COVID-19 Resources

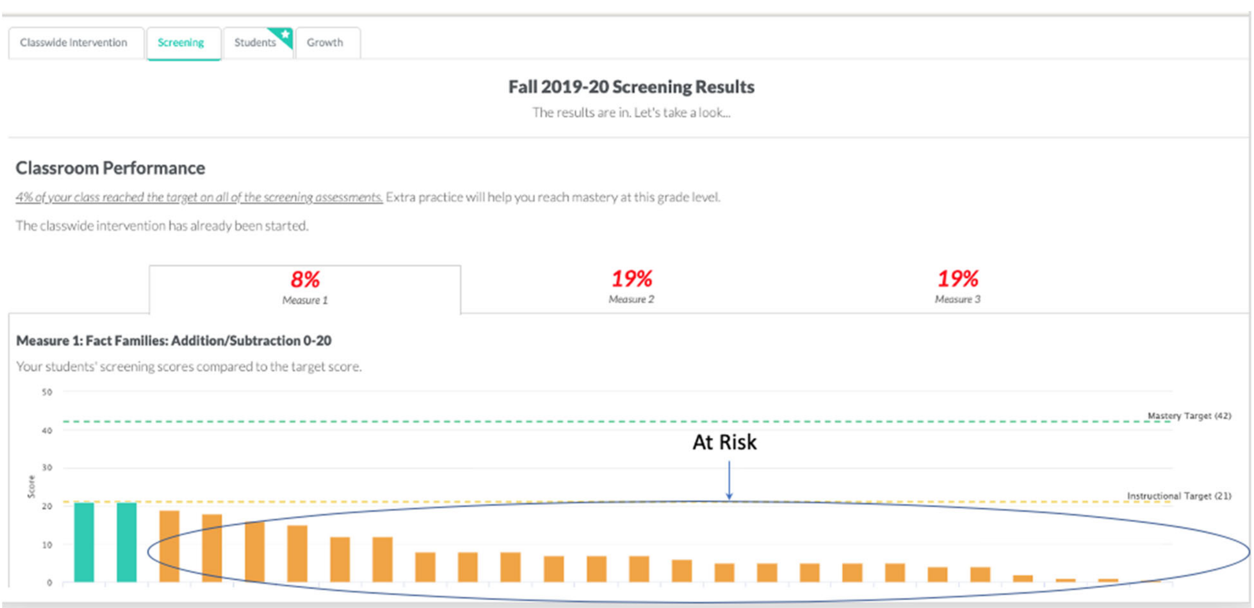
Considerations for Math Intervention Upon the Return to School

The loss of instruction due to COVID-19 closures and the loss of spring testing data creates a perfect storm for school psychologists who wish to meet the needs of diverse learners, including identifying and making eligible those students who are in need of special education. NASP has developed a series of resources and webinars to provide actionable how-to advice to cope with missing academic data, identify children in need of instructional supports, and use the resulting data to inform referral and eligibility decisions. The overarching message in this series is that relying on initial screening assessments will produce unreliable and unusable data regarding actual individual student risk given the scale and scope of lost learning time for most students this school year. Further, it will result in inequitable identification (i.e., overidentification) of marginalized groups. Instead schools should be providing extensive universal academic interventions first to help close the gap for most learners and use those data to identify students who need more intensive, individualized supports. The academic series is available in the NASP COVID-19 Resource Center at www.nasponline.org/COVID-19.

Efficient and Effective Intervention Tactics Are Needed to Produce Learning Gains

Universal screening results are expected to show many children at risk due to loss of instruction in the preceding year, as exemplified in Figure 1.

Figure 1.



With many students at risk, school psychologists may be tempted to institute waiting periods before recommending Tier 2 or 3 interventions as a means to avoid overpopulating those intervention groups and depleting resources. The logic of waiting is to allow the core instruction to impact learning rates and then identify children who are lagging behind their peers after some period of time given normal instruction. Waiting times have not been shown to lower risk over time. At best it is a tactic that will be highly variable (i.e., dependent on the quality of core instruction and teacher-initiated supplementation of core instruction) and at worst it will be much less efficient.

