Exploring Science of Reading Policy through the Lens of Self-Determination Theory

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Abstract: We believe that reading instruction should be guided by scientific research. The science of reading (SOR) outlines the knowledge and skills students need to learn to read. Currently, policymakers and educational leaders are specifying curricular materials and instructional approaches while outlawing others to mandate SOR instruction. In this paper, we argue that such SOR policies hinder students' motivation and work, thereby undermining learning. Across the United States, policymakers are requiring SOR instructional programs and approaches that overemphasize whole-

class direct instruction and underemphasize active student participation. As literacy scholars, educators, and parents, we examine this context through the lens of self-determination theory (SDT), a leading theory of human behavior. SDT demonstrates that motivation occurs on a continuum of autonomy and control. When people's basic psychological needs—autonomy, competence, and belongingness—are met, they experience more autonomous types of motivation, which leads to enhanced performance. In this paper, we argue that current SOR policy implementation stridently compromises students' feelings of autonomy, competence, and relatedness. We explore the implications of such controlled environments for students.
Keywords: reading; reading instruction; reading research; education policy; science of reading; self-determination theory

Explorando la política de la ciencia de la lectura desde la lente de la teoría de la autodeterminación

Resumen: Creemos que la enseñanza de la lectura debe guiarse por la investigación científica. La ciencia de la lectura (SOR) describe los conocimientos y las habilidades que los estudiantes necesitan para aprender a leer. Sin embargo, actualmente, los responsables políticos y los líderes educativos están especificando materiales curriculares y enfoques de instrucción, mientras que prohíben que otros exijan la enseñanza SOR. En este artículo, argumentamos que estas políticas de SOR obstaculizan la motivación y el trabajo de los estudiantes, lo que perjudica el aprendizaje. En todo Estados Unidos, los responsables políticos están exigiendo programas y enfoques de instrucción SOR que sobreenfatizan la instrucción directa a toda la clase y subestiman la participación activa de los estudiantes. Como académicos, educadores y padres de familia en alfabetización, examinamos este contexto a través de la perspectiva de la teoría de la autodeterminación (SDT), una teoría líder del comportamiento humano. La SDT demuestra que la motivación ocurre en un continuo de autonomía y control. Cuando se satisfacen las necesidades psicológicas básicas de las personas (autonomía, competencia y pertenencia), experimentan tipos de motivación más autónomos, lo que conduce a un mejor rendimiento. En este artículo, argumentamos que la implementación actual de las políticas de SOR compromete gravemente los sentimientos de autonomía, competencia y conexión de los estudiantes. Exploramos las implicaciones de estos entornos controlados para los estudiantes.
Palabras clave: lectura; instrucción lectora; investigación lectora; política educativa; ciencia de la lectura; teoría de la autodeterminación

Explorando a política da ciência da leitura pela lente da teoria da autodeterminação

Resumo: Acreditamos que o ensino da leitura deve ser guiado por pesquisas científicas. A ciência da leitura (CLR) descreve o conhecimento e as habilidades que os alunos precisam para aprender a ler. Atualmente, porém, formuladores de políticas e líderes educacionais estão especificando materiais curriculares e abordagens instrucionais, enquanto proíbem outros de exigir o ensino da CLR. Neste artigo, argumentamos que tais políticas de CLR prejudicam a motivação e o trabalho dos alunos, prejudicando assim a aprendizagem. Nos EUA, formuladores de políticas estão exigindo programas e abordagens de ensino da CLR que superenfatizam o ensino direto para toda a turma e subestimam a participação ativa dos alunos. Como acadêmicos de alfabetização, educadores e pais, examinamos esse contexto sob a ótica da teoria da autodeterminação (TDS), uma teoria líder do comportamento humano. A TDS demonstra que a motivação ocorre em um continuum de autonomia e controle. Quando as necessidades psicológicas básicas das pessoas — autonomia, competência e pertencimento — são atendidas, elas experimentam tipos mais autônomos de motivação, o que leva a um melhor desempenho. Neste artigo, argumentamos que a implementação atual da política de

SOR compromete estridentemente os sentimentos de autonomia, competência e relacionamento dos alunos. Exploramos as implicações desses ambientes controlados para os alunos.
Palavras-chave: leitura; instrução em leitura; pesquisa em leitura; política educacional; ciência da leitura; teoria da autodeterminação

Exploring Science of Reading Policy through the Lens of Self-Determination Theory

The National Assessment of Educational Progress ([NAEP]; NCES, 2024) results illustrate that reading proficiency has been relatively stagnant since the assessment program began. For decades, policymakers have tried to mandate enhanced literacy teaching and learning to address the lack of gains in student reading achievement. The Reading First program, for example, was a product of the No Child Left Behind Act (NCLB, 2002). Reading First was a $1 billion-per-year federal program that awarded grants to 1,809 school districts that provided funding to 5,088 schools. To receive Reading First funds, schools had to use programs aligned with scientifically based reading research, which NCLB codified as using "experimental or quasi-experimental designs in which individuals, entities, programs, or activities are assigned to different conditions and with appropriate controls to evaluate the effects of the condition of interest, with a preference for random-assignment experiments" (NCLB, section 9101).

