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Online Education and the Socioeconomic Achievement Gap: A Solution or a Problem?

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Online Education and the Socioeconomic Achievement Gap: A Solution or a Problem?

Senior Project Submitted to
The Division of Social Studies
of Bard College

by

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Abstract

The socioeconomic achievement gap refers to how students of lower socioeconomic status (SES) underperform academically relative to their higher SES peers. In addressing this issue, researchers have considered online learning as a potential solution. Because online learning platforms provide increased flexibility and access for students, some argue that online education will democratize education and narrow the socioeconomic achievement gap. As such, in recent decades, online learning has increasingly been used as an addition to and, in some cases, even a replacement for in-person learning. A closer examination of the subject, however, reveals that the widespread adoption of online learning may actually exacerbate the achievement gap. This paper focuses on four ways in which online learning can actually widen the achievement gap: exacerbating the educational digital divide, increasing the demands of student self regulated learning, keeping lower SES students in environments not conducive to successful learning, and reducing the possibility of protective social support. However, this paper will also explore ways in which online platforms can be used as a method of narrowing the SES achievement gap. Rather than simply trying to imitate a classroom environment over the internet, online platforms may be used as a tool for socioeconomic integration .

Distance Education and the Socioeconomic Achievement Gap: A Solution or a Problem?

What is the Achievement Gap, and why we should care.

The socioeconomic (SES) achievement gap refers to the finding that students of lower socioeconomic status tend to underperform in school relative to their higher SES peers. A famous early investigation of this achievement gap was done by Coleman et al (1966) two years following the civil rights act in 1964. In response to the bill, the Coleman Report investigated inequities between racial minorities and their white peers in school. The report found that students belonging to racial minorities, who are generally of lower SES than their white peers, had lower levels of academic achievement and were more impacted by the quality of their schools. Although this general finding has been reliably replicated across studies over time, the magnitude and development of this trend has been up for some debate. Karl White (1982) conducted the first meta-analytic study of the socioeconomic achievement gap and claimed that SES only weakly correlated to academic achievement. Another meta-analysis done 23 years later by Sirin (2005) attempted to replicate White's study and found an even smaller effect size for this relationship. Taken at face value, these results would seem to suggest that the achievement gap is not as large an issue as many believe.

A closer examination of their analysis, however, paints a more nuanced picture of the situation. In his meta-analysis, White distinguishes between studies that used aggregated units of analysis, which took the averages of group SES and group achievement and those that used student units of analysis, in which SES and achievement were measured on an individual level.

In other words, a study using aggregated units of analysis would measure how the average SES of a school district would predict the average achievement of its students, while a study using student units of analysis would analyze how an individual's SES would predict their achievement. When student units of analysis were used, the correlation between SES and achievement was indeed weak ($r = 0.24$). However, when aggregate units were used, the correlation was strikingly higher ($r = 0.68$). Similar effects were found in Sirin's (2005) study. White himself admits that "in those cases when an aggregated unit of analysis is appropriate for the questions in which the researcher is interested, SES and academic achievement do appear to be strongly correlated" (White, 1982). As such, a more nuanced interpretation of White and Sirin's studies would be that SES is only a weak predictor of a single student's achievement, but a strong predictor of population-level academic achievement.

This finding is hardly surprising. Aggregated measures eliminate noise in data, thereby tending to yield larger effects. By contrast, data analyzed on an individual level are much more subject to variability and individual differences. As such, it is of little surprise that the correlation between SES and individual achievement is so weak. There are so many individual differences in IQ, upbringing, family values, social support, etc. that limit the predictive power of a single measure such as SES. For this exact reason Carpenter, Ramirez and Severn (2006) argue that a singular definition of the achievement gap ignores important within-group differences in SES groups. Discussing the achievement gap in terms of SES will naturally limit the extent to which other demographic factors such as race, ethnicity, and inclusion in an ELS program are considered. In this context, White and Sirin's finding that SES is only a weak predictor of academic success on an individual level is relatively unsurprising. This finding however, does

not change the fact that, as shown in White and Sirin's study, SES is highly predictive of academic achievement on a community level.

Furthermore, SES and academic achievement are both broad constructs, meaning that the mechanisms that connect them are multidimensional. For example, SES is a construct that encapsulates several demographic factors, the most commonly studied being income, location of residence, dependence on welfare programs, and parental education level. In terms of predicting academic achievement, these predictor variables show a high level of collinearity with each other but still seem to contribute uniquely to predicting academic achievement. For example, maternal education level seems to be a stronger predictor of a child's academic achievement than poverty or welfare income (Lacour & Tissington, 2011). As such, SES is better understood as a conglomerate of interconnected demographic factors that contribute an overall way of living.

Similarly, academic achievement is a broad construct that can be broken down into several smaller components such as GPA, exam scores, college attendance, graduation rates, degree attainment etc. As such, SES can affect achievement in many different ways. Most simply, SES predicts success in class, such that higher SES students are more likely to perform better in their classwork than their lower SES peers. Several mechanisms drive this association, including, but not limited to, the fact that lower SES predicts lower school readiness (Dotterer, Iruka & Pungello, 2012), lower physical health (Basch, 2011; Heissel, Levy & Adam, 2017), and more negative perceptions of student-teacher relationships (Xuan et al, 2019). These trends can be parsed out in even more detail, with SES influencing different subjects differently. One longitudinal study found that the achievement gap was consistently larger for reading than for mathematics (Alspaugh, 1996). This finding could potentially be explained by the fact that lower

SES students are more likely to be raised in families in which English is not the primary language, and have parents who speak in less complex sentences (Rosen et al, 2020), meaning that discrepancies between SES in language abilities are likely to be amplified. Furthermore, SES has been shown to predict college plans, college admission and college graduation (Sewell & Shah, 1967). After college, students of lower SES are more likely to have lower levels of academic attainment, as well as lower income (Walpole, 2003). This finding is in no small part due to the fact that lower SES also predicts a higher probability of accruing student debt (Houle, 2013). In short, SES affects all levels of academic achievement, from grades, to experiences in higher education, to income after graduation.

In the four decades since the White study, and the six decades since the Coleman Report, researchers have found evidence that suggests that the socioeconomic achievement gap has been widening on a global scale. One study of one-hundred countries found that, generally speaking, the achievement gap has been increasing worldwide (Chmielewski, 2019). While this trend is partially explained by the fact that increasing enrollments in developing countries are revealing pre-existing inequities, there is some evidence that increasing competitiveness and growing class disparities are also driving this trend.

The Promises and Realities of Online Education

One technology that seemed to have the potential to narrow the achievement gap was online learning. Before discussing the ways in which online education interacts with the achievement gap, however, some clarification of the terminology is needed. Though the terms online learning and distance education are often used interchangeably, distance education refers

to any form of learning in which learner and teacher are separated, while online learning is specifically done over the internet (Picciano & Seaman, 2007). For example a televised painting course could be considered distance education, but not online learning. Though the term distance education is not strictly wrong for the purposes of this study, this paper will primarily focus on online education.

Online education can be categorized as synchronous and asynchronous. Synchronous courses are courses in which the students are attending class at the same time that the instructor is teaching. Asynchronous courses are courses in which the lessons are pre-recorded and students are free to attend class on their own time. While the current paper focuses primarily on synchronous online learning, much of the research discussed applies to asynchronous learning as well.

Between 2002 and 2005, the number of students in the US taking at least one online course grew from 1,602,970 to 2,329,783 with an average growth rate of 18.2% per year (Allen & Seaman, 2005). By 2018, 35.3% of students enrolled in degree-granting postsecondary education institutions were receiving some sort of distance education, and almost half of these students were taking their courses entirely online (National Center for Education Statistics, 2018). Many researchers have viewed this growth in online learning optimistically, with the notion that increasing online avenues to formal education will narrow the socioeconomic achievement gap. A theoretical examination of online learning through the lens of Tomasevki's "4-A's Framework" (2001) found that online learning increases **availability** of educational resources, improves **accessibility** by eliminating barriers of time and place, provides an **acceptable** medium of learning for parents and students, and offers a more **adaptable**

educational platform that can be tailored to localized situations (Gieth & Vignare, 2008). Field studies have provided evidence in support of this theoretical position. A case-study of 5 working-class adults in Malaysia found that online education was successful in increasing learning opportunities and improving SES among the participants (Wong, 2008).

In addition to increasing access to education, several studies have suggested that learning outcomes are equivalent between students taking online classes versus those taking in-person courses (McThee, Marks, & Duffy, 2012; Glen, 2001; Cavanaugh, Gillan, Kromrey, Hess & Blomeyer, 2004; Cimermanova, 2018). One meta-analysis even found that online students have even outperformed in-person students in exams and grades (Allen, Mavry, Mattrey, Bouhis, Titsworth, & Burrell, 2017). A similar result is found when examining student perceptions of online versus in-person learning. Research has suggested that perceptions of course effectiveness do not differ between in-person and online students (Glenn, 2001) with students often preferring the online option (Hannay & Newvine, 2006).

Despite these optimistic results, the existing research suffers from methodological limitations that reduce validity of these findings. Most notably, almost all the research comparing online and traditional education suffer from sampling bias. Due to the impracticality of randomly assigning participants to long-term online or in-person education platforms, almost all the participants in such studies are self-selected. As a result, the association between learning platform and learning outcomes could be a spurious relationship with demographic characteristics acting as third variables. Such a problem is exacerbated by the fact that attrition rates are generally higher in online classes than in traditional classrooms, especially among women (Kizilcec & Halawa, 2015). As such, studies comparing the outcomes of online versus

in-person classrooms are comparing students in traditional classrooms to a subset of students who both elect to take online classes, and are able to complete them. In other words, these studies are not working with comparable populations. On the first level, students who elect to take online classes are demographically different from those in in-person classes (Hansen & Reich, 2007). Of those who elect to take online courses, heightened attrition rates suggest that there are differences between those who are able to complete the course and those who are not.

