ views of evidence-based practices. Higher agreement scores indicated more positive beliefs. Previous literature using this scale demonstrated good internal consistency ($\alpha = 0.77$; Owens et al., 2018). The current sample demonstrated good internal consistency ($\alpha = 0.69$, $\Omega = 0.76$).

Mental Health Literacy

Teachers’ attitudes and knowledge of mental health were assessed using the 35-item Mental Health Literacy Scale (MHLS; O’Connor & Casey, 2015). The MHLS measured mental health literacy as a unidimensional construct affiliated with six attributes: ability to recognize specific mental disorders, knowledge of where to seek mental health information, knowledge of risk factors and causes, knowledge of self-treatments, knowledge of professional help available, and attitudes that promote appropriate help-seeking behaviors. All items were ranked on a Likert-type scale, with responses ranging from “Very unlikely” to “Very likely”

Sample of choice-based task

If these were your options for an intervention package for a student with emotional and behavioral problems, which would you choose?
Choose by clicking one of the buttons below.

(1 of 15)

I'd choose an intervention that ...

Option 1	Option 2	Option 3
Gives me information about ways to solve my student's academic problems	Helps me understand reasons for my student's academic problems	Gives me information about ways to solve my student's academic problems
Reduces my stress, anxiety, guilt a little	Reduces my stress, anxiety, guilt a lot	Increases my stress, anxiety, or guilt
Makes me feel confused	Helps me feel much more informed	Does not change how informed I feel

If the option you selected was the only option available, would you use it?

Yes

No

Fig. 1 Sample of choice-based task

(e.g., “To what extent do you think it is likely that *Personality Disorders are a category of mental illness?*”), “Very unhelpful” to “Very helpful” (e.g., “To what extent do you think it would be helpful for someone to avoid all activities or situations that made them feel anxious if they were having difficulties managing their emotions?”), “Strongly disagree” to “Strongly agree” (e.g., “I am confident that I know where to seek information about mental illness”), and “Definitely unwilling” to “Definitely willing” (e.g., “How willing would you be to make friends with someone with a mental illness?”). Scores were summed to reflect teacher mental health literacy. Higher scores of mental health literacy indicated greater knowledge of mental health. The MHLS in the current sample showed good internal consistency ($\alpha = 0.89$, $\Omega = 0.89$).

Stress

A shortened version of the Teacher Concerns Inventory (TCI; Fimian, 1988) assessed sources and manifestations of teacher stress. Sources of teacher stress evaluated causes of stress through the subscales of time management (e.g., “Not enough time to get things done”), work-related stress (e.g., “Caseload/class is too big”), and discipline and motivation (e.g., “Discipline problems in my classroom”). Emotional (e.g., “Feeling anxious”) and fatigue (e.g., “Physical exhaustion”) manifestations were measured to infer physiological and behavioral symptoms of stress caused by work-related pressures. Items were ranked on a 5-point Likert-type scale, with responses ranging from “No strength; not noticeable”

to “Major strength, extremely noticeable.” Mean scores for each TCI subscale were summed and averaged to reflect overall stress. Greater scores on the TCI indicated higher levels of job-related teacher stress. The scale demonstrated good internal consistency ($\alpha = 0.94$, $\Omega = 0.94$).

Data Analytic Strategy

To examine teacher preferences, parameter estimates (i.e., utility values and importance scores) were first calculated. These provided data to run market simulators, forecasting tools used to predict respondents' preferences at the “whole product/service” level. The process for computing utility values, importance scores, and simulations is summarized below.

Utility Values and Importance Scores

As described by Egan and colleagues (2019), hierarchical Bayes theorem and a simulated Monte Carlo Markov Chain algorithm (e.g., Gibbs Sampling) were used to compute utility coefficients for each participant (Orme, 2013). The hierarchical model draws from two separate models, including (a) a lower-level model that estimates how well part-worth utilities fit choices of each respondent within the study sample and (b) an upper-level model that borrows information from other respondents in the study sample to compute part-worth utility averages and variances for the entire study sample (Orme, 2013). Utility values were zero-centered and involved setting the average utility value range of all

attributes to 100. Utility values show the relative strength of the levels of each attribute on participant choices; higher values reflect stronger preferences, and negative values reflect lack of preference. To estimate each respondent's sensitivity to variations in the levels of an attribute, importance scores were calculated by computing a percentage score; this percentage reflects the sum of each of the ranges in utilities (i.e., maximum minus minimum) across the attributes divided by the number of attributes (Orme, 2013). Higher importance scores show greater influence of one attribute versus others on participant choices (Wymbs et al., 2015, 2017).

