

September 2022

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Recommended Citation

Griendling, L. M., VanUitert, V. J., & McDonald, S. M. (2022). Are students' basic psychological needs fulfilled in remote learning environments?: A mixed methods study. *Middle Grades Review*.

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Cover Page Footnote

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Are Students' Basic Psychological Needs Fulfilled in Remote Learning Environments?: A Mixed Methods Study

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Abstract

Self-determination theory (SDT) posits that three basic psychological needs (i.e., autonomy, competence, and relatedness) must be fulfilled to promote positive outcomes among individuals participating in social environments. Teachers can provide supports to fulfill these needs within classroom environments to help them become autonomously motivated to engage in tasks and activities. Unfortunately, school closures and the shift to remote learning during the COVID-19 pandemic may have challenged teachers' ability to create need-supportive classroom environments due to issues such as reliable access to technology, teacher preparedness in facilitating remote learning, and negative impacts to mental health and well-being. However, the extent to which these challenges impacted students' basic need fulfillment has not been investigated to date. Thus, the purpose of this convergent mixed methods study is to evaluate remote teaching from multiple perspectives in order to gain a more complete understanding of the types of strategies that are employed in remote classes, as well as the extent to which teachers, students, and parents perceive remote learning environments as being supportive of students' autonomy, competence, and relatedness needs. Teachers ($n = 17$) from two middle schools were observed providing remote instruction, and they, along with students ($n = 11$) and parents ($n = 10$), participated in a survey and interviews that provided further insight into basic need fulfillment in remote environments. Implications for the field are discussed.

Introduction

Adolescence is perhaps the most complex developmental phase in one's life, as individuals at this stage are simultaneously navigating major physiological, educational, and social role transitions (Bandura, 1986). While physical and emotional changes from the onset of puberty are occurring, the transition to middle school presents a major environmental change, tasking adolescent students with mastering more complex academic and social skills, and challenging their sense of efficacy in different social contexts (Bandura, 1986, 2001, 2006). When unique social conditions such as pandemics or political changes transpire, the way in which adolescents manage constraints and capitalize on situations can significantly impact their life trajectory (Bandura, 2006). As adolescents often do not have direct control over these unique social conditions, they may seek an authoritative figure with access to resources and expertise to assist them in progressing toward a more positive life trajectory (Bandura, 2006; Brandstädter, 1992). In the social environments of schools and classrooms, teachers often assume this role as they are tasked with providing various structured supports that guide

adolescent students toward positive academic and social outcomes.

To facilitate such positive outcomes, self-determination theory (SDT) posits that three basic psychological needs must be fulfilled (Ryan & Deci, 2000). These three basic needs include (a) autonomy (i.e., feeling as though they have control over or choice in the tasks they engage in); (b) competence (i.e., feeling capable of successfully engaging with tasks); and (c) relatedness (i.e., feeling connected to and supported by others participating in that environment). Additionally, the three needs of autonomy, competence, and relatedness are interrelated. Therefore, when teachers provide supports or scaffolds that fulfill these needs within the classroom environment (e.g., demonstrating warmth and respect toward students, providing a rationale for task engagement, appreciating and acknowledging students' perspectives), relationships are enhanced, adolescent students feel a greater sense of competence, and they become more autonomously motivated to engage in tasks and activities (Deci & Ryan, 2008; 2014).

Unfortunately, school closures and the shift to remote learning due to the COVID-19 pandemic

may have challenged teachers' ability to create classroom environments that are supportive of adolescents' basic psychological needs. While the quick conversion to online learning systems is commendable, barriers such as equitable access and teacher preparedness in facilitating remote learning impacted many students' ability to participate successfully (Cicero et al., 2020; Van Lancker & Parolin, 2020). The COVID-19 pandemic also negatively impacted social well-being and mental health, as students reported feelings of isolation and increased anxiety due to the ongoing uncertainties around returning to school, physical health and safety, and familial financial stability (Dorn et al., 2020; Praghlapati, 2020), compromising students' engagement and academic achievement (Dorn).

The aforementioned challenges brought to light during the COVID-19 pandemic are not surprising, as a lack of interaction, community, accessibility, and management are previously cited challenges across the remote learning literature base (Arkorful & Abaidoo, 2015; Arnesen et al., 2020; Greer et al., 2014). Considering these past and present challenges, however, calls to question the adequacy of remote learning environments in fulfilling students' autonomy, competence, and relatedness needs. While teacher support and opportunities for interaction among peers have been shown to heavily influence adolescent students' motivation in online learning formats, access to and support with technology also significantly impacts motivation (Azaiza, 2011; Mupinga, 2005; Roblyer & Marshall, 2003; Weiner, 2003). As reliable access to and support with technology was absent for many students during the COVID-19 pandemic (Cicero et al., 2020; Van Lancker & Parolin, 2020), and when taken in conjunction with the negative impacts to mental health and social well-being (Dorn et al., 2020; Praghlapati, 2020), students may have felt less connected to and supported by their teachers and peers, contributing to feelings of being incapable of success and, therefore, decreasing their autonomous motivation to participate in remote learning environments (Deci & Ryan, 2000). Yet, the extent to which these challenges impacted students' basic need fulfillment has not been investigated to date.