A closer examination of exactly how these two populations differ reveals that even though online classes have improved access to education, those of higher SES are still the primary beneficiaries of such courses. A study of 68 massive open online courses (MOOCs) offered by Harvard and MIT found that participants in MOOCs came from households with significantly higher incomes compared to the national median (Hansen & Reich, 2015). With regard to parental income, the data that Hansen and Reich (2015) collected suggests that a 17-year-old whose most educated parent has a bachelor's degree is 5 times as likely to register onto MOOC's as a student whose most educated parent has a high school degree. Indeed, most registrants of MOOC courses already had a college or graduate degree (Hansen & Reich, 2015).

Comparing a blended, MOOC-based program with the equivalent residential program at MIT, Littenberg-Tobias and Reich (2020) found that there were more male students and more students with graduate degrees in the blended program than in the residential program.

Furthermore, males and graduate students were more likely to complete the online portion of the course. In sum, there does seem to be a difference between those who take traditional classes and those who elect to take online courses. Specifically, those who take online courses seem to come from higher SES backgrounds. Among those, SES further predicts online course completion. The

finding that online courses and traditional classes yield equivalent educational outcomes fails to take this SES difference into account.

Though the Hansen and Reich studies are the most widely cited studies regarding SES differences between online and in-person students, it is worth acknowledging that they only studied MOOCs, which are only a subset of online learning. However, other studies seem to suggest that their results would generalize to other forms of online learning. In one of the few studies that did randomly assign participants to comparable long term online vs in-person courses, students in the in-person course significantly outperformed students in the online course in both average exam scores and improvement over the term (Arias, Swinton, & Anderson, 2018). This result is particularly telling given the fact that the sample size used was remarkably small ($n = 32$). For such a low powered study to achieve a significant result would suggest that the true effect size for this finding was likely quite large. Similarly, another study compared online vs. in-person learning while statistically controlling for SES and found that online learning was negatively associated with course persistence and course grade (Xu & Jaggars, 2018). In other words, once SES is controlled for, the favorable outcomes of online learning are no longer apparent.

As such, though proponents of online education have touted its ability to provide access to underprivileged populations, the data suggests that online learning has mainly benefitted those of higher SES. This paper will highlight four key ways in which online education places lower SES students at a disadvantage: 1) exacerbating the digital divide, 2) placing higher demands on self regulated learning, 3) limiting social interaction, and 4) creating a learning environment that requires students to remain at home. Rather than completely dismissing online education

however, this paper will explore the potential for online learning to narrow the achievement gap via socioeconomic integration.

Limitations and challenges of the current study

This paper is not an empirical study, but rather reviews the current literature in order to explore the relationship between socioeconomic status and online learning. As such, the conclusions of this study are naturally constrained by the limitations of the literature itself. For example, while the topics of this study are most directly applicable to young children, most of the research done on online learning was directed at postsecondary education (Picciano & Seaman, 2007). This trend could be attributed to the fact that colleges and universities tend to adopt online education sooner and more frequently than primary and secondary institutions. This finding presents two major challenges to the current study. Firstly, if most of online education is occurring at the postsecondary level, then perhaps a study examining online education's effect on primary school students may be a moot point. Secondly, the findings of papers regarding college-age students may not generalize to younger populations.

With regards to the first issue, online education is indeed more common in postsecondary institutions, but is also becoming increasingly common in grades K-12. Some estimates have calculated that online learning in K-12 schools has increased more than tenfold between the years 2001 and 2006 (Picciano & Seaman, 2007). This significant growth demonstrates that online learning is being increasingly adopted by K-12 schools. Furthermore, in response to the COVID-19 pandemic, schools across the nation have almost all adopted some version of online education. The question then is whether or not these schools will retain some form of online

education after the pandemic has ended. As such, though the data is relatively scarce, studying online education in primary and secondary schools is highly relevant.

The second issue becomes more of a challenge to address. There is no way to demonstrate with complete certainty that the findings in postsecondary schools will generalize to younger populations. However, several of the factors discussed can reasonably be assumed to apply to older and younger students. For example, the fact that online learning limits in-person social interaction has been studied mainly with older students, but is quite easily applicable to younger students as well. In a similar vein, the fact that online education places higher burdens on technological resources should be true no matter the age of the student. Nonetheless, this issue is a significant problem with this study, and highlights the need for future research to focus more on online education in younger students.

Part I: Where online learning falls short

The Digital Divide

What is the Digital Divide?

Broadly speaking, the digital divide refers to the fact that individuals of higher SES have more access to, and are more able to effectively use, newer technologies (Tarman, 2003). This divide has long resulted in educational discrepancies between SES groups. As the internet plays a larger role in modern society, however, the digital divide will have an increasingly large impact on knowledge gaps between SES groups. Lu Wei and Douglas Hindman (2011) found that discrepancies in internet usage were a stronger predictor of knowledge gaps than discrepancies in

“traditional” forms of media (e.g. newspapers, books, magazines, etc). In other words, the knowledge gap between high and low SES individuals was more prominent among individuals who used the internet more. As such, a system in which a child’s education is done primary online would likely place lower SES students at a further disadvantage. This phenomenon functions on two levels, access and usage (Wei & Hindman, 2011). The “first-level” digital divide refers to the body of research done in the earlier days of the internet, demonstrating that lower SES individuals have less physical access to digital technologies. More recent research has revealed an emerging “second-level” digital divide in which SES individuals are less able to use the technology they have for education, professional development, and finding economic resources. Both mechanisms contribute uniquely to placing lower SES students at a disadvantage, and point towards a potential risk of adopting widespread online education.

The First-Level Divide

The first-level divide is based on the fact that individuals of lower SES have fewer resources with which to buy computers and high speed internet access. In 2012, only 61.9% of Americans whose highest degree was a high school diploma or GED reported having broadband internet access, while 89.7% of Americans with a BA or higher reported the same (United States Census Bureau, 2012). By contrast, 35.2% of Americans whose academic attainment is a highschool degree or GED reported having no household internet access, while only 8.3% of Americans with a college degree or higher reported the same (United States Census Bureau, 2012). Such discrepancies mean higher SES students would be the primary beneficiaries of online education, thereby potentially increasing the achievement gap.

Nowhere is this dynamic clearer than during the COVID-19 pandemic when nearly all schools at all levels went online. During this time, poor rural communities had a disproportionately difficult time adjusting to online learning, mainly due to the fact that rurality negatively predicted internet speed (Lai & Widmar, 2020). This disparity has led some schools to rely on postal mail to communicate with students, and some teachers have even called students on landlines to make up for lost class time (Lai & Widmar, 2020). The COVID-19 pandemic has thrown the digital divide into sharp relief and provides a clear case study as to how online learning has negatively impacted the education of students of low SES.

On a more hopeful note, there is evidence that this first-level divide seems to be narrowing over time. One of the driving mechanisms in this trend depends on the increasing access and effectiveness of wireless technologies. Improving wireless technologies allows for the spread of internet access without as much of the expensive physical infrastructure needed in years past (Smyth, 2006). Furthermore, the increasing affordability of personal computers and government efforts to provide computers to public schools has improved access to computers among school-aged children (Harris, Straker, & Pollock, 2016). At first glance, such findings seem to suggest that the digital divide will soon be a relic of the past. More recent research has suggested, however, that the digital divide has not been shrinking but is simply evolving into a new, perhaps more insidious form of inequality.

The Second Level Divide

Researchers refer to this new form of the digital divide as the “second-level” divide. Unlike the first level divide which focused on access, the second-level divide focuses on usage.

Specifically, the second-level divide refers to the finding that lower SES individuals are less able and less likely to use technology for academic or professional purposes. One survey of 1,351 students found that neighborhood SES (NSES) was positively associated with the amount of school computer use, while NSES was negatively associated with home computer use (Harris, Straker & Pollock, 2017). Such a finding would suggest that while lower SES students are spending more time on computers at home, students from higher SES spend more time on computers at school. The same study found that NSES was positively correlated with playing educational games, using learning programs, and emailing on school computers, and negatively correlated with multimedia use, internet surfing, and online chatting. These results suggest that higher SES students are more likely to use school computers for learning or academic purposes, while students of lower SES were more likely to use home computers for social media and entertainment. Furthermore, lower NSES predicted higher exposure to TV, mobile phones, and electronic games.

Two main conclusions can be drawn from this study. Firstly, the basic findings of the first-level digital divide are becoming more obsolete. Students of lower SES were using digital technologies at a relatively high frequency, and in several cases were using digital technology more than their higher SES peers. Secondly, the digital divide between SES groups seems to be shifting more towards how this technology is being used. A child from a higher SES neighborhood will be more likely to use technology for school-related purposes, while a child from a lower SES neighborhood is more likely to use technology for recreation and entertainment. This trend was summarized nicely in a study that found that SES was more

strongly associated with informational use of the Internet than with access to the Internet (Wei & Hindman, 2011).

While this second-level digital divide seems to be less related to socioeconomic inequities in online learning than the first-level digital divide, a closer examination of why this second-level divide exists in the first place reveals otherwise. While the second-level divide can be explained by simply stating that higher SES students are more interested in academic uses of digital technology, such a claim seems unlikely. More probable is the notion that lower SES schools are less effective in teaching meaningful online skills and less likely to assign homework that involves heavy academic uses of the internet. In 2002, 90% of teachers in schools in which 11% or less of students were on free or reduced price lunch reported receiving training on using the internet in lessons (Kleiner & Lewis, 2003). By contrast, in schools in which 71% of students or more were enrolled in free or reduced price lunches, only 67% of teachers reported having the same kind of training. In a survey of 2,462 teachers found that in high income areas, 70% of teachers reported that their school did a “good job” helping the teachers integrate digital technology in the classroom (Purcell, Buchanan & Friedrich, 2013). In the low income areas, that number drops to just 50% of teachers. One consequence of this finding is that lower SES schools tend to assign less stimulating assignments on the computer. Low income students are more likely to use computers for drilling and practice, while higher SES students are more likely to use computers for research and simulations (Gorski, 2005).