Simulations

Randomized first choice market simulations were used to model teacher response to the service options. Simulations were run to predict percentages of teachers that would prefer a high-, medium-, or low-intensity intervention or none of these. Randomized first choice (RFC) simulators are forecasting tools that predict individuals' responses to the combinations of attribute levels. Attribute levels reflect service subcomponents that may be available in the real world. For example, in this study, subcomponents of services (i.e., attribute levels) can be arranged to build various intensities of intervention or implementation supports. Simulations estimated the proportion of teachers preferring each service by determining the service that maximized teachers' preference score across attributes and service variability error (Huber, Orme, & Miller, 2007).

The present study conducted simulation analyses using a subset of intervention attributes (i.e., frequency of student intervention, frequency of teacher consultation, level of parental involvement) to model a low-, medium-, or high-intensity interventions. These options did not have a label such as "high-intensity intervention" as they were instead presented as a combination of generic service components. The none option was included in analyses to further explore whether there are distinct subgroups of teachers with similar preference patterns for varying intensities of intervention implementation supports.

Aim 1: Teacher Preferences for Intervention Intensity

We modeled intervention packages by varying levels of three process attributes (i.e., frequency of student intervention, frequency of teacher consultation, and level of parental involvement), holding all other attributes constant. The high-intensity intervention package consisted of *daily* opportunities for student intervention, parental involvement, and teacher consultation; the medium-intensity package consisted of *weekly* opportunities for student intervention, parental involvement, and teacher consultation. The low-intensity intervention consisted of opportunities for student

Table 3 Importance scores for teachers in the sample

	Average importance scores (N = 229)		
	R	M	SD
<i>Attributes</i>			
Effect on feeling informed	1	11.90	3.07
Student's academic outcomes	2	11.50	2.94
Student social/emotional outcomes	3	11.03	2.37
Student's behavioral outcomes	4	9.59	2.76
Effect on classroom environment	5	8.99	2.67
Effect on teacher stress	6	8.51	2.45
Supporting evidence base	7	8.39	2.53
Level of parental involvement	8	7.69	2.49
Effect on feeling confident	9	7.67	1.96
Frequency of teacher consultation	10	5.01	2.79
Delivery of teacher consultation	11	4.88	2.27
Frequency of student intervention	12	4.84	2.64

R Relative rank of importance

intervention and teacher consultation *as needed* and *monthly* opportunities for parental involvement. The current study acknowledged the potential for participants to "opt out" of these three previously described options. Thus, the none group thus reflected participants responding no to the question "If these were your only options available, would you use [the option you selected]?" We then conducted simulation analyses to determine teachers' preferences for each intensity of intervention.

Aim 2: Teacher Characteristics Associated with Preferences

A series of 4 × 4 one-way ANOVAs were run to assess differences in teacher beliefs, knowledge, mental health literacy, and stress between preference groups. Post hoc Dunnett's C tests were used to examine pairwise comparisons following significant omnibus tests.² Additionally, we explored the associations between preference for attributes of school-based interventions and demographics (e.g., race, gender, highest degree earned, current grade taught, years spent teaching) using Chi-square analyses.

² We used Dunnett's C test to control for experiment-wise error. Dunnett's C test is a multiple comparison test used to determine whether the mean of a control condition differs from that of two or more other means of experimental conditions. We then used Brown-Forsythe test to the assumption of equal variances in each ANOVA.

Table 4 Descriptive characteristics of study variables among intervention options

	<i>N</i> (<i>N</i> =26)	<i>L</i> (<i>N</i> =78)	<i>M</i> (<i>N</i> =86)	<i>H</i> (<i>N</i> =39)	<i>F</i>	Dunnett's <i>C</i>
	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)		
MHL	114.77 (14.88)	121.87 (16.46)	124.92 (13.68)	118.03 (17.70)	3.69*	<i>M</i> > <i>N</i> *
Beliefs	45.58 (8.09)	48.68 (6.22)	49.44 (6.92)	46.38 (7.18)	3.22*	–
Stress	82.50 (26.90)	75.81 (17.57)	73.15 (23.06)	78.51 (19.93)	1.50	–

Means, standard deviations, and *F*-values were obtained from analysis of variance (ANOVA). Dunnett's *C* comparisons indicated significant differences between groups for MHL, beliefs, and stress

MHL Mental health literacy, *N* no intervention, *L* low-intensity intervention, *M* medium-intensity intervention, *H* high-intensity intervention

* $p < 0.01$

Results

Aim 1: Teacher Preferences for Intervention Intensity

Part-worth utility values (Table 2) and importance scores (Table 3) indicate that teachers were most interested in the level of parent involvement (Table 3), and they preferred parents be involved on a weekly basis (Table 2). An intervention that involved as needed opportunities for teacher consultation was also desirable (Table 2). Finally, teachers' preferences were relatively less influenced by the frequency of student intervention (Table 3), though they preferred an intervention provided to the student daily (Table 2).