Therefore, the purpose of this study is to evaluate remote teaching from multiple perspectives in order to gain a more complete understanding of the types of strategies that are employed in remote classes, as well as the extent

to which teachers, students, and parents perceive remote learning environments as being supportive of their autonomy, competence, and relatedness needs. With this knowledge, we hope to increase understanding of what is working and where additional research and strategy development is needed to facilitate effective, supportive remote learning experiences in the future. Using a convergent mixed methods approach, we seek to answer the following research questions:

(RQ1) Do differences exist between participants' perceptions of basic need fulfillment when reflecting on students' prior in-person learning experiences versus remote learning?

(RQ2) What types of need-supportive practices/strategies are teachers employing in remote learning environments, and how often are they employed?

(RQ3) What do students, parents, and teachers perceive as the least and most challenging aspects of learning and teaching remotely?

Method

Participants

Participants in this study comprise three of the key stakeholder groups involved in the remote learning educational experience: teachers, students, and parents/guardians. Due to rapid school closures that resulted in immediate, substantial changes to the typical public school experience at the onset of COVID-19, access to participants proved challenging. Therefore, a convenience sample was used across all participant groups. Following study approval from the Institutional Review Board, the superintendents and building-level administrators of two middle schools located in two different school districts within the southeastern region of the US provided consent for participant recruitment within their school communities. The study took place during the 2020-2021 academic year, and both schools were operating on a hybrid model with some students attending in-person classes in rotating groups twice per week, while others whose parents opted to keep them at home learned remotely. A total of 39 total participants consented into the study. This included 17 teachers, as well as 10 parents and 11 students. Each participant group is described in greater detail below.

Teachers

The principals of the two middle schools that agreed to participate in the study sent emails to all teachers seeking their voluntary participation and seventeen teachers were recruited (five from School #1 and 12 from School #2). If they indicated interest in participating, the principal investigator provided details about the study procedures, as well as the consent form requiring their signature. Teachers were asked to participate by completing a researcher-developed survey measure (see the Measures section, below) and allowing two observations of their remote instruction to identify the types of instructional strategies that were being utilized in remote environments. Additionally, teachers were able to opt into a third follow-up interview component. Each teacher participant was offered either a \$20 gift card award for participating in the two primary components or a \$30 gift card for participating in all three components. Since the instructional strategies described as supportive of the three basic needs of SDT are not specific to course-type, teacher participants could teach any content area (i.e., English, Math, History, or Science) or elective course (e.g., Art, PE/Health, Chorus, Band, etc.). Demographic information for all teacher participants is provided in Table 1.

Table 1

Demographic Characteristics of Teacher Participants

Gender, <i>n</i> (%)	
Male	2 (11.8%)
Female	15 (88.2%)
Race/Ethnicity, <i>n</i> (%)	
White/Caucasian	16 (94.1%)
Bi-racial/Multi-racial	1 (5.9%)
Age (years)	
Mean (SD)	41.5 (11.2)
Level of Education, <i>n</i> (%)	
Bachelor's Degree	7 (41.2%)
Master's Degree	10 (58.8%)
Teaching Experience, <i>n</i> (%)	
1-3 years	3 (17.6%)
4-10 years	1 (5.9%)
11-15 years	3 (17.6%)
More than 15 years	10 (58.8%),
	<i>M</i> = 22.1 years
Grade Level Taught, <i>n</i> (%)	
6 th Grade	7 (41.2%)
7 th Grade	6 (35.3%)

Multiple Grade Levels Content Area(s) Taught, <i>n</i> (%)	4 (23.5%)
English/Language Arts	2 (11.8%)
Mathematics	3 (17.6%)
History/Social Studies	2 (11.8%)
Special Education*	4 (23.5%)
Elective	4 (23.5%)
Multiple Content Areas	2 (11.8%)
Instructs Students with Disabilities, <i>n</i> (%)	17 (100%)
Yes	

Note. *Among the four special educators in the sample, one provides services in a general education History classroom, two provide services in general and special education Math classrooms, and one provides services in general and special education English classrooms.

Table 2

Demographic Characteristics of Parent/Guardian and Student Participants

Parents/Guardians:	
Gender, <i>n</i> (%)	
Female	10 (100%)
Race/Ethnicity, <i>n</i> (%)	
White/Caucasian	10 (100%)
Age (years)	
Mean (SD)	45.8 (8.1)
Level of Education, <i>n</i> (%)	
High School	2 (20%)
Trade/Certificate Program	1 (10%)
Bachelor's Degree	3 (30%)
Master's Degree	4 (40%)
Child w/ a Disability, <i>n</i> (%)	2 (20%)
Yes	8 (80%)
No	
Students:	
Gender, <i>n</i> (%)	
Male	2 (18.2%)
Female	9 (81.8%)
Race/Ethnicity, <i>n</i> (%)	
White/Caucasian	10 (90.9%)
Latin-x/Hispanic	1 (9.1%)
Age	
11	1 (9.1%)
12	6 (54.5%)
13	4 (36.4%)
Grade Level,	
6 th grade	6 (54.5%)
7 th grade	4 (36.4%)
8 th grade	1 (9.1%)