In other words, the second-level digital divide has its roots in basic socioeconomic inequities. Lower SES students are less likely to engage in academically rigorous activities online because their schools are less able to assign such kind of work. This finding has major

implications with regard to online education. In shifting to online platforms, lower SES communities and school districts will most likely be less able to keep pace with higher SES communities. Lower SES teachers have less training and fewer resources with which to integrate technology into their classrooms, let alone conduct an entire class online. A learning environment in which all class activities, homework assignments, research projects, and educational resources will be online will likely exacerbate the existing second-level digital divide and further place lower SES students at a disadvantage.

In sum, lower SES communities have less access to digital resources and have less experience using digital technology for academic and professional purposes, thereby placing them at a disadvantage in a world in which education is done primarily online. Even if the first-level divide eventually closes, however, and lower SES communities do manage to gain the skills needed to hold online classes, there is still the issue of how well lower SES students would actually perform in online courses.

Raising Demands for Self Regulation

Self-Regulation as a Predictor of Success in Online Education

Of the student factors that contribute to online academic success, the concept of self-regulation has received particular attention. For the purpose of this examination, self regulation will be defined as the act of controlling one's own motivation, thought processes, emotions, and behaviors (Bandura, 1994). Self regulation is a subset of executive function, which, broadly speaking, refers to the ability to carry out intention (Baumeister, Schmeichel, & Vohs, 2007). As one may expect, executive function and, more specifically, self regulation are

deeply predictive of academic success (Nota, Soresi, & Zimmerman, 2004; Lenex, McClland, Braak, Idsoe, & Storksen, 2020). One widely cited model of this mechanism is Zimmerman's (1998) self-regulation cycle, in which forethought leads to performance which leads to self reflection which cycles back to forethought. In other words, successful self-regulators plan their behaviors, execute them through volitional control, reflect on their experience, and adjust their plans accordingly. In an academic setting, such a process allows students to effectively apply learning strategies based on their situation. Critically, self-regulation has been shown to positively predict academic achievement in both students of high and low SES (McClland & Wanless, 2012).

Such findings seem to generalize to online learning environments. Self regulation has consistently been shown to predict success in online learning environments (Cazan, 2014; Bothma & Monteith, 2004; Lynch & Dembo, 2004). Furthermore, self regulation seems to be associated with positive perceptions of online courses (Barnard, Paton & Lan, 2008), and student confidence (Hodges, 2005). In fact, research suggests that online courses require higher levels of self-regulation than in-person classes (Vonderwell & Savery, 2004). In a survey of over 1,000 colleges and universities, a majority of students reported that greater discipline was required to complete online courses than traditional courses (Allen & Seaman, 2005). This finding was strongest among schools that offered online courses, suggesting that exposure to online education reinforces for students the importance of self regulation in an online learning environment. These perceptions are backed by the finding that, when compared to their in-person peers, students enrolled in online courses employ more self-regulated learning strategies (Quesada-Pallares, Sanches-Marti, Ciraso-Cali, & Pineda-Herrero, 2019) and are less prone to

procrastination (Klingsieck, Friesb, Horzc, & Hoferd, 2012). Such results suggest that online education requires, or at least favors, students with heightened levels of self regulation.

Indeed, these findings are not altogether surprising when considering the unique learning environment created by online learning. Generally speaking, online learning offers more flexibility to students, allowing them to control where, and often even when, they are engaged in learning. Such a situation, though convenient, places higher demands on student self regulation (Pedrotti & Nistor, 2019). Students are responsible for making sure they choose an learning environment that is free of distractions and, in the case of asynchronous learning, must themselves allocate time for attending class. In traditional classrooms, these factors are the responsibility of the school and instructors. Adding an additional layer of complexity is the finding that the presence of internet connected technologies (ICT) in learning environments consistently result in heightened student distraction (Goundar, 2014; McCoy, 2016). One study of 675 students across 27 US states found that 20.9% of class time was spent browsing non-course related media (McCoy, 2016). Another study found that in an online course, social media and technology accounted for 29% of off-task thinking. Since online education requires the constant presence of ICTs, it is highly plausible that the distracting nature of ICTs would become even more of a problem in an online learning environment. This problem is exacerbated by the fact that students in an online education setting lack the kind of close supervision possible in an in-person class (Hassenburg, 2007). In sum, the autonomous nature of online learning, mixed with its reliance on ICTs creates a learning environment that is inherently more distracting, therefore requiring higher levels of student self regulation.

SES Differences in Self-Regulation

The increased demand on SRL in online classes places low SES students at a disadvantage. There is much evidence suggesting that SES can affect students on a cognitive and even neurological level. On a functional level, family SES is associated with a higher neural activation during a working memory task (Rosen, Sheridan, Sambrook, Meltzoff, McLaughlin, 2018). Simply put, the brains of students from families of higher SES were more active when engaging in a working memory task. Furthermore, SES predicted functioning in the perisylvian (language) system and prefrontal (executive) system (Noble, Norman, & Farah, 2005). Such studies point to the fact that students of higher SES seem to benefit from improved neural functioning in academic tasks such as memory, language, and executive function. These differences seem to extend to neural structure as well. Parental education predicted cortical thickness in the right anterior cingulate gyrus and left superior frontal gyrus, parts of the brain associated with affect regulation and working memory respectively (Lawson, Duda, Avants, Wu, & Farah, 2013). In sum, there seems to be associations between SES, neural functioning, and neural structure.

Unsurprisingly, these neurobiological differences result in differences between SES groups in terms of basic cognitive functioning. Indeed, executive function was found to be a significant mediating variable in socioeconomic achievement gap (Blakey et al., 2020; Aran-Filippetti & Richaud, 2012; Nesbitt, Baker-Ward, & Willoughby, 2013). This model would suggest that students of lower SES would perform less well than their higher SES peers in school due to lower levels of executive function. In a similar way, self-regulation mediated the association between child SES and teacher's expectations of the child's future success, such that

teachers expected less from students of lower SES because of their reduced levels of self regulation (Miech & Essex, 2001). Students from lower SES consistently exhibit lower self regulation and executive functioning, which seems to greatly disadvantage them in an academic setting.

As much as lower SES students are disadvantaged in a traditional school setting, however, online classes place even more demands on self regulation than traditional classes, these cognitive differences are likely to place lower SES students at a greater disadvantage. As discussed earlier, online education places a greater responsibility on students, and therefore requires higher levels of student self regulation and executive function. As such, the lower levels of self regulation observed in students of lower SES would become more academically problematic when placed in an online setting. Successful online learning requires students to create environments conducive to learning, as well as resist the distractions inherent to digital media which would likely be harder for students of lower SES on account of lower self regulation and executive functioning. The question remains, however, as to why students of lower SES suffer from such cognitive disadvantages in the first place. While the easy answer would be to claim that people fall into different SES groups based on inherent differences in cognitive ability, the data suggests that the causal relationship operates the other way around. Less stimulating home environments limit the cognitive development of children born into lower SES families. As such, understanding the role of online education in the socioeconomic achievement gap requires exploring interactions between education and the home environment.

Requiring Students to Remain at Home

SES and the Home Environment

As discussed earlier, students of lower SES tend to exhibit lower levels of self regulation and executive function than their higher SES peers. The impact of SES on self-regulation seemed to partially explain the relationship between SES and academic achievement. Given that SES predicts the development of self regulation and executive function, what needs to be explored is exactly how SES affects cognitive development. In other words, do these differences between SES groups stem from inherent differences between people at birth, or do they occur later in the child's development?

One particularly promising and robust area of study in this domain seems to be the home environment, specifically with regards to cognitive stimulation. Cognitive stimulation refers to the amount to which an environment engages different brain functions. Critically, longitudinal studies have demonstrated that cognitive stimulation mediates the relationship between SES and executive function (Rosen, Hagen, Lurie, Miles, Sheridan, & Meltzoff, 2020), as well as the relationship between SES and language abilities (Raviv, Kessenich, & Morrison, 2004). In other words, students born to higher SES families tend to have more cognitively stimulating home environments, which aids in the development of executive function and language acquisition. Lower SES families will typically have fewer resources with which to invest in books, toys, and craft supplies, resulting in a less stimulating home environment. Furthermore, lower SES is associated with lower parental education. As such, lower SES parents are less likely to use complex sentences with their children and to become heavily involved in their children's

education (Rosen et. al, 2020). Such research highlights the extent to which home environments can influence academic outcomes.

One study by Birgit Becker (2011) explores a particularly relevant implication of this literature. This study compared differences in language abilities in preschool students across 4 counties in the UK. The key finding of this study was that preschool attendance was positively correlated with improved language skills in low SES students, but made no difference in students of higher SES. Furthermore, Becker found that preschool attendance narrowed the language gap between high and low SES students, but failed to close the gap completely. This study has two main implications. Firstly, preschoolers of lower SES rely on school for developing language skills more than their higher SES peers, who presumably are able to develop such skills at home. Secondly, school is helpful, but insufficient in fully addressing the SES achievement gap. Based on these findings, the following sections will explore what elements of the home environment hinder lower SES students' academic performance, and what implications these may have on the future of online education.

Poorer Learning Environments

The relationship between home environments and online education lies in the fact that online education requires students to learn from home in most situations. As such, successful online learning requires the student to study successfully from home. However, as the previous section discussed, the cognitive stimulation of home environments differs by SES, meaning that lower SES home environments may be less conducive to studying and learning than higher SES

environments. A better understanding of this dynamic requires further analysis of exactly how the home environment affects academic achievement.

Two overarching models explain the relationship between SES, cognitive stimulation and academic achievement: the investment perspective and the family stress model. The investment perspective refers to the idea that lower SES families have fewer resources to invest in their children's education and cognitive development while the family stress model refers to the idea that lower SES families experience more stress which adversely impacts parenting abilities (Jeon, Buettner & Hur, 2014). Consistent with these models, researchers have found that parent self-reports of home stimulation mediated the relationship between SES and cognitive skills while parental depression mediated the relationship between SES and socioemotional functioning (Jeon, Buettner & Hur, 2014). With regard to the investment model, lower levels of stimulation due to insufficient socioeconomic resources results in lower cognitive skills. With regard to the family stress model, lower SES results in higher rates of parental depression, which negatively influences the development of socioemotional functioning.