This 2002 federal reading legislation, the first of its kind, emphasized using scientific research to guide reading instruction. Unfortunately, the Reading First Impact Study found that "Reading First did not produce a statistically significant impact on student reading comprehension test scores in grades one, two or three" (National Center for Educational Evaluation and Regional Assistance, 2008, p. xv). Similarly, studies of teachers' perceptions of Reading First revealed frustrations with their instruction being restricted, which precluded differentiation and impeded their ability to optimally do their job (Duggins & Acosta, 2019; Houston, 2009; Jaeger, 2006).

The Science of Reading (SOR) is the latest initiative that strives to address persistently stagnant reading achievement in U.S. schools (Reinking et al., 2023; Tierney & Pearson, 2024). According to The Reading League (TRL, 2022), "The science of reading is a vast, interdisciplinary body of scientifically based research about reading and issues related to reading and writing" (p. 6). This definition brings together decades of research from multiple fields, including education, cognitive psychology, linguistics, neuroscience, and more. The SOR movement focuses on the essential and foundational knowledge and skills students need to know to learn how to read (Cervetti et al., 2020; Tierney & Pearson, 2024; TRL, 2022).

SOR, like Reading First, is aimed at using scientific research to guide instruction. We would like to establish here that the authors of this article support the use of rigorous research, across paradigms and methodologies, in guiding policy and practice. Indeed, we feel that scientific research, while imperfect, is the best tool we have to create knowledge and understanding (Parsons et al., 2016; Parsons et al., 2022). We engage in and have respect for the research enterprise. The critiques offered in this paper are unrelated to the use of research to inform policy or practice; rather, our critiques focus on how recent policies and their implementation are *not* guided by research and are heading toward unintended consequences.

In this article, we examine SOR policies in light of self-determination theory (SDT), a theory of human behavior that has provided important insights into motivation, teaching, learning, wellness, and human flourishing (Deci et al., 2017; De Naeghel et al., 2012; Patrick et al., 2007). We make the case that SOR, as it is currently being implemented, contradicts SDT and is likely to stymie students' motivation and flourishing. First, we present a brief overview of SOR policies that have

been implemented in the United States, with a close examination of one state to demonstrate the mandates within these laws. Then, we present SDT, describing its tenants and how current SOR policy likely undermines students' motivation and well-being.

Science of Reading Policies

One difficulty of creating policy informed by reading research is that while research provides much insight into reading skills and processes that students need to be successful readers (Duke & Cartwright, 2021; Freebody & Luke, 1990; National Reading Panel, 2001; Snow et al., 1998, 2005), it provides limited guidance on instruction that supports these skills and processes (Petscher et al., 2020; Seidenberg et al., 2020; Solari et al., 2020; Woulfin & Gabriel, 2022). The research tells us very little, for example, about dosage (amount) or differentiation (for whom). Nevertheless, SOR policy being passed into law has much to say about dosage and differentiation, which is curious since the science is very limited in this area (Shanahan, 2020).

SOR advocates often reference the Simple View of Reading (SVR; Gough & Tunmer, 1986; Hoover & Gough, 1990) in their conceptualization of reading (TRL, 2022). SVR presents reading as the outcome of Word Recognition (i.e., decoding, using phonics knowledge to figure out unknown words) and Language Comprehension (i.e., understanding word meanings). If students know what the words are (decoding) and know what they mean (language comprehension), then they can read. However, Gough and Tunmer (1986) did not discuss instruction in their foundational and oft-cited work. When reading is oversimplified as the product of word recognition and language comprehension, it becomes misunderstood that reading instruction should adhere to those components. (e.g., Rose, 2006; Tierney & Pearson, 2024). This becomes especially problematic when students receive heavy doses of phonics instruction to aid word recognition, often to the detriment of other needed areas as has been noted in recent work (e.g., Hall et al., 2023; Harrison et al., 2025).

SOR supporters also typically use Scarborough's (2001) Reading Rope to illustrate the individual components of the early reading process and how the strategic combination of these skills leads to reading (TRL, 2022). SOR builds upon the collective body of reading research, including that of previous federal initiatives such as the National Reading Panel (2001), which provided a comprehensive review of experimental and quasi-experimental research on reading. This analysis led to the Five Pillars of l reading (i.e., the five aspects of learning to read that have strong evidence in the research reviewed): Phonemic Awareness, Phonics, Fluency, Vocabulary, and Comprehension.