Students & Parents/Guardians

To recruit student and parent/guardian participants, the principals of the two participating middle schools sent an email asking the parents/guardians of all middle school students who were learning remotely to contact the principal investigator if they and their children were interested in participating in the study. Students and their parents/guardians were asked to participate in the survey component of the study, and were also given the option to participate in a follow-up interview. Student and parent/guardian participants were each given a \$10 gift card award for completing their respective survey forms. If they also opted into the interview component, their gift card values were increased to \$20 per person. To qualify for participation, parents/guardians had to have a child who was currently learning remotely at one of the two participating middle schools. There were 10 parents/guardians (five from School #1 and five from School #2) who consented to participate in the study. Parents/guardians consented to 11 students' participation (five from School #1 and six from School #2). One parent from School #2 had twins who were both learning remotely, so they were asked to complete the survey measure twice (reflecting on each student's experience

separately). Thus, the survey sample reflects 11 parent/guardian responses and 11 student responses. Table 2 includes demographic information for student and parent/guardian participants.

Measures

The measures used for the purposes of data collection include: (a) two observations of teachers' remote instruction; (b) administration of a survey measure developed by the principal investigator that relates to the three basic needs of SDT; and (c) individual, semi-structured interviews with all participants who elected to participate in this final component. Each component is described below.

Observations

All teachers were asked to participate in two observations of their remote instruction to identify the types of practices/strategies they employed to support fulfillment of students' autonomy, competence, and relatedness needs. Table 3 provides an overview of the need-supportive practices that observers watched for, and frequency counts were gathered for each practice.

Table 3

Descriptions of Need-Supportive Teacher Behaviors to Observe

Teacher Behaviors	Description
Provides clear expectations and/or goals	"The goal for today is..."; "Remember, being respectful means..."; "By the end of our class today you will be able to..."
Provides a meaningful rationale for learning	"When you understand what it means to <i>persuade</i> someone, it will help you with some writing tasks, making an argument in class discussions, and making a case for the things you want your parents to get you!"
Provides positive and constructive feedback	Feedback is positively stated and specific to aid students' understanding, engagement, and completion. (e.g., "I love that you're sticking with this tough task. Talking with your partner about X could be help you figure this out together!")
Elicits and values student input	Asks about, and/or responds to students' thoughts, feelings, preferences, goals, etc.
Incorporates students' interests, preferences, and/or goals	Evidence of student interests/preferences/goals in instruction and activities

Uses non-controlling language	Uses phrases like "I would suggest..." or "You might try..."; avoiding controlling terms like <i>should</i> and <i>have/need to</i> (e.g., "You need to do this.")
Activities are structured for optimal challenge	The tasks/activities students engage in are not too easy, not too hard – they are designed at that 'just right' level to avoid student frustration and disengagement.
Incorporates cooperative learning activities	Provides opportunities for students to engage in pairs/small groups with peers to collaborate on tasks/activities.
Incorporates activities to build classroom community	Engages students in brief conversations that value their perspectives on a variety of topics (e.g., question of the day, quote of the week)
Communicates perspective-taking/empathy	Responds to students with phrases like, "Yes, I also think this one can be challenging" or "I can totally understand that."
Praises and encourages students	"Excellent job on this problem!"; "You're doing great work, keep it up!"; "I know you can do it!"
Demonstrates patience to allow students time to work through tasks	Students are provided ample time and feel comfortable working at their own pace. The teacher avoids phrases like "You're running out of time!" and may reassure students with comments like, "Don't stress, you have plenty of time. Keep it up!"
Provides scaffolded supports	Adjusting the level of assistance provided to students so that they do not become frustrated; offering hints/reminders.
Provides opportunities for students to take ownership/initiative in learning	Students are given meaningful choices in tasks and/or tasks are designed to engage interests.

While both schools were operating on a hybrid schedule, teachers in School #1 provided instruction to in-person and remote students simultaneously; whereas teachers' schedules in School #2 were structured so that they each had one fully remote class period per day. For School #1, the researchers were asked to conduct synchronous observations by attending teachers' regularly scheduled class meetings during a mutually agreed upon time. As the purpose of the observations was to understand what need-supportive practices/strategies teachers employed to support remote students, but teachers in School #2 were attending to both in-person and remote students simultaneously, teachers' actions were only recorded when they were directed toward one of the students who was attending class remotely. The teachers provided links to the meeting room that their remote students used, and these synchronous observations lasted for the entire duration of the class meeting. The average length of the synchronous class observations was 57.5 minutes and ranged from 11 minutes to 73

minutes. In the case of the 11-minute synchronous observation, the teacher only had one remote student in this 8th grade guitar/band class, and the student signed on to check in and was then given permission to sign off for independent practice. Across all classes, remote students were allowed to sign out of the virtual meeting room once instruction and any assigned tasks were completed.