Besides lack of cognitive stimulation, however, several other factors contribute in making the homes of lower SES less conducive to academic studying and learning. One construct that encapsulates many such factors is household chaos, which refers to environments characterized by high levels of background noise, crowding, disorganization, and lack of routine (Matheny, Wach, Ludwig & Phillips, 1995). The Confusion, Hubbub, and Order Scale (CHAOS) frequently used to measure this construct includes items such as "There is very little commotion in our home", "We can usually find things when we need them", and "First thing in the day, we have a regular routine" (Matheny, Wach, Ludwig & Phillips, 1995). Critically, household chaos is

negatively correlated with SES and predicted lower cognitive and academic outcomes (Marsh, Dobson & Maddison, 2020). This finding is not altogether surprising, given the fact that lower SES households tend to experience more stressors with fewer resources with which to handle them. Lower SES households tend to have more household crowding (Melki, Beyhoun, Khogali, Tamim & Yunis, 2003), more stressed parents (Nagy, Moore, Silveira, Meaney, Levitan & Dube, 2020), and higher rates of children with ADHD (Machlin, Miller, McLaughlin, & Sheridan, 2019). There is also evidence to suggest that a student's cognitive functioning can be influenced by neighborhood environments, not just their own households. Neighborhood chaos mediated the relationship between SES and executive functioning (EF) such that higher levels of chaos predicted a stronger SES–EF relationship (St. John & Tarullo, 2019). In other words, chaos amplifies the existing cognitive gap between higher and lower SES groups.

The research described above paints a clear picture of how lower SES households tend to be less conducive for study. Children growing up in lower SES environments are more likely to suffer the effects of insufficient resources, overburdened parents, and higher levels of household chaos, all of which have been shown to negatively predict cognitive and academic outcomes. The next step is to examine how online education may mitigate or exacerbate these pre-existing disadvantages. With regard to resource limitations, prior sections discussed how first-level digital divide may strain the technological resources of lower SES families, both in terms of access to the internet and access to computers. With online education, even basic school supplies such as craft supplies and notebooks traditionally supplied by the school would be the responsibility of the parent. Furthermore, by making students study from home, lower SES families will not be able to benefit from free lunch and afterschool programs that many schools offer.

The effects of having children at home all day are likely to increase issues with household crowding and chaos as well, resulting in heightened parent stress. In light of the COVID pandemic, one survey done by the American Psychological Association found that 71% of parents found managing their children's online learning a significant source of stress (Canady, 2020). The supposed convenience of online learning is undermined by the fact that parents need to deal with having more of their children at home more often, and by the fact that managing class schedules is now the duty of parents, not the school. Such a situation is likely to exacerbate the issues of family stress and household chaos already associated with lower SES. Lower SES parents, already dealing with higher amounts of stress, are less likely to be effective in managing their children's class schedules than their higher SES peers who on average have less stress. Furthermore, higher SES students are more likely to have a quiet work environment at home where they can work on their assignments and attend online classes; lower SES students are more likely to have higher rates of household chaos in their homes, meaning that their learning environment will be less conducive to good study.

In short, the living conditions associated with lower SES place lower SES students in a uniquely poor situation in which to attend online classes. They have fewer resources with which to conduct class. Their parents are on average more stressed and probably less likely to be able to effectively help them manage their online classes. Lower SES households are more chaotic, which deprives the students of a nice environment in which to learn from home.

The Harlem Child Zone: A Case Study

The previous section centered around two main arguments. Firstly, the section described how the conditions associated with lower SES households are inherently unsuited for successful online learning. Secondly, online education would actually exacerbate the preexisting household burdens of lower SES families by increasing household crowding, increasing demands on family resources, and heightening parental stress. Online learning places responsibilities on the family that were traditionally the purview of schools. In traditional schools, the school watches over the students, keeps the students on schedule, provides meals, and provides good places to study, in online education these responsibilities are transferred to the family. While higher SES families may have the resources to accommodate such changes, lower SES families may not.

One way to understand how this dynamic may play out is by examining a situation in which the opposite phenomenon occurs: what happens when schools lighten the burden of child raising from the family. In this regard, the Harlem Child Zone provides an informative case study.

The Harlem Child Zone (HCZ) was a 97-block area in Harlem, New York that provided a network of charter schools aimed towards improving instructional quality, and community services aimed towards alleviating some of the stressors associated with low SES households. The ultimate goal of the HCZ was closing the achievement gap between poor African-American students and their wealthier white peers. There is evidence to suggest that these programs have had the desired effect. Across different HCZ programs, there have been increases in school readiness, exposure to reading, and academic performance (Dobbie & Fryer, 2009). Dobbie and

Fryer (2009) conducted a study on the Harlem Child Zone in order to examine whether high quality schools or community programs drove these improvements in academic performance.

According to the authors, school programs, not community programs, were responsible for gains in achievement. Students inside the HCZ who had access to both the community and school programs and students outside the zone who only had access to the schools seemed to experience similar benefits (Dobbie & Fryer, 2009). Upon initial inspection, these results would suggest that improving instructional quality is a better strategy for improving student performance than alleviating family stressors. As such Dobbie and Fryer attributed the gains made by the HCZ to teacher quality and not to improving quality of living. Such a finding seems to contradict the thesis of the earlier sections. If school quality can improve performance irrespective of family stressors, then perhaps online education is a viable solution so long as it can offer higher quality instruction

Dobbie and Fryer's conclusion, however, failed to take into account a key detail about the school programs themselves. The "high quality" schools they examined were hardly typical American schools, providing free medical, dental and mental-health services, and high quality meals (Dobbie & Fryer, 2007). Furthermore, in these schools students typically will spend 50% more time at school than a typical public school, with students who need remediation in math and language arts spending almost 100% more time in school than their public school peers (Dobbie & Fryer, 2009). In other words, these schools provide much more than instruction, but offer various services that would have otherwise been the responsibility of the child's caretakers. Not only do children have free healthcare and meals, but they also have more time with adults who are invested in their education.

This fact complicates the authors' conclusion in two ways. Firstly, while this study is interesting, the fact that these schools are so different from typical public schools limits the external validity of the study. Secondly, the initial premise that academic and community services can be separated and analyzed separately is a questionable assumption. The schools they analyzed clearly provided services that go above and beyond traditional instruction. As such, there is little surprise that these institutions were the main driving force behind the improvements observed in the HCZ. They were essentially providing both academic and community services to their students.

Returning to the original topic of this section, the HCZ offers a good example of what happens when schools take on some of the responsibilities typically associated with the home. Parents of students in these schools can be assured that their children will receive high quality food and healthcare for free, all while receiving a good standard education. Such a situation has resulted in a significant narrowing of the achievement gap. In this regard, online education is the antithesis of such a program. Instead of relieving the burden of the caregivers while still providing quality education, online education places several school responsibilities on the shoulders of the caregivers, all without any guarantee of higher instructional quality. Using the HCZ as a model, the predicted effect of online education would be a widening in the achievement gap.

In summary, the HCZ demonstrates the benefits of a more hands-on approach to in-person learning. By going in the opposite direction and eliminating in-person learning altogether, online education has the potential to widen the achievement gap.

Eliminating Social Interaction

Academic resilience

The research reviewed so far has focused on the different ways in which lower SES students are educationally disadvantaged, particularly in online platforms. However, such a picture fails to capture the entire story. Indeed, there are students of lower SES who, despite the odds, are able to reach high levels of academic achievement. This ability to perform well in spite of socioeconomic risk factors is referred to as academic resilience (Morales, 2010). This construct is related to the notion of grit, the ability to persevere with long term goals despite adversity (Duckworth, 2007), but is more specific to academics. Academic resilience is typically measured by academic achievement, and number of risk factors that were overcome. Resilience research and theory revolves around the notions of risk factors, protective factors, vulnerability areas, and compensatory strategies (Morales, 2010). Risk factors impede achievement while protective factors mitigate these harmful effects. Vulnerability areas are the result of risk factors while compensatory strategies are methods of dealing with the vulnerability areas. Resilience theory is the study of how these factors interact. Using an example that was discussed earlier, having higher levels of household chaos is a risk factor that may result in ineffective studying as a vulnerability area. In this scenario, a highly skilled teacher would be a protective factor that could compensate for these vulnerabilities. With enough protective factors, certain students will be able to attain high academic achievement in spite of risk factors.

Resilience theory also gives a useful framework with which to examine online education. Rather than looking at all the ways in which online education disadvantages lower SES students,

resilience theory would examine how online learning may heighten or lessen the effects of protective and risk factors. In the following section, one specific protective factor that is particularly affected by online education will be examined

Social Support as a Protective Factor

Social support is defined as any behavior within a person's social circle that either enhances their performance or protects against negative outcomes (Malecki & Demaray, 2006). Most often the literature surrounding social support has focused on parents, teachers, and peers. Focusing specifically on teachers, one sample of 282 low-income third grade students demonstrated that beginning of the year social-emotional competence, year-long improvement in social-emotional competence, and perceived teacher support were all strong predictors of end-of-the-year academic competence (Elias & Haynes, 2008). These results seem to have two main implications. Firstly, social support from teachers can greatly improve the scores of low income students. Secondly, the fact that social-emotional competence predicted academic performance would suggest that positive social interactions in general play a role in improving academic outcomes. While these social support factors would arguably be predictive of success at any SES, one study of high and low SES students found that social support was a stronger predictor of achievement among low SES students than among higher SES students (Malecki & Demaray, 2006).