In addition, the SOR movement emphasizes explicit teaching, consistent assessment, and Multi-Tiered Systems of Support (MTSS; TRL, 2022). Explicit teaching is an instructional approach that emphasizes explicit explanations, modeling, practice with immediate feedback, and independent practice (Duffy, 2009; Robertson, 2021; Vaughn & Parsons, 2023). Consistent assessment is completed with screeners to determine risk and ongoing progress monitoring to identify proficiency and areas of need in the subskills involved in learning to read (Bailey et al., 2020). MTSS is an instructional approach where students receive increasing levels of support (i.e., intervention) if they do not demonstrate adequate progress on the ongoing assessments (Vaughn & Fletcher, 2020). Many states include MTSS as part of their reported reading policy plans (Reading League Compass, n.d.).

Moreover, instructional emphases and policies in SOR, such as explicit teaching of subskills, do not emphasize culturally sustaining pedagogies (Gabriel & López, 2024; Paris, 2012). Such approaches to instruction value linguistic, literate, and cultural plurality, working to sustain students' cultural practices instead of eliminating them (Paris & Alim, 2017). Educators can work toward culturally sustaining pedagogy by honoring students' funds of knowledge, the deep cultural and

cognitive resources that students bring with them to school, and incorporating them into instruction (Moll, 2006; Muhammad, 2020). Similarly, the SOR movement does not prioritize differentiation, an approach to teaching that adjusts instruction to students' needs rather than one-size-fits-all instruction (van Geel et al., 2018). Instead, SOR policies, as outlined below, typically prioritize programmatic instruction, often with teachers reading from a script (Aydarova, 2023, 2024; Vaughn et al., 2020, 2022). Conversely, research has shown that when teachers apply culturally sustaining pedagogy and differentiate instruction to meet students' diverse needs, students' achievement is elevated, especially for students most at-risk of difficulty in school (Bui & Fagan, 2013; Hamre & Pianta, 2005; Parsons, Vaughn et al., 2018).

Although a full description is beyond the scope of this article, it is important to note that policies are intermingled with the political economy (e.g., Luke, 2018; Harrison et al., 2025). Curriculum creators and professional developers profit handsomely from adopted curricula and required professional development (Aydarova, 2024). Writing about the science of reading, Aydarova (2023) concluded: "although the new legislation overtly addressed changes in literacy instruction, it ultimately served to secure a market share for certain private providers of curriculum, assessment, and teacher professional development" (pp. 570–571). Therefore, it is important to consider who stands to profit from policies that require specific curricula.

We define reading as the ability to not only rapidly and accurately decode words, but to attach context-appropriate meaning to those words, so that words arranged in sentences are comprehended by the reader, then larger and larger chunks of connected texts are well-understood (e.g., the goal of reading as defined by Castles et al., 2018). The current SOR policy movement guided by the SVR does not fully recognize a longstanding and rich body of research that considers multiple facets of literacy that move from decoding to full, flexible text comprehension and analysis capability for all learners, regardless of their native language (e.g., Leider et al., 2013; Pearson, 2007; New London Group, 1996). For example, Freebody and Luke (1990) described four interconnected roles that a successful reader must develop: code breaker (understanding the sound-symbol relationships in English found in the alphabetic code); text participant (accessing background knowledge about the topic and textual/genre referents to infer meaning from text); text user (developing awareness of what it means to be a reader of different types of text in different contexts, such as school, pleasure, and work); and text analyst (developing awareness of critical stances in reading to consider positionality, ideas, and language embedded in text). They noted that

> all of these roles form part of successful reading as our culture currently demands
> them; therefore, any program of instruction in literacy, whether it be at kindergarten
> or in adult ESL classes or at any points in between, needs to confront these roles
> systematically, explicitly, and at all developmental points. (p. 15)

By teaching all students that there is much more to reading than codebreaking (e.g., graphophonemic connections), teachers can better support students' development and awareness of background knowledge, their active role in reading, and the purpose of comprehending text.

The New London Group (1996) aligns well with this stance and reflects the importance of metalanguage and awareness of multiple literacies that builds ongoing access to evolving language needs along with critical awareness of different types of literacy for different communication purposes. Recently, Kalantzis and Cope (2025), two members of the New London Group, offered an updated view of the body of research that arose from the original 1995 convening, noting that students must achieve rich understanding of multiple forms of literacy to flexibly move between written text and speech. Relevant to the current argument, "the movement from speech to written text entails a difficult transposition. This makes reading and writing much more challenging than

phonemic awareness alone" (Kalantzis & Cope, 2025, p. 143). Thus, we believe that the deep, rich body of research on literacy development is not fully represented in the current SOR policy movement, to the detriment of instruction that prepares students to be active, engaged readers who are able to read and comprehend texts for multiple purposes.