Additionally, because more risk can be expected, systems will be overwhelmed if they try to reduce risk via individually planned and delivered interventions. Relying on tactics like differentiation are not likely to produce the desired gains (Cordray et al., 2012), nor are computer-delivered interventions that take the teacher out of the instructional role (Lenard & Rhea, 2018). Because children will be arriving to school in the fall with skill gaps, the school psychologist can be a key partner in helping teachers boost instruction for all students using class-wide intervention.

Use Class-Wide Intervention to Produce Rapid Learning Improvements

Class-wide intervention is not a new idea and has been demonstrated to be highly useful to improve learning in many research studies in reading and mathematics following Greenwood's (1991) study of class-wide peer tutoring. Common models include: Peer Assisted Learning Strategies (https://frg.vkcsites.org), PRESS Classwide Reading Intervention (https://presscommunity.org), and Spring Math Classwide Intervention (www.springmath.com).

Mathematical success is highly predictable: Children who meet certain expected benchmark skill proficiencies and understandings at certain milestones are likely to experience success in future math instruction. One way to reduce mathematical risk is to build proficiency in essential math skills that can be readily identified at each grade level. Class-wide math intervention is highly time efficient, requiring only about 15 minutes each day to implement. It can be used to supplement any core math curriculum.

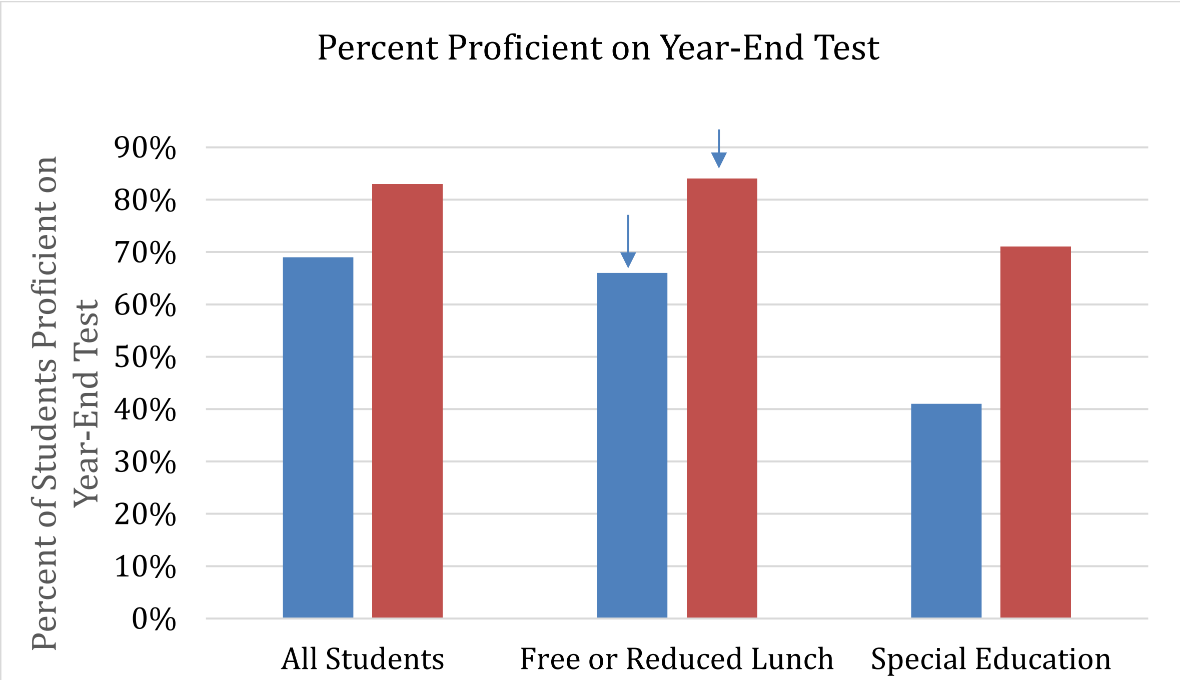
In terms of multitiered systems of supports (MTSS), class-wide intervention can be situated at Tier 1.5, between universal screening and before Tier 2 intervention (Kovaleski, VanDerHeyden, Runge, & Zirkel, in preparation). It functions as both an intervention and a second screening gate and effectively reduces high base rates of risk to permit more accurate screening decisions about which students need intensified instruction at Tiers 2 or 3 (VanDerHeyden, Broussard, & Burns, 2019). A companion resource, *Classwide Math Intervention Protocol*, provides detailed information to conduct evidence-based, class-wide intervention.