Explaining why teacher social support may result in higher levels of performance, one study found that perceived teacher support predicted increased achievement motivation, especially in the early adolescent years (Becker & Luthar, 2002). The feeling that teachers are

not simply doing their job but have a personal connection to the students seems to increase students' motivation to perform well. The fact that this association is particularly strong in the early adolescent years could be due to the fact that students at that age are increasingly becoming more independent from their parents and seeking social validation from sources outside the home.

A similar study found that the amount of and quality of teacher-student academic interaction are the two most important factors in determining student outcomes (Waxman, Padron, Shin & Rivera, 2008). Quality of social interaction was measured using the Overall Classroom Observation Measure, in which teacher support was observed with items such as "Teacher and children participate equally in instructional conversations around clearly defined, topics", "Teacher encourages children to engage in conversations and elaborate on their thoughts," and "Teacher is genuinely warm and responsive towards children" (Stipek & Byler, 2004). Becker and Luthar (2002) found that such items were strong predictors of student motivation, which in turn predicted academic resilience. In addition to increasing student motivation, social support significantly moderated the relationship between SES and stress, such that lower SES students were less stressed if they reported having high levels of social support (Woodward, Walsh, Senn, & Carey, 2017).

While the current literature review has focused mainly on teacher-student relationships, social support from family, peers and teachers have all been shown to be predictors of resilience and achievement (Fang, Chan, & Kalogeropoulos, 2019). Other research indicates that different sources of social support benefit lower SES students differently. For example, one study found that friend support was the main source of listening support for middle school students, while

adult caretakers were the main source of listening support for high schoolers (Richman, Rosenfeld, & Bowen, 1998). Similarly, parents and caretakers were the major source of emotional support at both middle and high school levels, with friend support serving as the second source for middle schoolers, and teachers serving that same role for high schoolers (Richman, Rosenfeld, & Bowen, 1998). In other words, different kinds of social support benefit different groups of students in different ways. Other researchers have decided to look at school culture as a whole, adopting what is referred to as the supportive school community model. The supportive school community model, as opposed to the effective school model, suggests that a supportive learning environment is the most important element in fostering academic achievement (Borman & Overman, 2004). In support of this model, Borman and Overman (2004) found that a safe and orderly environment, positive teacher-student relationships, and parental involvement were all strong predictors of resilience in students.

Online learning and the Removal of the social environment

With regards to social support and academic resilience, research has suggested that online learning actually eliminates the social environment and the classroom community that is so important for developing academic resilience. The lack of in-person contact between students and teachers limits the teacher's ability to engage individually with students, makes class discussion and collaboration difficult, and eliminates a sense of community within the classroom (Hassenburg, 2009). With synchronous online learning, progress has been made in this regard with the help of screen sharing technologies and breakout rooms. However, the inability to be in the same place at the same time makes more complex forms of collaboration difficult, and

eliminates the communal aspect of socializing before or after class. With asynchronous learning, such socialization becomes practically impossible.

When Muilenberg and Berge (2001) performed a large-scale ($n = 2,504$) exploratory factor analysis of online education studies, they found that students often felt isolated in their online classes. In a similar study survey of 1,002 university students, 68% of the students reported that the “isolation” was the worst aspect of online learning (Rush, 2015). When discussing social interaction, isolation is the opposite of social support in which the individual feels alone and removed from others. In one particularly telling quasi-experiment comparing the experiences of international students taking online versus traditional classes, researchers found that online classes heightens the sense of isolation even more so than traditional classes (Erichsen & Bolliger, 2011). This particular sample of students is interesting because, even in traditional settings, international students tend to feel more isolated than their domestic counterparts. As such, this study reveals that studying online is capable of making students already prone to isolation feel even more isolated.

Some researchers have pushed back against such critiques, arguing that online learning may actually foster more community rather than less. Martin Weller (2005) argues that if online school is viewed as a subset of online activity as a whole, then the development of community is inevitable. This argument predicated on two key arguments: 1) that online learning is comparable with other forms of online activity and 2) that online activity inevitably results in the development of communities. Though the second assumption seems strange, this claim is not entirely unfounded. The three examples provided in the paper are Naspter, a music sharing software, blogging, and open source models of software production. Weller argues that in a place

where information can be openly shared, people will naturally group together into online communities based on specific interests, thereby developing community. If online education is seen through this lens, then online learning communities will already begin to form.

Weller's argument fails to hold up in two key aspects. Firstly, online learning cannot be freely equated with other forms of online activity. The online communities that he mentions are based on shared interests in specific, often niche, subjects. Using his examples, people who are already interested in music enjoyed the ability to freely exchange audio files with one another, while people interested in other specific topics may decide to follow and join specific blogs that discuss those issues. Online schools differ in that the participants themselves do not decide what to learn, but are directed to specific ideas, topics and activities by their instructor. As such, there would not be the same kind of free, unstructured flow of information in online school as there is in, for example, a blog. Furthermore, online communities are dependent on their members sharing information that they already have among themselves. In an online school, especially with younger students, most of the topics are, and should be, new to the students, meaning that the students are less likely to be openly sharing their perspectives to the group unprompted by the instructor.

Secondly, online communities should not be equated with the school and home communities that foster social support and academic resilience. While close personal bonds can and do form in online forums, this personal connection is not a key element in online communities. People can work closely together on an open-source project without learning anything about the personal lives of anyone else. Again, these connections are possible, but not ingrained into the structure of online communities. An in-person community, by contrast, is not

just a group of people who share information. Through the act of learning and studying together, personal bonds are formed based not only on the course information, but on people themselves. An in-person community is a place where people will care if someone looks unwell, a place where people want to learn more about each other, and a place where people who share no interests can become close friends. That is lost in an online community.

Other researchers have suggested the specific measures can be taken to increase the communal aspects of online learning. To alleviate these feelings of isolation, researchers have suggested the use of synchronous communication such as chat rooms, implementing a “warming-up” period for students to get to know each other, and establishing clear-cut guidelines for online communication (McInnerney & Roberts, 2004). The very fact that such research exists, however, proves acknowledgement that online learning does detract from communities and does fail to provide social support. Measures taken to improve the communal elements of online learning are simply attempts to imitate the wonderful social connections that are already an integral part of traditional learning.

If online learning does detract from community and social support, however, there should be no difference in how lower and higher SES students are affected. While the loss of community applies to lower and higher SES students equally, the effect is disproportionately severe for lower SES students. As stated earlier, social support and community are strong predictors of academic resilience, a construct that benefits lower SES students more than higher SES students. Therefore, the loss of social support would be felt more heavily by lower SES individuals. Furthermore, social support received at home differs significantly between lower and

higher SES groups, meaning that the loss of school social support may be particularly difficult for lower SES students.

Lower Levels of Parental Involvement

Since online learning removes children from the physical school environment, students in online programs receive less social support from their peers and teachers. This reduction in social support is hypothesized to disproportionately affect lower SES students. However, the argument can be made that by staying at home, social support from the home may be able to compensate for the loss of school social support. While this claim may hold true for higher SES households, evidence suggests that lower SES families may be less likely to provide this kind of support to their students if they learn from home.

Generally speaking, lower SES parents tend to be less involved in their children and more likely to employ harsher disciplinary measures (Roubinov & Boyce, 2018). One study of 132 families found that SES positively predicted parental responsiveness, measured by parental warmth, support and inductive reasoning, and negatively predicted parental harshness, as measured by power assertion and corporal punishment (Gulseven, Kumru, Carlo, Palermo, Selcuk, & Sayil, 2018). In other words, lower SES parents are less warm, less supportive, and employed more severe punishment methods. While these differences in parenting methods are not inherently better or worse, these differences in parenting mediated the positive association between SES and child emotional development (Gulseven et al, 2018). Lower SES predicted harsher and less supportive parenting methods, which in turn predicted lower levels of emotional development.

A similar trend can be seen with regards to cognitive development. Maternal sensitivity, measured by hostility, supportive presence, and respect for child's autonomy, was a significant mediator in the relationship between SES and child cognitive ability (Raviv, Kessenich, Morrison, 2004). These issues regarding cognitive ability seem to have long term effects on IQ. Vocal responsivity and maternal responsivity to distress at three months of age accounted for a quarter of the variance in IQ scores between SES groups at age six (Coates & Lewis, 1984). In sum, lower SES parents tend to be harsher and less supportive, which can have consequences for their children's emotional and cognitive development. In a school context, such differences are likely to play a role in determining student outcomes

In an example even more directly related to school, children who received free or reduced prices lunches reported less parent involvement in school, fewer educational discussions at home, and lower parental academic expectations of their children (Lee & Bowen, 2006). On one hand, such research seems to indicate that lower SES parents are simply less attentive and caring parents. As discussed in earlier sections, however, lower SES parents often have to contend with household crowding (Melki, Beyhound, Khogali, Tamim & Yunis, 2003), are more likely to have children with ADHD (Machlin, McLaughlin, & Sheridan, 2019), and as a result tend to be more stressed (Nagy, Moore, Silveira, Meaney, Levitan & Dube, 2019). Such findings could help explain the differences in parenting methods between higher and lower SES parents. Lower SES parents are not inherently worse parents, but are faced with a greater number of challenges relative to the resources at their disposal.

If schooling were to be done online, not only would lower SES students lose vital social support in school, but would also be placed at a disadvantage at home. While higher SES parents

have the time and resources to provide social and academic support for their children learning from home, lower SES parents would not be able to do so to the same extent. Not only do lower SES students depend more on school social support than higher SES students, but lower SES parents are also less able to compensate for the loss of social support at school than higher SES parents. As such, the widespread adoption of online learning may very well result in a decrease in the academic resilience of lower SES students.

Part II: How online learning can be improved

Methods of closing the achievement gap

The following section provides an overview of different attempts made at addressing the achievement gap issue. This review will be structured through the lens of Bronfenbrenner's Ecological systems theory (1992) which conceptualizes different spheres of influence around a child. Specifically, this section will examine interventions performed at the individual, microsystem, and macrosystem levels. The individual level consists of ways in which personal characteristics of a child may influence their outcomes. The microsystem refers to influences from the child's immediate family (i.e family, friends, and school). The macrosystem refers to influences derived from government or culture.