Across the United States

At the time of our writing, 40 states and the District of Columbia have passed laws and instituted policies for research-based reading instruction (Schwartz, 2024). The first was Mississippi in 2013. Mississippi instituted a multilayered approach that included teacher professional learning and coaching, expanded early-childhood education, individual student reading plans for students identified at risk of reading problems, and test-based third-grade promotion (Burk, 2020; Mumma & Winters, 2023). As a result, Mississippi saw dramatic increases in student reading scores on the National Assessment of Educational Progress (NAEP), moving from 49th in the nation to 21st. The increases were so substantial that it became known as the "Mississippi miracle" (Lurye, 2023). Many states used Mississippi as a model for their legislation.

A controversial aspect of Mississippi's reading legislation is student retention. If students did not reach benchmark in reading by the end of third grade, they were retained to repeat the grade. Many researchers and educators disagree with student retention because research demonstrates that it is harmful for students (Martin, 2011). Nonetheless, Mississippi included 90 minutes of reading/literacy intervention for each retained student to ensure a more individualized instructional approach instead of business-as-usual grade level instruction. Mississippi has noted strong gains in student scores on the NAEP and other assessments. It is important to note that NAEP assesses students in fourth and eighth grade. Therefore, the dramatic increases in NAEP fourth-grade scores in Mississippi are undoubtedly influenced by the retention policy, although some question its impact (see Burk, 2020). By retaining third-grade students who do not demonstrate proficient reading, they removed the bottom 10% from the assessment pool, thereby increasing Mississippi's performance on the assessment (Drum, 2023; Hiltzik, 2023).

Mississippi's drastic improvement in their NAEP reading scores caught the attention of policymakers and education leaders. In the past decade, many states have tried to replicate the success by increasing phonics and phonemic awareness instruction and by implementing accountability, spreading the adoption of SOR policy and practice across the US. Of the 40 states and the District of Columbia that have policy guidance for instruction and intervention, 38 include requirements for teacher professional development and coaching, and 29 include policy guidance for assessment as well as an approved list of curriculum resources (Schwartz, 2024; TRL Compass, n.d.). *Education Week* (Schwartz, 2024) also reports that 27 states include policy language to either allow or require third-grade retention based on reading assessment scores. Neuman and colleagues (2023) analyzed SOR policies and noted concerns of fragmented reading instruction that can interfere with coherence across aspects of instruction, and unequal attention to various student groups, particularly English learners.

Spotlight on Virginia

Now, we take a close look at SOR policy in one state, Virginia, where the authors of this article work. In 2022, the Virginia Legislature unanimously passed the Virginia Literacy Act (VLA). While the language in the actual bill closely resembles the language of the previous literacy statute and similarly seeks to ensure scientifically based reading instruction for all students in grades K-3, the legislation pointed to the state department of education to develop the details. And, as we have learned, the devil is in the details. To provide clear, effective instruction, student knowledge and

needs should first be assessed. A well-developed assessment system is vital for effective instruction (Biancarosa & Snow, 2006; Fisher et al., 2016; Lesaux & Marietta, 2011). School districts should employ a thoughtfully selected set of connected assessments to screen all students for reading benchmarks and general difficulties, followed by targeted diagnostic assessments for those who need additional information to determine specific needs. Virginia schools, like many others, are required to administer periodic state-designed or state-approved literacy screeners. Similar to legislation in other states, a provision of the VLA states that K–3 students who do not meet benchmark on the screeners receive a personalized student reading plan that requires evidence-based intervention for the duration of the school year (https://www.doe.virginia.gov/teaching-learning-assessment/k-12-standards-instruction/english-reading-literacy/literacy/virginia-literacy-act).

The provisions of the VLA require that school districts select from a list of state-approved curricula for literacy instruction, called high-quality instructional materials (HQIM). Each approved core curriculum (i.e., HQIM) is described in detail on the department website, with noted strengths and weaknesses (Virginia Department of Education, 2023).

The law mandates that teachers use the selected curriculum for "the entire literacy block" (https://www.doe.virginia.gov/home/showpublisheddocument/38768/638063939944270000). Indeed, the *Virginia Literacy Act Implementation Playbook* (2024) firmly states on page 1 that "all schools and educators are being asked to exclusively use the HQIM adopted by their division. This means daily lessons must be grounded in adopted materials, and leaders should be able to walk through classrooms and see every teacher using the materials purchased." The *Playbook* reiterates the call for fidelity to HQIM, stating that administrators should:

> Ensure that clear expectations are set with school leaders and teachers that adopted HQIM must be used consistently and with integrity, and should form the basis for all core instruction. Outside resources should not be used as they are rarely as strong as HQIM and typically are not designed as part of a coherent scope & sequence. (p. 35)

This requirement becomes problematic when we return to the state-approved literacy materials descriptions and notice that each program has drawbacks such as gaps in foundational skill supports. For example, one HQIM, Imagine Learning EL, was marked for lacking enough decodable texts to accompany weekly lessons: "The Divisions should consider providing students with additional decoding practice and may need to supplement the program with additional decodable texts" (Virginia Department of Education, 2023). In another poignant example from another approved HQIM, Benchmark Advance materials were described as generally beneficial and approved for statewide adoption, with the caveat that, "As supportive and well-matched as this program is for novice teachers, veteran teachers may struggle with the lack of autonomy in selecting books and implementing unique, crafted lessons" (Virginia Department of Education, 2023, p. 8).