What Results Can One Expect From Class-Wide Math Intervention?

Gains on proximal and distal measures. When implemented well, class-wide math intervention can produce robust student growth on curriculum-based measures (Codding et al., 2016) and year-end test scores (VanDerHeyden & Burns, 2005). In a randomized controlled trial (RCT) with 537 students, implementation quality accounted for treatment outcomes in which strong effects were reported across all curriculum-based measurements (CBMs) for Grades 4 and 5 (standardized mean differences effect sizes ranging from .52 to .78 across six CBMs). Moderate effects were reported on the year-end state accountability measure in Grade 4 for all students (effect size = .18) and especially for students who exhibited some type of elevated risk before the intervention began (effect size = .41 for students scoring 1 standard deviation below the mean and .66 for students scoring 2 standard deviations below the mean; VanDerHeyden, McLaughlin, Algina, & Snyder, 2012). Change in percent of students proficient on the year-end test in fourth grade control classrooms and intervention classrooms are shown in Figure 2 for all students and for students who received free or reduced price lunch and for students who were receiving special education.

Strong return on investment. Recent cost effectiveness analysis found that class-wide math intervention can be highly cost effective, yielding incremental cost effectiveness ratios (ICERs) that are far superior to tactics such as changing the math curriculum (ICERs of $53.92 for Spring Math, $66.35 for PALS, and $72.21 for Fraction Face-Off; Barrett & VanDerHeyden, 2020).

Figure 2.