In School #2, the building-level administrator requested that researchers conduct asynchronous observations of teachers' remote instruction, and teachers were asked to send video recordings. To ensure anonymity, and as the focus of the observations was teachers' actions, the building-level administrator asked teacher participants to blur the images of students faces or names as they appeared on the screen. While there were 12 teacher participants in School #2, one teacher only completed the survey and never provided the two requested video recordings for this observation component, and another teacher only provided

one video. Further, four general educators and four special educators who were partnered as co-teachers in inclusive content area classes opted to participate in the study together, and they provided video recordings of their co-taught classes. Co-teaching pairs were asked to share two videos of their co-taught classes and each video was viewed twice (one time for each teacher) to capture each individual teacher's actions separately. Thus, a total of 13 video recordings were collected and 21 asynchronous observations were conducted. Video recordings ranged from 24 minutes to 76 minutes in length, with an average of 56.5 minutes.

Interobserver Agreement. The principal investigator provided training to two independent observers who double-coded 20% of the 10 synchronous and 24% of the 21 asynchronous observations. Interobserver agreement was 67% and 87% for the two double-coded synchronous observations, and ranged from 67% to 100% for the five double-coded asynchronous observations, for a cumulative average of 77% agreement. All discrepancies were reconciled through discussion until 100% agreement was reached.

Basic-Need Satisfaction Online Survey

The Basic-Need Satisfaction Online survey measure was developed by the principal investigator and includes three separate forms for student, parent/guardian, and teacher participant groups. In addition to demographic information, the student and parent/guardian forms include additional items asking about the extent to which parents/guardians were available to support students while participating in remote classes due to the potential effects this could have on students' need fulfillment. In addition, the teacher form includes an item asking teachers to indicate their level of comfortability with providing remote instruction. Further, it should be noted that while there were 10 parent/guardian participants, 11 responses were recorded as one parent was asked to submit two responses—one response for each of her twin children. The survey yielded quantitative and qualitative data through a series of Likert-type and open-ended items centered around the three basic psychological needs of SDT (i.e., autonomy, competence, relatedness). Additional open-ended items were included to gather broader perspectives on remote learning and teaching experiences, such as "What aspects of teaching

remotely are most challenging?" and "What do you like most about learning remotely?" To determine if differences in basic need fulfillment exist between past, in-person learning and remote learning, the survey includes two sets of similarly-worded Likert items. To identify potential relationships between groups, all items are stated in a way that focuses on students' need fulfillment. A 4-point scale was used, with responses ranging from *definitely false* (0) if the statement applied to none of the respondent's classes, to *definitely true* (3) if the statement applied to all of the respondent's classes. An example is provided in Table 4.

Table 4

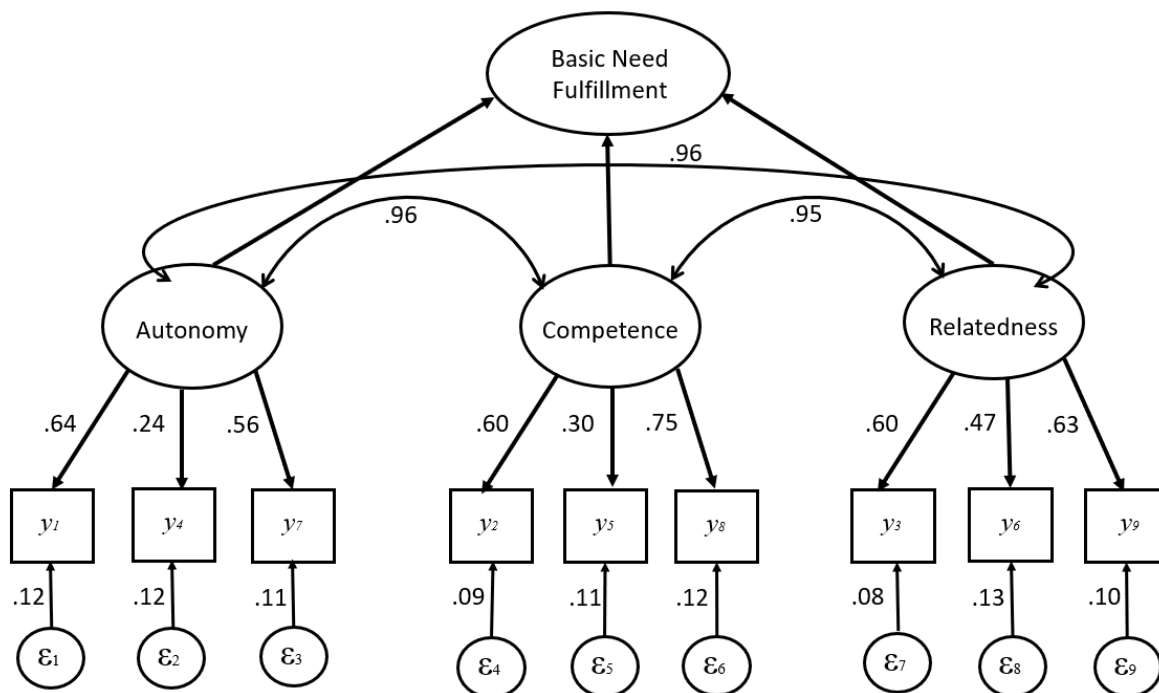
Example of Likert Items Across Student, Parent, and Teacher Forms