We do not expect any program to perfectly serve the needs of all learners, but the guidance provided by the state currently feels at odds with itself. Further, we fully agree with the provision and use of high-quality materials while avoiding low quality materials, yet we have concerns with the variance with which fidelity to scripted programs may be interpreted and then required. Particularly in the Benchmark Advance example above, the recognition that the curriculum is better suited for novice teachers who can benefit from more scaffolding emphasizes our point that expert teachers benefit from autonomy to determine how to best reach their students (Vaughn et al., 2020).

This legislation, then, prevents teachers from deviating from a curriculum that was created by publishers for nationwide use by following general guidelines rather than state-specific standards. *The VLA Implementation Playbook* states

> Adopting a single, coherent curriculum across schools will mean that all students are held to the same expectations and effective experiences in the adopted Standards of Learning. Students in the lowest performing schools and students with every teacher will receive the same content and learning opportunities as students in the highest performing schools. And in divisions with high mobility, students will maintain coherent experiences when they move or change schools. (p. 24)

While the proposal to adopt a single, coherent curriculum across schools aims to standardize expectations and ensure equitable access to educational resources, it significantly undervalues the importance of the teacher in fostering effective learning environments.

Although curriculum uniformity can promote consistency, it may fail to address the diverse needs of students, especially those in low-performing schools or from diverse backgrounds. In Virginia alone, there is a wide range of demographic and socioeconomic diversity that suggests one size may not fit all. Let's look at three cities in Virginia, beginning with Bristol. Bristol is a small rural town of 17,036 in southwest Virginia, straddling the border to Tennessee. You may have heard of the Bristol Motor Speedway, a NASCAR track that is located there, though on the Tennessee side. The population is largely white (87%) and only 20% of the adult population has a college degree. Less than 3% of the population is Latinx and 17% is below the poverty line. Arlington, Virginia is a city of 235,845 in the northern region of the state, just a few miles from the nation's capital. Arlington is a densely populated urban setting that is racially diverse: 60% White, 16% Latinx, 10% Asian, 9% Black, and 4% multiracial. In Arlington, 76% of the population has a college degree and 6% are below the poverty line. Last is Newport News, a coastal city of 185,118 in southeastern Virginia. The population is diverse: 41% Black, 41% White, 10% Latinx, 4% multiracial, and 3% Asian. In Newport News 30% of the population have a college degree and 15% are below the poverty line.

These three cities in three regions of Virginia show the variability that often exists within a single state. The students in these cities have vastly different day-to-day lives due to their contexts and backgrounds. Can unwavering fidelity to an instructional program—even best-in-class curriculum—optimally meet the diverse needs of students in all these different contexts? Informed by scientific research on the importance of relating content to students' existing knowledge, experiences, and cultures (National Academies of Sciences, 2018; Ormrod, 2020), we say, "no."

The exclusive use of adopted HQIM can hinder teachers' ability to adapt their lessons to meet the diverse needs of their students. The dosage of explicit instruction that each child requires is different, yet when fidelity to HQIM is required, teachers are unable to optimize instructional time (Seidenberg, 2023). In this section, we focused primarily on the policies—what is in them. Below we explore the policies and implementation through the lens of SDT.

Self-Determination Theory

Overview

SDT is a macro theory developed by Deci and Ryan (1985) to explain human development and behavior. Since its conception, SDT has been applied to multiple fields, including education, and tested across cultures (Ryan & Deci, 2017). SDT includes multiplexing-theories, including its theory of basic human needs. This theory's main assertion is that everyone has three basic psychological needs—the need for autonomy, the need for competence, and the need for relatedness. People are motivated when their three basic psychological needs are supported by their environment. Alternatively, people's motivation suffers when their needs are blocked or thwarted. In

education, researchers typically consider how teachers support or thwart their students' needs and how this influences students' motivation and achievement (Howard et al., 2024). An additional area of research investigates how teachers' basic needs are met and how this in turn impacts students (Howard et al., 2024).

Individuals thrive in autonomous environments, which in an education context looks like students voluntarily engaging in the learning process. For example, when teachers provide rationales for lesson objectives or classroom tasks, students are more likely to want to learn. Fulfilling the need for autonomy is oftentimes integral to the fulfillment of the other basic needs, although all three needs must be met for optimal wellbeing (Ryan & Deci, 2017). Autonomy is not just about providing people with choices. Even when one has multiple options to choose from, if none of these options are personally valuable to them, then they will not experience autonomy. Individuals experience autonomy when they willingly participate in an activity (Vansteenkitse et al., 2023). Even if there are no choices for one to make, if they want to engage in a task then they are experiencing autonomy. When teachers support students' needs for autonomy, students engage with their learning volitionally and with an understanding of how lessons or assignments will help them reach their learning goals (Ives et al., 2021).