Conjoint simulations predicted that 38% of teachers preferred a medium-intensity intervention, while 34% of teachers preferred a low-intensity intervention, 17% of teachers preferred a high-intensity intervention, and 11% of teachers preferred the “none” option or preferred to “opt out” of the presented intervention packages.

Aim 2: Teacher Characteristics Associated with Preferences

A series of between-groups one-way ANOVAs were conducted to compare differences in teacher characteristics between those preferring a high-, medium-, or low-intensity intervention or none of these (Table 4). The results revealed that mental health literacy ($F(3, 225) = 3.69, p < 0.01$) and beliefs ($F(3, 225) = 3.22, p = 0.02$) significantly differed among preference groups. Specifically, teachers preferring a medium-intensity intervention reported higher mental health literacy than teachers in the none group (Hedges' $g = 0.72$). Post hoc follow-up tests did not reveal statistically significant differences in beliefs between groups.

Chi-square analyses were used to test whether teacher demographic characteristics varied among those preferring each intervention package. Preference was unrelated to gender, race, ethnicity, grade taught, years spent teaching, and years spent teaching current grade. The highest

degree teachers earned was significantly different among groups ($F(3, 225) = 5.61, p < 0.01$). To further explore the association between degree and preferences, the highest degree earned variable was dichotomized (i.e., pre-graduate school education, graduate school education) and Chi-square analyses were conducted to analyze this relation. Findings revealed that teachers who earned a graduate degree preferred to opt out of services and teachers with a bachelor's degree or lower were more likely to choose a high-, medium-, or low-intensity intervention (Table 2).

Discussion

Teachers display varying needs for training and support in order to implement mental health services for their students (Owens et al., 2018, 2019), yet few studies have examined their needs or preferences for intervention components related to intervention intensity. Given that the time and duration of an intervention are among the top teacher barriers (Long et al., 2016), this study aimed to further understand elementary school teachers' preferences for intervention intensity and subsequently identify characteristics that may predict these preferences. We first estimated what proportion of teachers would choose to implement a low-, medium-, or high-intensity intervention, or none of these for students displaying emotional and behavioral problems. Conjoint simulations indicated that 38% of the sample preferred a medium-intensity intervention, 34% preferred a low-intensity intervention, 17% preferred a high-intensity intervention, and 11% preferred the none option. Overall, these findings suggest that most teachers are willing to participate in school-based services, as indicated by the finding that more than two-thirds of the sample expressed a preference to implement intervention components on a weekly or as needed basis. Study findings also reflect the varying preferences of teachers. Intervention components should be tailored to match teachers' preferences as well as student needs.

In comparison with other teacher segments, more teachers (38%) preferred a medium-intensity intervention consisting of weekly opportunities for student intervention, teacher consultation, and parental involvement. This finding suggests that many teachers are therefore likely to view interventions that are delivered on a weekly basis as acceptable. A notable 17% of teachers preferred a high-intensity intervention consisting of daily opportunities for student intervention, teacher consultation, and parental involvement. These findings are consistent with research that suggests that many teachers prefer an intervention that provides opportunities for teacher support (e.g., teacher consultation) and parental involvement (Cunningham et al., 2009, 2014; Egan et al., 2019). Teacher consultants should take heed to this finding as providing support to teachers may improve teacher adherence to evidence-based practices (Reinke, Herman, & Stormont, 2013).

Thirty-four percent of teachers preferred a low-intensity intervention that involved as needed implementation of student intervention, as needed teacher consultation, and monthly opportunities for parental involvement. To enhance teacher uptake of evidence-based practices, teachers preferring a low-intensity intervention might be trained on effective teaching and behavior management strategies that may be utilized as needed. If these strategies are ineffective, teachers might be encouraged to obtain additional training, subsequently increasing their acceptability of more intensive intervention components. A portion of the sample (11%) selected the none option, meaning that they preferred to opt out of services altogether. Taken together, these findings are congruent with research indicating that some teachers prefer an intervention that is less time demanding (Cunningham et al., 2009, 2014), and these teachers may be more likely to opt out of opportunities for further training or support that would increase their workload.

Additionally, we examined how teacher characteristics may predict preferences for varying intervention intensities. Mental health literacy was significantly greater among teachers preferring a medium-intensity intervention than teachers selecting none. A possible explanation for this finding may be that teachers prefer a medium-intensity intervention because they understand that addressing mental health requires additional support of parents and mental health experts, thus increasing their preference for an intervention that provides frequent opportunities for knowledge, training, and/or support. In contrast, teachers may choose to opt out of services due to their lack of knowledge about what it takes to treat mental health. This is congruent with findings that suggest that mental health literacy is a factor that predicts the use of evidence-based interventions offered within a community (Tully et al., 2019). It is recommended that preferences are examined prior to intervention implementation to highlight groups of teachers that may require more

support to feel comfortable implementing more intensive interventions. For example, teacher consultants can provide teacher training to improve mental health literacy to increase the acceptability of weekly based interventions offered in tiered intervention programs.