In-Person Learning Items	Remote Learning Items
S: I felt like I had choices in activities when learning in the classroom.	S: I feel like I have choices in activities while learning remotely.
P: My child was provided with choices in activities when learning in the classroom.	P: My child is provided with choices in remote learning activities.
T: I gave my students choices in activities as often as possible when teaching in person.	T: I give my students choices in activities as often as possible when teaching remotely.

A theoretically-driven confirmatory factor analysis (CFA) was estimated to establish validity of the Likert items included in the survey. As reflected in the model shown in Figure 1, SDT posits that the three latent variables of autonomy, competence, and relatedness are interrelated and, therefore, are expected to be correlated. A range of model fit indices were evaluated, including the model chi-square statistic ($\chi^2 = 30.40, p = .17$), standardized root mean square residual (SRMR = 0.07), root mean square error of approximation (RMSEA = .08), and the comparative fit index (CFI = 0.97) indicated that the model was an appropriate fit for the data (Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2005). Factor loadings are shown in Figure 1.

Figure 1

Theoretical CFA Model



Interviews

The teacher and parent/guardian survey forms include a final item that asks if they would be willing to participate in individual, semi-structured interviews. Parents/guardians are also asked to indicate if they would grant permission for their child's participation in an interview. If participants indicated consent via the survey form, an email was sent including a link to schedule a time for the interview with the principal investigator. Interview questions sought additional broad reflections from participants on their experiences with teaching and learning remotely, as well as specific information related to the three basic needs of SDT. For example, teachers were asked "Can you describe in detail what the most and least challenging aspects of remote teaching have been for you?" and "Are there particular strategies that you try to implement to support students' sense of relatedness with others in the classroom?" Students were asked "What types of things do your teachers do to help you while you've been learning remotely?" and "Do you feel like you've been able to build relationships with your teachers and the other kids in your classes while learning remotely this year? If so,

can you think of anything your teachers did to help you connect with others?"

All five teachers from School #1, and 11 out of 12 of the teachers from School #2 opted to participate in follow-up interviews. Additionally, four parents agreed to participate in the interview component, and also consented for their student's participation. As one parent is a mother of twins, five total students participated. Student assent was sought at the start of each interview.

Analysis

Quantitative data yielded from the aforementioned Likert items were analyzed to determine whether differences existed between participants' perceptions of basic need fulfillment during remote versus in-person learning experiences. The Shapiro-Wilkes test of normality revealed that data were non-normally distributed; therefore, a Wilcoxon signed-rank test was conducted, a nonparametric test equivalent to the dependent t-test. Data collected during synchronous and asynchronous observations yielded quantitative data in the form of frequency counts, as well as qualitative,

anecdotal notes about the types of need-supportive practices that teachers employed in remote learning environments.

Responses to open-ended items on the survey measures, as well as interview questions, yielded qualitative data related to student, parent/guardian, and teacher perceptions of the least and most challenging aspects of remote learning and teaching. All qualitative data (i.e., open-ended survey item responses and interview transcripts) were read line by line and ideas within the documents and categorical analysis (Constas, 1992) was used to code responses. Codes were developed both *a priori* and *a posteriori* in an iterative manner, with three *a priori* codes developed from the three basic needs of self-determination theory (i.e., autonomy, competence, and relatedness; Deci & Ryan, 2000), and 11 *a posteriori* codes developed from themes that emerged within participants' responses about least/most challenging aspects of remote teaching and learning.

Results

Research Question 1: Differences in Perceptions of Basic Need Fulfillment

To understand whether differences exist between perceptions of basic need fulfillment in remote versus in-person learning environments,

participants' responses to the two sets of Likert items were compared using a Wilcoxon signed-rank test. Collectively, participants' perceptions significantly differed, with most participants indicating that students' autonomy ($n = 18$; $p = .02$), competence ($n = 19$; $p = .002$), and relatedness ($n = 22$; $p < .001$) needs were less fulfilled in remote learning environments. However, when parsing out the rankings by participant group, this was the predominant perception only among most teachers and parents/guardians, while most students suggested that all three of their basic psychological needs were equally fulfilled when learning in either environment. Regarding autonomy, most teachers ($n = 9$; $p = .01$) and parents ($n = 5$; $p = .44$) felt that this was less fulfilled in remote environments, whereas most students ($n = 5$; $p = .69$) felt that this need was equally fulfilled whether learning in person or remotely. Most teachers ($n = 10$; $p = .01$) and parents ($n = 6$; $p = .13$) also felt that competence was less fulfilled in remote environments, while most students ($n = 6$; $p = .81$) indicated both environments fulfilled their competence need equally. Lastly, most teachers ($n = 11$; $p = .003$) and parents ($n = 8$; $p = .02$) indicated that students' relatedness need was less fulfilled in remote environments, while most students ($n = 6$; $p = .56$) suggested this was fulfilled equally when learning remotely or in person. These results are shown in Table 5.