The next basic psychological need is the need for competence. Competence means one feels effective in the work they aim to do (Ryan & Deci, 2017). People experience competence when they can successfully complete an activity or understand a concept. Competence is supported by structure, which includes clear expectations, consistent rules, and feedback (Ryan & Deci, 2020). Structure allows students to purposefully and effectively work toward their academic goals because it provides them with clarity about class expectations (Ryan & Deci, 2016). The opposite of structure is chaos. Chaotic environments, in which expectations or guidelines are unclear, thwart individuals' well-being generally, particularly their need for competence (Vansteenkiste et al., 2019).

The third basic psychological need is the need for relatedness. Relatedness, which is also referred to as belonging, is the need to form connections with others (Ryan & Deci, 2017). People experience relatedness when they feel valued and respected (Ryan & Deci, 2020). For example, Niemiec and Ryan (2009) stated, "In the classroom, relatedness is deeply associated with a student feeling that the teacher genuinely likes, respects, and values him or her" (p. 139). Moreover, teachers can support relatedness by encouraging prosocial interactions with and between students (Deci & Ryan, 2012). Relatedness is a strong predictor of motivation in the classroom (Wang et al., 2024). In addition, relatedness is strongly correlated with autonomy support; therefore, when teachers establish trusting and caring relationships with students, they are also supporting students' autonomy (Deci & Ryan, 2016).

Although the three basic psychological needs are understood separately, in context it can be difficult to untangle each and measure their different impacts. This is because supportive environments often support all three needs and "each need facilitates the satisfaction of the others under most conditions" (Ryan & Deci, 2017, p. 248). Some studies measure need fulfilment through items that separately address the three needs but result in one averaged score representing general need fulfilment. For example, Erturan-İlker et al. (2018) found that both English and Turkish high school students' general need fulfilment positively predicted their enjoyment and concentration in English lessons. In other words, students who had higher need satisfaction had higher levels of enjoyment and concentration. Ha and Roehrig (2025) studied elementary and middle school students' reported need satisfactions in a summer reading program context. They found that the students who experienced growth in their reading skills professed need satisfaction and engagement with the reading program at higher rates than students who did not experience growth in their

reading skills. Although Ha and Roehrig (2025) measured each basic need separately, they found similar positive outcomes.

Despite the measurement difficulty of untangling the three basic needs from each other, some studies have tried to investigate how each need impacts student performance. Howard et al. (2024) conducted a meta-analysis on studies that investigated elementary to university-aged students' basic needs and various outcomes such as achievement and engagement. Out of the three basic needs, teachers' support of student autonomy had the strongest positive relationship with both GPA and general academic performance. Similarly, teachers' thwarting of student autonomy had a negative relationship with GPA and general academic performance. Competence support and relatedness support did not have significant relationships with either GPA or academic performance. Specific to reading, Marshik et al. (2017) found that Grade 3 and Grade 5 students' perceptions of competence positively predicted reading achievement. Furthermore, teachers' provision of autonomy support also positively predicted reading achievement.

Generally, when these psychological needs are met, people are more motivated (Ng et al., 2016), perform better (Manninen et al., 2022), achieve better grades (Gillet et al., 2019), and have more indicators of well-being (Nie et al., 2015). For these reasons, employers and teachers can optimize people's work and wellbeing by providing work and school environments that support autonomy, competence, and relatedness.

Science of Reading Policies and Self-Determination Theory

When we carefully examine SOR policy implementation in light of SDT, we are able to see that current SOR policies are undermining students' self-determination and thereby undermining their motivation, wellbeing, and academic achievement.

As demonstrated above, SOR policy focuses on foundational reading skills that are prerequisites for learning to read: alphabetic and phonetic knowledge. These vital basic skills are effectively taught through direct instruction (Foorman et al., 1998; NRP, 2000; Rupley et al., 2009). A central argument for adopting SOR policy has been that schools are not focusing enough instruction on these foundational skills, and they are not being taught explicitly or systematically. For example, Hanford (2018) shared

> decades of scientific research have revealed that reading doesn't come naturally. The human brain isn't wired to read. Kids must be explicitly taught how to connect sounds with letters—phonics…. But this research hasn't made its way into many elementary school classrooms. (para. 6)

As a result, many SOR policies require schools or school districts to adopt specific curricula and mandate fidelity to the program that emphasizes direct instruction.

Consider the following example from our local district: Benchmark Advance is the adopted SOR curriculum. The Benchmark Advance Research Foundation program guidance materials state that "phonological and phonemic awareness skills are introduced in whole-group targeted mini-lessons and then reinforced during small-group instruction based on students' needs, providing differentiated, direct instruction. Specific language for modeling the phonological awareness skills is provided in the daily lessons." These lessons are fully scripted and many teachers who are frequently reminded to maintain the fidelity of the program interpret that as a mandate to follow the script. As a result, the whole group, direct instruction portions of the lessons are taking up the majority of the literacy instructional block, leaving no time for differentiated small group instruction.