The hypothesis that teacher beliefs and stress would predict preferences was not supported. This is surprising given findings that teacher beliefs are associated with teacher acceptability of a MTSS intervention (Donnell & Gettinger, 2015) and high levels of teacher stress predicted acceptability of teacher consultation services (Owens et al., 2018). It may be that beliefs and stress are factors that do not strongly influence one's preference for intervention intensity. Alternatively, it may be that skills predict preference. For instance, teacher coping and self-efficacy may better predict teacher functioning than stress alone (Herman et al., 2018). Taken together, these findings suggest that targeting mental health literacy, rather than beliefs or stress, may be more effective to increase teacher acceptability of more intensive interventions. It is recommended that additional teacher characteristics (e.g., time management skills, agreeableness) are examined to predict preferences for interventions offered in schools.

Curiously, teachers who have earned a master's degree or higher were more likely to opt out of services, while teachers who earned a bachelor's degree or lower were more likely to select a low-, medium-, or high-intensity intervention. This finding suggests that teachers with a graduate degree may have not been interested in teacher consultation services and therefore opted to not engage in intervention implementation. In comparison, teachers without a graduate degree may feel a greater need for consultation related to the skills required for implementing more intensive interventions. Although this finding was not anticipated, it appears that teachers without a graduate degree are more likely to find an active intervention preferable than teachers who earned a graduate degree. This finding is similar to results from a meta-analysis showing that paraprofessionals (i.e., trained parents or teachers) produced larger overall treatment effects than therapists or professional student therapists, especially for acting-out problems in children (Weisz et al., 1995). Thus, it may be that teachers with less formal training might be open to and may be more effective in implementing active interventions for acting-out behaviors. Future studies might further explore how teacher education may impact preferences for intervention intensity.

Limitations

The findings presented must be considered within the context of the study's limitations. First, study findings may not generalize to elementary school teachers in the USA.

According to the National Center for Education Statistics (2020), most elementary school teachers are female (77%) and have at least 10 years of teaching experience (61%). The cross-sectional study utilized an MTurk sample that was 54% female with an average of 6 years of teaching experience. Future research might examine teachers' preferences for intervention intensity within a more representative sample. Additionally, teacher barriers were not assessed in the current study. Given that teacher barriers are associated with intervention acceptability (Long et al., 2016), and presumably teachers' preferences, it is critical that subsequent studies investigate how barriers may impact preferences for intervention intensities. Additionally, although this study showed trade-offs made by teachers in the time and effort required, we did not examine teachers' preferences for *how* they spend their time, e.g., instruction versus on preparation attributes, and did not include a financial demand attribute. Inclusion of these additional attributes in a conjoint study examining their influence on teachers' choices would be telling.

Another limitation of the study is the use of the "as needed" level to measure teachers' preferences for process attributes. As stated by Long and colleagues (2016), the "as needed" category may be interpreted as being more or less frequent than the other response options. This discrepancy could have skewed the number of teachers found to prefer a low-intensity intervention (34%). It is recommended that future studies use more objective descriptions to measure the frequency of intervention component delivery. Finally, while DCEs have been found to accurately predict consumer's decision making, research is needed to confirm whether this novel method can accurately predict the selection of mental health services.

Conclusions

The current study used conjoint analysis to measure teachers' preferences for intervention intensity. This method advances the measurement of preferences for intervention attributes, thus improving our understanding of teacher characteristics that predict preferences for intervention packages. Findings indicated that more teachers preferred a medium-intensity intervention than low- or high-intensity interventions, and teachers with greater mental health literacy were more likely to select a medium-intensity intervention than no intervention. Highlighting preference variations may inform developers on how interventions can be tailored to match teachers' preferences and subsequently improve student outcomes (Coles et al., 2015; Ennis et al., 2016). Additionally, identifying teacher preferences allows opportunities for teacher consultants to later guide teachers to accept more effective evidence-based practices (Andersen & Daly, 2013), such as when the evidence-based practice calls for more

intensive strategies. A key implication of our findings suggests that some teachers may be less willing to implement more intensive interventions, despite their strong preference for optimal student outcomes (Egan et al., 2019). Other teacher characteristics that may serve as teacher barriers should be examined to further understand what factors may contribute to intervention preference and implementation.

Funding Funding was provided by National Science Foundation (Grant No. 1659455).

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