Table 5

Results of Wilcoxon Signed-Rank Tests Comparing Perceptions of Students' Basic Need Fulfillment (Remote vs. In-Person Learning)

	All Participants				Teachers				Students				Parents			
	<i>n</i>	Sum of Ranks	<i>z</i>	<i>p</i>	<i>n</i>	Sum of Ranks	<i>z</i>	<i>p</i>	<i>n</i>	Sum of Ranks	<i>z</i>	<i>p</i>	<i>n</i>	Sum of Ranks	<i>z</i>	<i>p</i>
Autonomy																
R > IP ^a	5	158	-2.4	.02	1	10	-2.6	.01	2	20.5	-0.5	.69	2	18	-0.9	.44
R < IP ^b	18	486			9	115			4	30.5			5	38		
R = IP ^c	16	136			7	28			5	15			4	10		
Competence																
R > IP ^a	4	120	-2.9	.002	1	9.5	-2.8	.01	2	18	-0.4	.81	1	11	-1.6	.13
R < IP ^b	19	524			1	122.5			3	27			6	45		
R = IP ^c	16	136			6	21			6	21			4	10		
Relatedness																
R > IP ^a	4	76	-3.8	.0001	1	8	-2.9	.003	2	16	-0.6	.56	1	4	-2.5	.02
R < IP ^b	22	613			1	130			3	29			8	59		
R = IP ^c	13	91			1				6	21			2	3		

Research Question 2: Need-Supportive Practices Employed in Remote Environments

The three need-supportive practices that teachers employed most frequently in remote learning environments included (a) praising and encouraging students, (b) eliciting and valuing student input, and (c) providing scaffolded supports. Teachers offered students praise and encouragement a total of 311 times across all observations; however, the frequency of this practice ranged from 0 to 50 instances per each individual observation. Further, teachers' praise and encouragement usually took the form of generic statements, such as "Great job!" or "Wonderful!" Teachers were observed eliciting student input a total of 298 times, with the frequency of this practice ranging from 0 to 61 occasions per each separate observation. Aside from one pair of co-teachers who engaged students in non-academic conversations through a "Question of the Day" during the first 10 minutes of each class, teachers typically elicited student input through questions that focused on the content addressed in class (i.e., "Can someone tell me the answer to...?"). Finally, teachers scaffolded the level of support that they provided to students a total of 150 times and individual observations of this practice ranged from 0 to 17 times. Scaffolds primarily took the form of verbal (e.g., rephrasing questions or directions; providing verbal prompts to guide students through activities) and visual (e.g., displaying slides/activities through the screen sharing function) support.

The three need-supportive practices that teachers employed least frequently in remote

environments were (a) incorporating cooperative learning activities, (b) providing a meaningful rationale for learning, and (c) providing opportunities for students to take ownership or initiative in learning. Regarding incorporation of cooperative learning activities, this practice was only seen one time across all observations, when an elective teacher from School #1 had in-person students collaborating with remote students to write stories using a web-based program. Teachers provided a meaningful rationale for learning a total of 14 times with a range of 0 to 3 times per each separate observation, and this practice was predominantly seen in elective courses (e.g., explaining why band students need to practice their instrument, or how the career and life readiness course will get students thinking about goals for the future). Finally, teachers provided opportunities for students to take ownership or initiative in learning a total of 26 times across all observations, with a range of 0 to 6 instances per a single observation. This practice usually involved giving students the option to remain online while they worked or to sign out of the virtual meeting room and work independently at home. However, some teachers also tried to design activities that would engage students' interests and/or offer students some type of choice in activities to complete. In a seventh grade history class, for example, students were asked to choose a historical figure that they were learning about in class and create a fake social media profile describing details about the historical figure's life from a first-person perspective. The frequency counts for all 14 need-supportive practices and the range per observation is provided in Table 6.

Table 6

Frequency and Range Per Observation of Need-Supportive Practices Observed

Practice	Freq.	Range
Provides clear expectations and/or goals	56	0-5
Provides a meaningful rationale for learning	14	0-3
Provides positive and constructive feedback	83	0-11
Elicits and values student input	298	0-61
Incorporates students' interests, preferences, and/or goals	34	0-6
Uses non-controlling language	60	0-8
Activities are structured for optimal challenge	33	0-4
Incorporates cooperative learning activities	1	0-1
Incorporates activities to build classroom community	53	0-11
Communicates perspective-taking/empathy	47	0-6

Praises and encourages students	311	0-50
Demonstrates patience to allow students time to work through tasks	60	0-8
Provides scaffolded supports	150	0-17
Provides opportunities for students to take ownership/initiative in learning	26	0-6