Herein lies the rub: We fully support explicit and systematic teaching of basic literacy skills. Indeed, there are strong data demonstrating the effectiveness of 15-30 minutes of daily explicit and

systematic phonics instruction for primary grade students who have not acquired these basic skills (Duke & Mesmer, 2019; Ehri, 2020; Foorman et al., 1998; NRP, 2000). However, recent SOR curricula allot much more than the 15-30 minutes of daily explicit phonics instruction recommended by research, and the curricula typically requires undifferentiated, whole-class, direct instruction. For example, according to the first grade, unit two, week three comprehensive literacy planner from Benchmark, Day One of instruction includes 15-20 minutes of scripted, whole-group instruction on L-blends with an additional 10-15 minutes of small group or independent practice on the same blends. In addition, the students do a daily minimum of between 15 and 20 minutes of phonics work on the computer using the Lexia program.

This enactment is the major problem with the SOR movement that we outlined in the introduction. As noted above, SOR tells us a lot about the knowledge and skills students need to learn to read (Duke & Cartwright, 2021; NRP, 2001; Snow et al., 1998, 2005). It provides minimal guidance on most effective early literacy pedagogy (Petscher et al., 2020; Seidenberg et al., 2020; Shanahan, 2020; Solari et al., 2020) and does not include long-standing research on culturally sustaining pedagogy, differentiation, or motivation (Gabriel & López, 2024; Paris, 2012; Paris & Alim, 2017; Parsons & Erickson, 2024; Puzio et al., 2020). So, policymakers are mandating instruction that accurately addresses what needs to be taught but that misses the mark on how it should be taught and to whom. For instance, explicitly teaching phonics skills is aligned with research (Ehri, 2020; Foorman et al., 1998; Rupley et al., 2009). Explicitly teaching phonics skills for an hour to kindergarteners using whole-group instruction is not (NRP, 2000). Whole-class direct instruction is an efficient way to present material to all students in the class (Shapiro & Solity, 2008). However, whole-class direct instruction assumes all students are at the same place regarding their literacy knowledge and precludes culturally sustaining pedagogy, differentiation, and collaboration (Puzio et al., 2020; Walpole & McKenna, 2017).

As mentioned early in this paper, effective instruction is also characterized by culturally sustaining pedagogy (Paris, 2012). Culturally sustained pedagogy, which builds upon culturally relevant and culturally responsive pedagogies (Gay, 2015; Ladson-Billings, 1990), is rooted in the understanding that schools reflect white, middle-class knowledge, priorities, values, and norms that present impediments to learning for students from minoritized backgrounds who bring different funds of knowledge, priorities, values, and ways of being (Freebody & Luke 1990; Milner, 2021; Paris & Alim, 2017). Therefore, culturally sustaining pedagogy emphasizes honoring linguistic, literate, and cultural pluralism. This approach to instruction can sustain "the cultural and linguistic competence of their communities while simultaneously offering access to dominant cultural competence" (Paris, 2012, p. 95). Culturally sustaining pedagogy is offered as a path to addressing the achievement gap between white and minoritized students because it reduces the cultural mismatch between minoritized students and schools, which aligns with SDT's emphasis on autonomy, competence, and relatedness (Gabriel & López, 2024).

As it is currently conceptualized, then, the implementation of SOR-approved instruction in the classroom is likely to have negative effects on students' learning and motivation. Cornerstones of SOR curricula include: a focus on foundational skills, explicit teaching, whole class instruction, uniform instruction, and independent work. Yet, research on how people learn (National Academies of Sciences, 2018; Ormrod, 2020) and SDT (Ryan & Deci, 2017) tells us that students learn best when instruction is culturally sustaining, differentiated, and when students have choices and work collaboratively.

If educational research has taught us anything over the last 150 years, it is that students are different (Afflerbach, 2015; Milner, 2021; Puzio et al., 2020). Students have different backgrounds, cultures, life experiences, interests, linguistic abilities, home lives, nutrition, supports, and more.

Applying uniform instruction to vastly different human beings is illogical. That is why the concept of differentiation—providing different instruction to meet students' different needs—has been a staple of effective teaching for decades (Puzio et al., 2020; Walpole & McKenna, 2017). However, uniform instruction delivered to the whole class, often by reading a script, is the norm for SOR curricular implementation.

From a SDT perspective, a whole class approach that does not include room for culturally sustaining instruction or differentiation is an example of a controlling context. Classroom contexts can be autonomy supportive, which is empowering, or controlling, which thwarts autonomy (Ryan & Deci, 2017). Clearly, this approach could reduce students' feelings of autonomy because the curriculum controls all aspects of instruction without leaving room for teachers to integrate their professional and personal knowledge about their students and their funds of knowledge. Teachers provide autonomy support for their students by first learning about each student's backgrounds, interests, goals, families, traditions, and needs. With this knowledge, teachers design instruction that is curtailed for their students.