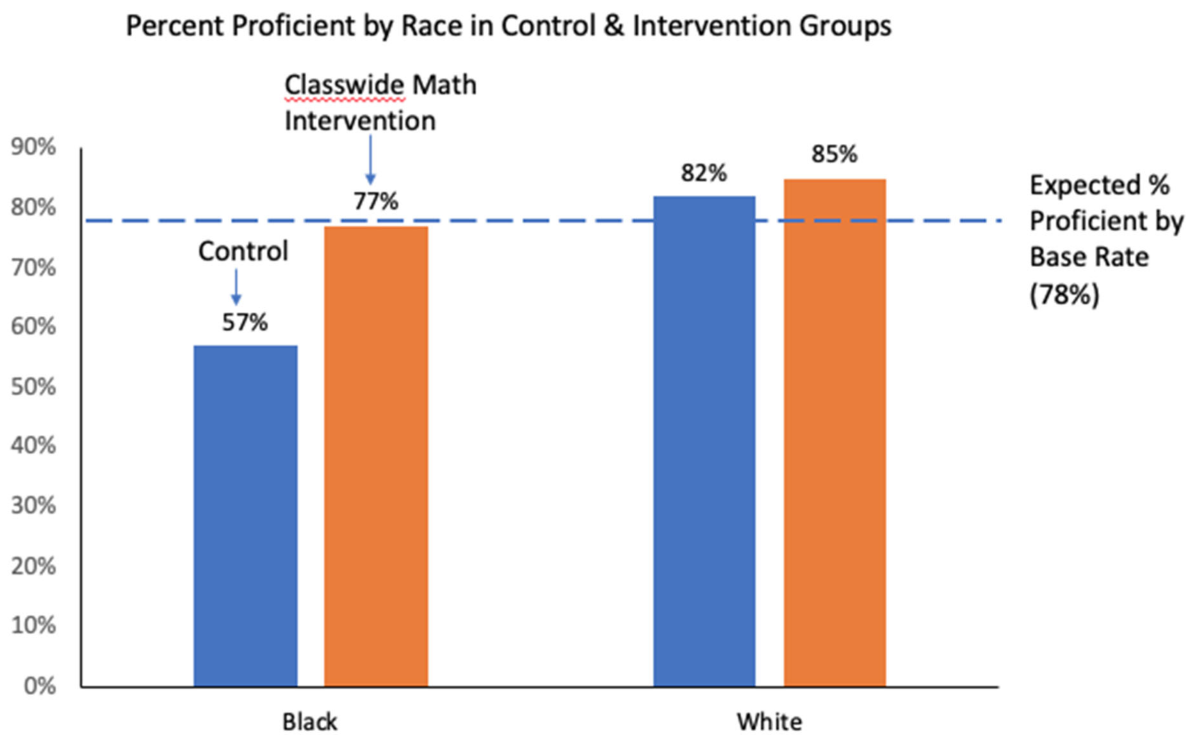


More accurate and equitable identification. Class-wide math intervention yields stronger negative posttest probabilities relative to fall and winter math screenings (VanDerHeyden, Broussard, & Burns, 2019). The negative posttest probability is the probability that a student who has passed the screening was actually at risk and failed the year-end measure, so lower is better and, ideally, negative posttest probabilities should be less than 10% to rule-out risk. A recent study examined negative posttest probabilities at fall and winter screenings and following class-wide intervention for students in kindergarten and Grades 1, 3, and 5. Fall and winter screening negative posttest probabilities ranged from 3 to 12%, whereas class-wide intervention negative posttest probabilities ranged from 4 to 7%, all of which can be used to rule students out as requiring more intensive intervention. Thus, use of class-wide intervention resulted in more accurate determination of risk in reaching a rule-out decision, which is the purpose of academic screening.

Class-wide intervention also contributes to more equitable determination of risk. In a secondary analysis of RCT data, VanDerHeyden and Codding (2015) found disproportionate risk by race, free or reduced price lunch status, special education status, and prior test failure before class-wide math intervention. Race, sex, free or reduced price lunch, special education enrollment, and prior risk were equally represented in intervention and control classrooms. Baseline scores were lower for Black students relative to White students, students who received free or reduced price lunch, students enrolled in special education, and students who performed poorly on the preceding year-end test. Students who experienced greater risk at baseline experienced stronger risk reduction via class-wide math intervention. Following class-wide math intervention, race, free or reduced price lunch status, and special education status was proportionate in the intervention classrooms, but remained disproportionate in the control classrooms.

Multilevel modeling (MLM) found that intervention effects were stronger for students who had failed the preceding year's test, but did not differ by race, free or reduced price lunch status, and special education status. MLM examining CBM effects by the same demographic categories found year-end differences, but only treatment assignment (i.e., being assigned to class-wide intervention) accounted for gains over time on one CBM. On the second CBM, treatment assignment and race accounted for gains over time, with Black students in the intervention group experiencing greater gains over time. Thus, use of static, single-point-in-time screening measures may overestimate risk status among minoritized students (Dupart et al., in press), whereas class-wide intervention produces more equitable risk determination. (See Figure 3.)

Figure 3.



How Can One Effectively Support Implementation of Class-Wide Math Intervention?

School psychologists need to identify and help organize the materials needed for implementation, help organize students into working pairs, identify a scheduled time for the intervention to occur, train the teacher in the basics of the intervention, and ideally be present the first day the intervention is implemented. The teacher must have access to a system to record progress each week. The school psychologist must have a system for monitoring progress, viewing and discussing weekly progress with the teacher, and identifying classes where progress is lagging relative to classes at the same grade level. Weekly in-class coaching during intervention use, especially in classes that are not showing strong growth, is essential to attain and sustain high-quality implementation. Teachers should have frequent feedback (weekly) that provides a visual/graphed summary of student gains and an opportunity to discuss and troubleshoot any barriers to implementation. One of the more expensive ingredients of class-wide math intervention is the integrity monitoring and coaching ingredient (Barrett & VanDerHeyden, 2020); however, it is a necessary active ingredient in the efficacy of the tactic (VanDerHeyden et al., 2012).

Conclusion

School psychologists who adopt class-wide math intervention into their practices and focus on high-quality, sustained implementation at school can expect to see rapid improvements to learning and as a side effect obtain data that they can use with much greater accuracy to determine who is in need of more intensive intervention.

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