Research Question 3: Least and Most Challenging Aspects of Remote Learning/Teaching

Teachers and parents/guardians who agreed to participate in follow-up interviews were asked to explain what aspects of remote teaching/learning they found the least and most challenging. This question was rephrased for students, asking them to describe what they liked most or least about learning remotely. Regarding the least challenging aspects of remote teaching, technology was referenced the greatest number of times among teachers. One teacher discussed in reference to her co-taught math class, "We've tried a lot more technology-based games in the [remote] classroom, which engages kids way more...and helps us learn about and relate to them." While this particular teacher found a way to use technology as a means for connecting with students and keep them engaged, teachers overall found that connecting with and engaging students in remote instruction was the most challenging aspect of this experience, with many of them indicating that schoolwide requirements for student cameras to remain off as a major barrier. For example, one teacher states "So, what we found hard...is making the connection with students. We don't know what they're doing behind their screen. We don't know if they're signing on and then stepping away."

Parents' and students' most frequently referenced themes were the same when discussing the least and most challenging aspects of remote learning. The least challenging aspect according to parents and students was the flexible pace of remote schooling, with four references from students and three references from parents. When asked what they like most, one student stated,

Probably the breaks in between classes 'cause sometimes it's a check-in so you don't have to stay in [the virtual meeting room] for very long and then you can have time to study...I can take as long as I want on some assignments and it's not like a rush.

Similarly, one parent responded,

I think that learning virtually and mostly being at home during the pandemic has just slowed everything down. It's allowed for more down time, more family time, more rest at night. I think the slower pace has been welcomed.

Regarding the most challenging aspect, students and parents referenced missing friends and the usual routine of in-person schooling on four and three occasions, respectively. According to one parent,

I think emotions of like sadness or depression would set in at various points throughout the year because she missed the socialization aspect...not having like the physical activity of...changing classrooms or running into people in the hallway...getting to know your teachers...I think that was hard.

Likewise, a student indicated,

I don't like how I don't really get to see my friends a lot. I know people in my classes last year, but I don't have any friends in my classes this year and sometimes it's kind of hard if you don't fully like know somebody that well in your class. So, I do miss my friends.

Discussion

Adolescents need to feel a sense of relatedness with others and competence with classroom tasks in order to become autonomously motivated and engaged in learning. However, the rapid shift to remote learning following school closures at the onset of the COVID-19 pandemic challenged teachers' ability to create learning environments that are supportive of these basic psychological needs. Teacher support, opportunities for interaction among peers, as well as access to and support with technology have been shown to heavily influence adolescent students' motivation in online learning formats (Azaiza, 2011; Mupinga, 2005;

Roblyer & Marshall, 2003; Weiner, 2003). Further, with reports of negative impacts to mental health and social well-being (Dorn et al., 2020; Pragholapati, 2020), students may have felt less connected to and supported by their teachers and peers, contributing to feelings of being incapable of success and, therefore, decreasing their autonomous motivation to participate in remote learning environments (Deci & Ryan, 2000).

When taken together, the quantitative and qualitative data resulting from this study corroborate some of these challenges and suggest that adolescents' autonomy, competence, and relatedness needs were, perhaps, less fulfilled in remote versus in-person learning environments. Reflecting upon observation data, teachers' remote instruction often lacked implementation of need-supportive strategies. Across a total of 31 observations of remote instruction, there was just one occasion where a teacher incorporated an activity that allowed for peer collaboration, and more than half of the other need-supportive strategies were observed less than 10 times in a single observation that averaged approximately one hour in length. Further, student and parent interview responses specifically point to a lack of connection with peers, and teachers echo this challenge as they indicate through survey responses that students' relatedness need was less fulfilled in remote environments than when learning in person. To that end, it is true that students' responses to the survey items comparing basic need fulfillment in remote versus in-person learning environments suggested feelings of indifference regarding the extent of basic need fulfillment. However, all student and parent/guardian participants also indicated that the parent/guardian was *always* home and available to support the student while learning remotely. As such, the consistent availability of parent/guardian support may have acted as a mediator between the comparative perceptions of basic need fulfillment in remote versus in-person learning environments among the students in this particular sample.

Of concern with regard to this finding is that constant parent/guardian availability and support was unique to this sample of students and, unfortunately, was not the reality for many students outside of this study who were learning remotely during the pandemic. Successful engagement in remote learning environments

requires relationship building among and between the students and teachers participating in that space, and relationship building requires a safe space that promotes regular engagement in open communication (i.e., giving and receiving feedback; Louwrens & Hartnett, 2015). For students who do not yet have the skills to independently engage in such activities, but also do not have parents/guardians readily available to support them in these endeavors from home, teachers' ability to implement need-supportive strategies within remote learning environments would likely be paramount to their success.