Individual-Level Interventions

In order to determine methods of closing the achievement gap, researchers have attempted to identify specific personal characteristics that give higher SES students an edge

above their lower SES peers. Specifically, researchers have tried to determine whether differences in mindsets could explain the achievement gap and whether or not changes in mindset could close the gap. One particular study hypothesized that lower SES students could close the gap themselves by being more persistent and spending more time in school. Unsurprisingly, persistence and time spent in school were positively associated with math, science, and reading scores (Huang, 2015). The same study, however, showed that both self-perceived persistence and time spent in school were highly predictive of higher SES. Two possible conclusions could be drawn from this finding. The first possibility is that lower SES students have lower SES because they are less persistent. Since students are not responsible for their own SES, however, such a claim seems highly improbable. The second, likely more reasonable, conclusion is that external factors related to SES are driving lower SES students to see themselves as less persistent and spend less time in school. As such, the original hypothesis that students could close the achievement gap themselves through increased persistence and school time seems unsupported. If external factors outside of the student's control were making low SES students see themselves as less persistent and made them spend less time in school, then the root problem lies with the external environment, not with the students' mindset.

A similar study found that higher SES students were less likely to harbor a fixed mindset about their abilities (Destin, Hanselman, Bountempo, Tipton, & Yeager, 2019). This difference in mindset partially mediated the association between SES and grades (Destin et al, 2019). A fixed mindset refers to the extent to which students feel agency over their own intelligence and ability. In other words, this study seems to suggest that higher SES students have better grades because they believe more in their capacity to change. Critically, however, the researchers found that

mindset accounted for only 2-7% of the relationship between SES and performance (Destin et al, 2019). While statistically significant, such a small effect size suggests that mindset interventions are unlikely to bring about any large-scale change.

Furthermore, examining the achievement gap through the lens of personal differences feeds into the flawed narrative of lower SES individuals failing to “pull themselves up by the bootstraps” and ignores how institutions systematically create these individual differences between SES groups. Just looking at the personal differences between SES groups, the conclusion may be drawn that lower SES individuals are just less persistent, less studious, and less flexible in their way of thinking. However, such a conclusion fails to account for how SES driven situations may result in these differences. Low and high SES students actually have similar levels of educational aspirations (Brookover, Erickson & Joiner, 1967). However, higher SES students’ educational plans matched their aspirations while lower SES students’ educational plans were much less ambitious than their aspirations (Brookover, Erickson & Joiner, 1967). These findings suggest that both low and high SES students dream of attaining a high level of academic achievement. The difference between the groups lies in the fact that higher SES individuals feel that their goals are actually attainable while lower SES students are more likely to believe that their situation precludes them from reaching their aspirations. This phenomenon is succinctly summarized in the finding by Dixson, Keltner, Worrell and Mello (2017) that hope partially mediates the relationship between SES and achievement. Because higher SES students have more resources at their disposal, they have more hope that they can actually achieve their goals with enough work. Hence, the finding that higher SES students are more persistent, spend more time at school, and have a less fixed mindset should be seen as a function of resource

disparity, not inherent difference. As such, while personal interventions may be helpful for closing the achievement gap, a more comprehensive intervention must occur at the institutional level.

Microsystem-Level Interventions

Though, as discussed earlier, family and school factors both influence the achievement gap, most microsystem-level interventions have focused on schools. School-level interventions are more easy to organize, fund, and implement and are therefore more commonly studied. Broadly speaking, microsystem-level interventions focus on providing additional resources and increasing the quality of education for lower SES students.

As discussed earlier, the Harlem Child Zone (HCZ) has employed school and community interventions to successfully narrow the achievement gap between poorer black students in Harlem and more affluent white students in the rest of New York City. One study found that HCZ students outperformed the average white student in New York City (Hanson, 2013). In 2012, the HCZ's Promise Academy I High School placed in the 99th percentile of city high schools (Hanson, 2013). These results are often compared to the results of the Knowledge is Power Program (KIPP), which consists of a system of charter schools across the country. KIPP schools feature longer academic days, summer classes, field trips, and electives such as dance, art, theater, photography, and music (Nesbitt, 2011). The program has resulted in significant improvements in student grades and test performance. One study estimated that 3 years of KIPP education reduced the black-white achievement gap in math by half, and reduced the gap in reading by one third (Nesbitt, 2011). While the HCZ and KIPP are fairly well-known

intervention programs, smaller programs such as the Perry Preschool Project and the Abecedarian program have been shown to result in large increases in IQ, reduce the number of students put into special education, reduce the number of students required to repeat a grade, and increase high school graduation rates (Nesbitt, 2011).

In addition to the curriculum-driven interventions described above, other programs have successfully narrowed the achievement gap by providing resources and mentorship to lower SES students. A particularly notable program is the Expanding College Opportunities Project (ECO) which focused on helping low SES students find good colleges. The interventions featured in this program included application guidance which helped students organize their application process, net cost interventions that provided information about financial aid, and fee waivers that covered the application fees (Hoxby & Turner, 2013). A randomized controlled trial revealed that the ECO program significantly increased rates of college enrollment among low-income students. The Fee Waivers significantly increased application behavior while the application guidance and Net cost interventions significantly improved enrollment behavior (Hoxby & Turner, 2013). Taken together, these micro-system level changes seem to have made significant and long-lasting improvements to the academic achievement of lower SES students.

Such success stories are, unfortunately, only one part of the larger picture. For every successful program initiated, there are those that have either yielded mixed results, or have been simply ineffective. Project Head Start offers educational opportunities to low SES preschool students in an attempt to reduce the SES achievement gap in IQ, literacy, and social competence. Project Head Start reduced gaps in IQ scores slightly, but yielded no lasting effect after elementary school (Nesbitt, 2011). Similar trends were observed for the grades of Project Head

Start children. Another disappointing finding was that Moving to Opportunity Experiment, which relocated low SES families to more affluent neighborhoods, yielded no significant improvement in children's educational outcomes (Ludwig, Duncan, Gennetian, Katz, Kessler, Kling, & Sanbonmatsu, 2013). Even the projects that have been successful need to be evaluated with caution. Most often the students who participate in these projects and studies are not a random sample of children, but rather a self-selecting group of families who want their children to attend special programs. As such, the results of these interventions are not necessarily generalizable to larger populations.

Besides the mixed results of several of these projects, there is also the issue of expense. Even when these microsystem level interventions do yield good results, they often come with a high price tag. In 2010, the HCZ spent about \$16,000 per student per year at their Promise Academies and \$5,000 per child for other HCP programs (Hanson, 2013). That same year, New York City spent only \$14,452 per student per year. Similarly, one researcher estimated that placing the poorest 6th of children in KIPP-type elementary schools would cost a total of \$18 billion (Nesbitt, 2011). While this sum is arguably a small sum to pay to provide quality education to underserved children, the fact remains that such programs can be very expensive and difficult to convince politicians to implement.

Macrosystem-Level Interventions

The national discourse on the achievement gap tends to focus entirely on improving school quality. Contrary to popular understanding, the achievement gap is not driven by a shortage of teachers but by a maldistribution of teachers. Specifically, lower SES schools have

fewer high quality teachers and higher attrition rates (Darling-Hammond, 2007). School reform efforts often focus on how to attract high quality teachers to high SES school districts and how to increase retention rates of teachers in low SES areas. Large-scale interventions have included teaching fellowship programs which provide scholarships for teaching education programs, teacher recruitment programs which aim to recruit experienced teachers to underprivileged areas, and creating new high-quality teacher education programs in high-need areas (Darling-Hammond, 2007). Despite these efforts, however, many researchers believe that a larger-scale intervention is required to truly address the achievement gap. Some have argued that the national government should launch a “Marshall Plan for Teaching,” in which such programs are launched nationwide (Darling-Hammond, 2007).

One such attempt was made during the Bush administration with the No Child Left Behind (NCLB) act. The NCLB measured student achievement through test scores and evaluated schools on their ability to make Adequate Yearly Progress (AYP) based on these student scores (Bale & Knopp, 2012). The rationale behind this act was to raise standards of accountability by rewarding schools who made AYP and punishing those that did not. While the intention of the act was positive, the NCLB failed to address key elements of the achievement gap. Rather than addressing root causes of the achievement gap, the NCLB adopted “carrot and stick” policies that punished the most disadvantaged school districts for not making the expected AYP. The rhetoric of NCLB is often used to blame “failing” schools and mediocre teachers for not lifting children out of poverty, rather than realizing poverty is what is driving these schools to fail and making teachers less effective (Bale & Knopp, 2012). Not only does this method fail to address

educational inequities, but perpetuates the myth that differing outcomes between SES groups are due solely to differences in school quality.

While improving teacher quality may seem the obvious method of improving academic performance among lower SES students, focusing exclusively on this issue overlooks many of the root causes of the achievement gap and unfairly places responsibilities on already overburdened teachers (Bale & Knopp, 2012). NCLB failed to take into account the lessons of the Coleman report almost half a century earlier. According to Colman, “school is only one factor affecting both achievement and motivation: differences in family background, and general influences of the society at large also have strong effects. Studies of school achievement have shown that variations in family background account for far more variation in school achievement than do variations in school characteristics” (Coleman, 1960).

Indeed, there is evidence to suggest that in certain situations, the NCLB has actually lowered standards of education. Rather than attracting high quality teachers to disadvantaged school districts, the punitive nature of the NCLB means that skilled teachers are often hesitant to work in schools that are branded as “failing” and are therefore more likely to leave (Darling-Hammond, 2007). With regards to curriculum, the NCLB’s emphasis on using standardized tests as measures of school and student success has come under fire as well. The NCLB’s emphasis on testing promotes a “drill and kill” approach to education that teaches students how to take tests rather than problem-solve or think critically (Darling-Hammond, 2007). Perhaps the most contentious aspect of the NCLB policy, however, is its emphasis on developing and founding charter schools. The following section will examine the charter school debate in further detail.