The findings of this study also provide information about ways teachers can further enrich remote environments and optimize student learning. For instance, purposeful learning opportunities through small group breakout rooms, wellness check-ins, and whole group discussions may significantly improve student relatedness experiences in the remote environment. In addition, the flexibility offered by learning remotely was a prominent theme that emerged during student and parent interviews and teachers were observed demonstrating patience to allow students time to work through tasks a total of 60 times, with up to eight comments/actions to this effect noted within an individual observation. However, teachers can further enhance flexibility within their remote classrooms by increasing the number of opportunities for students to take ownership or initiative in learning by using, for example, choice boards that offer students meaningful choices in the tasks/activities they are expected to engage in.

Limitations

The most significant limitations within the present study pertained to the participant sample. First, less than half the number of participants required for adequate power were recruited. Onwuegbuzie and colleagues (2004) recommend a minimum sample size of 82 participants for two-tailed, correlational analyses in mixed methods studies. However, despite access to two middle school communities and generous award offerings for participation, recruitment still proved to be a challenge with only 39 total individuals consenting into the study. One of the participating middle schools was the prior employer of the principal investigator and, therefore, old colleagues were contacted personally in an attempt to engage more participants. Yet, responses from those

who declined were indicative of the overall dilemma that we faced in this recruitment process, with most expressing continued discomfort with teaching remotely, and especially with being observed while providing remote instruction.

Second, as a result of the voluntary, convenience sampling procedure used to recruit participants, the sample was largely homogenous in several demographic aspects, with the vast majority of participants across all three stakeholder groups identifying as White females (90%). While this is fairly consistent with nationwide estimates of the teaching population comprising approximately 79% White females (Hussar et al., 2020), this severely limits the generalizability of results garnered from responses provided by student participants and their parents/guardians. Again, in an attempt to engage more participants—particularly those from minoritized racial/ethnic backgrounds—the principal investigator personally contacted teacher participants and asked them to reach out to parents/guardians and encourage their participation. However, none of the parents/guardians who were contacted by these teachers regarding participation responded to the request.

Finally, parent/guardian participants were asked to indicate the extent to which they have been home and available to help their student while participating in remote schooling, with responses ranging from “Never” to “Always.” Among the 10 parents/guardians in the sample, eight indicated that they were always available and two indicated that they were usually available. Parents/guardians also were asked about their personal level of education and the level of support they have been able to provide their student while learning remotely. Responses revealed that all parents/guardians were present in the same room or a separate room as their child, with four parents/guardians also working remotely, and their child could seek help from them throughout most of the day. In addition, all but three of the parent/guardian participants were college educated (Bachelor’s or Master’s degrees). This is consistent with literature suggesting that White students from households of average socioeconomic status are less likely to experience significant learning loss as a result of school closures and remote instruction as compared to low-income, Black and Hispanic/Latin-x students (Dorn et al., 2020). However, this reveals another significant

limitation within the present study, as the distinct remote learning experiences of those who are likely impacted the most by the current educational circumstances are largely unaccounted for.

Future Directions

Based on the aforementioned limitations, an obvious direction for future research endeavors would be to extend this study to a larger, more diverse sample of participants, in addition to accounting for varying levels of parent/guardian support available to students learning from home. Following the initial closures at the end of the 2019-2020 school year, Dorn and colleagues (2020) developed statistical models based on studies comparing the effectiveness of remote learning and traditional classroom instruction to estimate the potential impact of school closures on student learning. They found that the amount of learning loss experienced by students during school closures varies significantly by several factors, including: (a) access to remote learning; (b) the quality of remote instruction; (c) home support; and (d) the degree of engagement. Unfortunately, these projections also suggested that learning loss as a result of the current remote educational circumstances would likely be greatest among low-income, Black and Latin-x students who already experience discrepancies in achievement as large as two years behind that of their White peers from average-income households. This prediction is based upon data suggesting that students from low-income households are less likely to have access to high-quality remote instruction, as well as environments that are conducive to learning (e.g., a quiet space with minimal distractions, high-speed internet, and parental academic support). Data further suggests that only 60% of students from low-income households, versus 90% of high-income students, are logging into remote instructional environments (Dorn). While results of the present study provide insight into the remote learning experiences of a few, in addition to valuable recommendations for fostering remote learning environments that are supportive of students’ basic psychological needs, it is critical that the perspectives of historically underserved students from marginalized sociocultural backgrounds are accounted for in future research.

Conclusion

Adolescence comes with enough challenges without having to navigate a novel learning environment that creates barriers to building meaningful connections with others whom students would typically seek out for support during this life phase. It is crucial for adolescents to feel competent and cultivate positive relationships that facilitate feelings of belonging in order to become autonomously motivated to engage in learning and achieve in school. Unfortunately, meeting these basic psychological needs in remote learning environments proves challenging. The findings from this study offer some evidence with regard to the difficulty of meeting students' autonomy, competence, and relatedness needs when teaching and learning remotely. However, teachers can enhance students' experiences with remote learning by incorporating more meaningful opportunities to connect with peers and adults through use of cooperative learning activities and tools like breakout rooms and choice boards. By feeling more connected to and supported by peers and adults with whom they interact in remote learning environments, students' competence with learning tasks is enhanced, and they become more autonomously motivated and engaged in remote learning.

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