Charter Schools

A discussion of school reform would not be complete without discussing the charter school debate. Charter schools are funded by the government but run by independent sponsors. They have been the backbone of several of these school reform programs such as the HCZ and KIPP. While a full analysis of this controversy is beyond the scope of this paper, the charter school debate exemplifies the kinds of challenges inherent to school reform initiatives. The debate about charter schools tends to focus on three main issues: school choice, privatization, and accountability (Vegari, 2007).

School choice refers to the fact that, unlike standard public schools, parents have the ability to choose which charter school to send their children to. In public schools, parental choice is limited by the school district in which they live. Supporters of charter schools believe using a more free market approach to education would foster healthy competition that would improve the quality of schools as a whole (Convertino, 2017). This position is based on the belief that the service providers and consumers of a free market are better judges of quality than a centralized power such as the government (May, 2006). By contrast, critics of charter schools question whether or not parents are actually well equipped to make good decisions for their children. One study of 260 families who withdrew their children from public schools into charter schools found that parents tended to base their decisions on affective factors rather than strictly school performance (May, 2006). Another researcher pointed out that the main consumers of charter school education, poor and minority parents, are among the least well informed about how to

choose good schools (Vegari, 2007). Such an issue highlights the question of the role parents should play in closing the socioeconomic achievement gap.

With regards to school choice, one particularly contentious issue is how charter schools affect ethnic, racial, and socioeconomic distributions within schools. Most of the parents who send their children to charter schools such as KIPP or the HCZ's Promise Academies come from urban low SES or minority backgrounds (Vegari, 2007). These parents want to see their children receive a higher quality education than they would in typical inner city public schools. As such, charter schools tend to pull low SES and minority students out of public schools and into charter schools. Supporters of charter schools argue that placing lower SES and minority students together in the same school and giving them a special education is the first step in closing the academic achievement gap (Raymond, 2014). By contrast, critics of charter schools see this system as a new form of segregation, in which poor and minority students will be increasingly funneled into charter schools that are less well funded and lower quality than the schools their higher SES white students can attend (Vegari, 2007). In essence, this controversy stems from the question of whether the achievement gap could be closed with specialized programs or from integration.

Closely related to this issue of school choice is the issue of privatization. Traditional public schools are funded and run by the government. Charter schools, on the other hand, are funded by the government but run by independent sponsors. While charter schools are still regulated to some extent, the school itself is entirely run by private entities. The sponsors for charter schools are even able to outsource the instruction to other private entities not otherwise affiliated with the school. Such policies are appealing to people who believe that schools should

be run by educational specialists, not politicians. On the other hand, critics of charter schools feel uncomfortable with the fact that education, a matter of public concern, would be placed in the hands of private businesses (Bale & Knopp, 2012). The roots of this debate can be traced back to larger ideological differences between people who support a more libertarian vision of government, and people who support a more socialist model.

One issue that makes this debate particularly pressing is the fact that charter schools and public schools compete for the same pool of government money. Every child who switches from a public school to a charter school diverts money away from public schools and into charter schools. Supporters of charter schools believe that charter schools are the new future of public education, while critics of charter schools believe that they take money away from already underfunded public schools (Raymond, 2014). This facet of the charter school debate underscores the question of whether or not school reform should focus on improving existing institutions or revamping the entire system.

Lastly, there is the issue of accountability. As stated earlier, charter schools are funded by the government but are run by private entities. This situation makes the issue of accountability more complicated. While charter schools are somewhat regulated by the government, independent companies and sponsors are responsible for most of the school's operations. This freedom is one of the major selling points of charter schools. Instead of being bound to state curricula, charter schools can adjust their program to whatever the administration does best, and, importantly, whatever will draw parents to their school. While this system can arguably be exceptionally successful in certain schools, the lack of standardization makes evaluating charter schools very difficult, and therefore more difficult to hold schools accountable for quality

education. This issue sheds light on yet another aspect of closing the achievement gap.

Intervention programs need specific and measurable ways of determining whether or not the intervention had any effect in the first place.

In sum, the charter school debate provides a helpful framework through which closing the achievement gap can be understood. The issue of school choice raises the question of who should have the most agency in designing achievement gap interventions. The privatization debate raises the issue of whether or not the achievement gap should be closed by working within existing systems or by dismantling the current educational framework entirely. Lastly, the question of accountability demonstrates the difficulty of evaluating how successful an intervention program actually is.

Socioeconomic Integration

A brief history of educational integration

One of the oldest, and still most promising, strategies for closing the SES achievement gap is socioeconomic integration. Schools tend to be more or less socioeconomically segregated, with some schools having primarily low SES students and others catering to primarily high SES students. Socioeconomic integration is the process by which students of different SES are put together in a shared learning environment. A comprehensive understanding of socioeconomic integration, however, would not be complete without first understanding racial integration. The struggle for educational integration in the United States has largely been fought along racial lines and, as such, should be the starting point for any discourse on school integration

Contrary to popular understanding, the *Brown vs Board of Education of Topeka* (1954) decision, which ruled that segregated schools were not constitutional, did not mark the end of

racial segregation in school, but rather the beginning of the long road to desegregation. Although the years following the *Brown vs Board of Education* decision saw much progress in terms of racial integration, efforts were already being made to effectively resegregate schools. Just two decades after the *Brown vs Board of Education* decision, the Supreme Court overturned a lower-court order to consolidate Detroit public schools with surrounding suburban school systems in *Milliken vs Bradley* (1974), effectively allowing parents to avoid integrated schools by moving to white-dominated suburbs (Aberger, Brown, Mantil & Perkins, 2009). Although busing programs attempted to improve school integration by assigning and transporting students to schools across district lines, white families often moved their children to suburbs and enrolled them into private schools, a phenomenon known as white flight (Aberger et al, 2009). By 1974 Congress had prohibited the use of federal funding for busing programs. (Aberger et al, 2009). By 1995, African American students were more likely to attend a majority black school than in 1975 (Aberger et al, 2009). Though school segregation was not technically constitutional after 1954, such efforts made on the part of segregationists kept school segregation alive and well for decades and can be found even today, albeit in a slightly different form.

Socioeconomic integration as an educational reform strategy

Though socioeconomic integration is most frequently discussed in legal terms, educational equity still lies at the heart of the issue. The Coleman Report (1960) noted that next to individual SES, the SES of classmates was the strongest predictor of school achievement. In other words, students surrounded by high SES peers are more likely to do well academically than students surrounded by low SES peers, regardless of individual SES. More recent literature has

replicated such findings. One study by Gottfried (2014) found that classroom SES was a significant predictor of standardized test scores. These findings suggest that the achievement gap can be narrowed by placing lower SES students in classrooms with higher SES peers. Such an effect can be explained by the fact that lower SES students in middle-class schools are surrounded by peers who are, on average, more academically engaged and less likely to have disciplinary problems (Kahlenberg, 2012).

One particularly telling study conducted by Heather Schwartz (2010) investigated Montgomery county, which is known for providing extra resources to its lowest income schools. The study examined whether low SES students performed better in a high poverty school with greater resources or in a low poverty school with fewer resources (Schwartz, 2010). The results suggested that students actually performed better when they went to a low poverty school with fewer resources. In other words, peer SES was a stronger predictor of student achievement than school resources. This result suggests that there is an effect of peer SES on the achievement of lower SES students, independent of the resources of the school. Another study of the rural achievement gap in math found that the achievement gap is driven less by school resources and more by the influences on family and friends on motivation to pursue advanced math classes (Reeves, 2012). Rural students come from lower SES families, a condition associated with lower academic motivation, and have friends with lower academic commitments and aspirations.

However, there is evidence to suggest that the mere presence of higher SES peers is not what drives this effect, but rather cross-class friendships. One study of 4,288 sixth grade students found that cross-class friendships moderated the relationship between parental education and academic achievement (Lessard & Juvonen, 2019). Specifically, having at least one cross-class

relationship in sixth grade reduces the negative effects of lower SES on academic achievement. Going to school with higher SES students allows children to have more cross-class friendships, which has the potential to narrow the achievement gap. One study by Gregory Palardy (2013) found that peer influences were the primary mediating variable in the association between socioeconomic segregation and college enrollment among low SES students. In highly segregated schools, lower SES students were much less likely to enroll in college than in more socioeconomically integrated schools. This relationship was explained by the fact peer influences in primarily low SES schools tend to be negative with regards to academic achievement. In other words, socioeconomic integration promotes cross-class friendships that are more likely to provide positive peer influences to low SES students.

Challenges to socioeconomic integration

The main challenge to socioeconomic integration has come in the form of backlash from high SES or white populations. For instance, attempts to adopt a voluntary school integration plan in Wake County during the early 1980s backfired tremendously. While the district was successful in providing lower SES students access to a middle-class education, the influx of poor and minority students into Wake County schools and neighborhoods provoked the anger of several middle class white families in the county (Kahlenberg, 2012). The result was a legal battle between civil rights activists, teachers, and other pro-integration groups and conservative anti-integration parties. Besides issues of pure racism and classism, there is the very real concern that integrating schools racially and socioeconomically will decrease high SES performance as much as it helps low SES performance.

The research surrounding this question is complex and highly inconclusive. Wide-scale socioeconomic integration will result in raising the average SES of poorer schools while lowering the average SES of richer schools. The issue at hand is whether or not the benefits of integration for low SES students outweigh its potentially negative effects on higher SES students. Some researchers have found that the effect of school SES on academic achievement applies equally to students of all SES (Rumberger & Palardy, 2005). This finding would suggest that socioeconomic integration would benefit students of lower SES, while having equally negative effects on the academic achievement of high SES students. On the other hand, other studies have found no such negative effects for higher SES students, meaning that integration could only benefit lower students while not harming high SES students (Saatcioglu, 2010). In contrast, some other studies have found the opposite effect, whereby students of higher SES are more influenced by peer effects (Perry & McConney, 2010). This result would suggest that the negative effects of integration in high SES students may outweigh the benefits for low SES students.

To further complicate matters, other researchers have suggested that the benefits of integration for higher SES students may not be in the academic realm. Studying in a more diverse environment will decrease the risk of developing discriminatory attitudes and prejudices among higher SES students (Kahlenberg, 2017). There is also some speculation as to whether a more diverse classroom would be more cognitively stimulating, thereby improving cognitive outcomes for high and low SES students alike (Reid, 2012). Furthermore, there is the issue of equity versus equality. Some researchers argue that from a social justice perspective, a system that gives certain advantages to low SES and minority students while taking away certain

advantages from their more privileged peers is a more equitable approach to education (Perry & McConney, 2010).

In sum, there is no clear answer to this question of whether socioeconomic integration would harm higher SES students. The research about the topic is highly mixed and quite inconclusive when taken together. Even if integration did decrease the academic performance of higher SES students slightly, some would argue that reduction of racial and classist prejudices are worth the cost. An argument can also be made that taking certain advantages from higher SES students would be better from an equity standpoint. Despite the complex nature of this issue, however, families of high SES are still often resistant to the idea of socioeconomic integration, precisely because they fear negative consequences towards their children. Hence, attempts to increase the socioeconomic diversity of schools often face backlash akin to what happened in Wake County. Justified or not, such resistance must be taken into consideration when designing any kind of integration intervention

Using online platforms as a tool for SES integration

The problem so far

Part I of this paper focused on the ways in which online education could worsen the existing SES achievement gap. This second section, however, will examine how online platforms could be used differently in order to narrow the achievement gap. So far, the interventions and programs discussed above have each carried their own issues. Individual level interventions have shown some promise in improving the performance of specific individuals, but often fail to address underlying systemic issues that drive the achievement gap. Larger microsystem level

programs have changed the lives of several low SES students, but tend to be expensive while yielding mixed results. Macrosystem level changes, particularly the NCLB policy have tended to rely too heavily on carrot and stick methods of addressing the achievement gap, effectively punishing the most disadvantaged schools instead of really providing much needed support. Socioeconomic and racial integration holds much promise in decreasing the achievement gap, but has suffered from resistance due to racism, classism, and fear of lowering the achievement of high SES students. In sum, attempts to close the achievement gap have struggled with 1) addressing individual as well as systemic barriers to educational parity, 2) finding solutions that are reliable as well as cost effective, 3) addressing root causes of inequity rather than adopting overly punitive measures, and 4) coping with the resistance that naturally arises at any attempt towards racial, socioeconomic and educational equity.

The following section will discuss how online platforms can be used as a tool for socioeconomic integration while addressing the issues outlined above. Specifically, online platforms can be used to foster cross-class relationships, and promote some kind of socioeconomic integration.

How online platforms can help: A proposal

As discussed earlier, cross class friendships seem to act as a protective factor against the negative effects of low SES on academic achievement. Research done by Lessard and Juvonen, (2019) found that even having one cross class relationship can lessen the association between low SES and low academic achievement. As such, Derek Black, a professor of Law at Howard University School of Law, has gone as far as to argue that middle-income students should be

seen as education resources and, therefore, should be equitably distributed under the constitutional right to equal access (2012). In other words, under the right to equal access, lower income students should have just as much access to middle-income peers as their higher SES peers. One way in which access to middle income peers could be increased is through online platforms. While not much research has been done regarding cross class relationships in online settings, the recent COVID-19 crisis has provided some insights as to how friendships may play out in an online setting. One study found that young students were able to engage in meaningful socio-dynamic and collaborative play with each other via programs such as MSN Kids and simple video recordings (Quinones & Adams, 2020). There may be some advantages to developing friendships online as well. One study of Cybercity, a virtual community based on a simulated city, found that friendships developed in cyberspace can often more easily cross boundaries of SES, race, ethnicity, and nationality (Carter, 2005).

In sum, current research suggests that cross class friendships and socioeconomic integration can be a tool to close the academic achievement gap, and that online communities are effective in fostering deep friendships. These findings suggest that fostering cross-class friendships through online platforms should be able to improve the outcomes of lower SES students. While the limitations of such a strategy will be discussed later, the use of online platforms could be helpful in addressing the issues encountered by past attempts to close the achievement gap.

Past individual-level interventions have attempted to see whether or not specific mindset interventions would be successful in narrowing the achievement gap. While such interventions have had some success, they often fail to address larger systemic issues. The proposed

intervention hopes to address individual issues of student academic motivation and positive academic behaviors by tackling the systemic issue of socioeconomic segregation. Having middle or high SES peers tend to increase motivation to perform well academically (Reeves, 2012) and provides important resources for information regarding grades, schools, and career options (Crosnoe & Muller, 2014). Socioeconomic segregation deprives lower SES students of such resources. As such, an intervention aimed towards some kind of socioeconomic integration will be addressing personal as well as systemic barriers to the achievement of low SES students.

With regards to cost-effectiveness and overall expense, this intervention does not require any large investment in infrastructure or teaching personnel. As such, the overall cost of the proposed intervention would likely be very low, especially when compared to programs such as the Harlem Child Zone.

Furthermore, while this kind of intervention is certainly no silver bullet, promoting socioeconomic integration online is a constructive, rather than punitive, method of addressing the achievement gap. Unlike the NCLB, this intervention targets one of the mechanisms driving the achievement gap rather than simply providing incentives for teachers and schools to deal with the situation themselves.

Lastly, this intervention has the potential to promote integration in a way that prompts less resistance from middle class white parents. With traditional school integration, fear that introducing lower SES students into traditionally neighborhoods would lower standards of education have prompted strong backlash from middle-class parents. In this method of integration, students from lower SES and higher SES backgrounds can interact and bond with each other while circumventing this particular fear. As such, issues such as white flight and

segregationist rhetoric become smaller problems. Though this feature is being framed here as a strength, there are potentially serious problems with this line of thinking that will be addressed later.

What could this intervention look like?

While the COVID-19 crisis has had detrimental effects on almost every aspect of daily life, the necessity of conducting most human interactions online has provided a good model for how this kind of intervention may be structured. Online meetings could be held over video conferencing platforms such as ZOOM or Google Meets. Based on the current research, two types of meetings are recommended: individual and group meetings. In individual meetings, high and low SES students will be paired together for weekly unstructured one-on-one chat sessions. Research described above described how cross-class friendships can narrow the achievement gap (Lessard & Juvonen, 2019) and decrease discriminatory attitudes and prejudices among higher SES students (Kahlenberg, 2017). These individual one-on-one meetings are meant to form online cross-class friendships aimed towards these two primary goals. As an additional benefit, establishing such cross-class friendships can increase how much each individual “puts themselves in each other’s shoes”, a phenomenon referred to as perspective taking. Perspective taking has been shown to decrease stereotyping and in-group favoritism (Galinsky & Moskowitz, 2000) while increasing creativity (Knippenberg, Ginkel & Barkman, 2012). As such, these individual meetings have the potential to narrow the achievement gap, reduce discriminatory attitudes, and foster heightened creativity.

The proposed group session would be more structured and would focus on more specific issues such as specific school subjects, study sessions, and learning strategies. These sessions are similarly aimed towards narrowing the achievement gap, but addresses issues of learning discrepancies more directly. The goal of these sessions is primarily information exchange and study support. Such kinds of peer mentorship have been shown to greatly improve academic performance and persistence at all levels (Destin, Castillo & Meissner, 2019). While students of all levels may benefit, this kind of program is likely to be most helpful for low SES and academically struggling students. This kind of academic support, paired with the more personal relationships fostered by the individual online meetings, hold promise in potentially lessening the achievement gap.

Key Limitations

Though the previous sections have highlighted the ways in which this intervention could help to narrow the achievement gap, there are key potential limitations with this method that must be acknowledged. First and foremost is that this strategy works within, and not against, current socioeconomic structures. Arguably, the most effective intervention for low SES students would be aimed towards eliminating poverty altogether. However, such interventions would require a restructuring of this country's economic system, making the project both difficult to implement and unlikely to actually take place. As such, the proposed intervention sacrifices scope and comprehensiveness for the sake of feasibility.

The second primary limitation of this strategy lies in the fact that the proposed intervention can only achieve a kind of partial socioeconomic integration. Students of different

SES are given a platform to collaborate and bond, but are still for the most part kept apart physically and educationally. As such, there is a distinct risk that this intervention would be seen by upper class white families as a “risk free” alternative to true socioeconomic integration, thereby undermining more traditional efforts towards a more complete form of socioeconomic integration. The proposed program should be seen as supporting effort in the struggle for larger educational intervention, not a replacement. Online platforms may be used to help promote socioeconomic integration, but cannot be the primary vehicle for integration as a whole.

Conclusion: Implications for the present moment

With the end of the COVID-19 pandemic in sight, the promise of a return to normalcy increasingly becomes a part of everyday discourse. There are, however, real questions regarding which institutions should return to their pre-pandemic forms, and which ones may actually benefit from the transformations undergone during the pandemic. Schools are one such institution. In the wake of over a year of online learning, schools will have to decide how much online learning will continue to play a role in a post-pandemic world. This paper argued that continuing to use online platforms such as ZOOM and Google Meets as a replacement for traditional classrooms would place lower SES students at a disproportionate disadvantage relative to their higher SES peers. Conventional forms of online learning run the risk of exacerbating the digital divide, place higher burdens on the self regulation of low SES students, place low SES students in learning environments that are not conducive to study, and disconnects them from key elements of social support that foster academic resilience.

Despite these issues, however, online platforms may still have an important role to play in narrowing the achievement gap. By using online platforms as tools for socioeconomic integration rather than imitations of traditional classrooms, lower and higher SES students may find new ways to interact with one another, thereby narrowing the achievement gap, reducing discriminatory attitudes, and fostering healthy perspective taking. While this proposed intervention is in no way a complete solution to the achievement gap, this novel way of using the internet may be a powerful tool to combat educational inequity in future generations.

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