When students feel that their need for autonomy is supported, they experience volition in their own learning (Ryan & Deci, 2020). Controlling contexts do not just thwart autonomy; they can have negative impacts on students' needs for competence and relatedness as well (Ryan & Deci, 2017). For example, whole class instruction without differentiation may undermine some students' feelings of competence because the content is too difficult (frustration), too easy (boredom), or irrelevant. In addition, instruction that does not include collaboration among students inhibits their abilities to relate to, and learn from, one another—to form connections that are central to the psychological need for relatedness.

Research on SDT has repeatedly demonstrated that student motivation is heightened when students have choices (Guthrie & Humenick, 2004; Parsons, Malloy et al., 2018) and reading research has illustrated that motivation is associated with reading performance (Schiefele et al., 2012; Stutz et al., 2016; Toste et al., 2020). The Active View of Reading (Duke & Cartwright, 2021) presents motivation and engagement as substantial contributors to reading development, thereby advancing the SVR—as Gabriel and López (2024) stated "providing a 21st century update to a 20th century formula" (p. 236). When students have choices in reading instruction, their feelings of autonomy are heightened and they are more likely to be motivated and engaged (Ives et al., 2021). Unfortunately, student choice is infrequent in SOR implementation. Rather, a much more controlled environment, where the curriculum determines classroom proceedings, is typical.

For example, Benchmark Advance focuses on building content knowledge within and across grades. Therefore, the program includes 10 three-week units or knowledge strands that are the same across all grade levels. These units focus on 50% expository text and 50% narrative texts. The first unit focuses on Life Sciences. Kindergarten students will spend three weeks learning about how plants and animals have needs. A year later in first grade, students will spend three weeks of literacy instruction learning about how plants and animals grow and change. By grade five, students will be devoting three weeks of study to cultivating natural resources, specifically studying corn. Having a preselected thematic unit that is repeated every year during the same three-week period in which there is no choice about what is read is a clear example of lack of student choice. The texts read at every grade level are consumable paper pamphlets in which students also write.

A strong research base also exists for student collaboration. When students have opportunities for discussion and collaboration, it supports their oral language development (Cabell et al., 2015), motivation (Guthrie & Barber, 2019), and comprehension (Almasi et al., 2011; Murphy et al., 2009). The Institute of Educational Sciences released a guide for improving K-3 comprehension, which "recommends that teachers lead their students through focused, high-quality

discussions in order to help them develop a deeper understanding of what they read" (Shanahan et al., 2010. p. 23). One of the most well-known and most impactful instructional approaches to teaching reading comprehension, Reciprocal Teaching, has student collaboration as a central feature of the instructional approach (Palincsar & Brown, 1984). Collaborative Strategic Reading (Klingner & Vaughn, 1999) built upon Reciprocal Teaching to teach comprehension strategies to students who are struggling readers (Klingner et al., 2004). As the name implies, collaboration is central to collaborative strategic reading. More recently, Scanlon and colleagues (2024) presented the Interactive Strategies Approach to reading instruction, which emphasizes interaction among students and with the teacher. Yet, most activities in SOR curricular implementation involve teacher modeling or independent student practice. The following example demonstrates this implementation.

The Benchmark Advance comprehensive literacy planner for first grade, week 3, unit 2 outlines the daily instruction focused on the unit's essential question, "How do we learn about characters?" The planner starts with a 10-minute read aloud of a trade book, followed by 45-60-minutes of the teacher reading a text from the pamphlet; teaching vocabulary words and reinforcing print concepts (specifically ending punctuation); phonics and word study focused on l-blends and the first read-aloud of a second story from the pamphlet. The next two guidelines list small group reading, and independent reading and conferring, with no time allocated for either of these collaborative instructional contexts. Writing and language lessons follow, with a suggested timeframe of 20 minutes. Independent writing and conferring come at the end of the lesson, again, with no suggested time allocation. Adding up the suggested timing results in 90 minutes of primarily teacher-led direct instruction. In the upper grades, more of the 90 minutes of instructional time is allocated to independent practice. This restricted type of instruction precludes students from important dialogue and collaboration in literacy instruction that is supportive of literacy learning, critical thinking, empathy, and more.

Conclusion

SOR legislation is sweeping the country with a large majority of states adopting policies that require teaching the science of reading. At first glance this is a positive movement: Yes, teachers and schools should use scientific research to guide instruction. Upon closer inspection, however, the policies being written into law and the implementation of the policies are extending beyond, and in some cases distorting, what the scientific evidence shows (see Reinking et al. [2023] and Tierney & Pearson [2024] for extended discussions of the misalignment between SOR movement and existing research). In this article, we provided a snapshot of current SOR legislation, including the description of one state's law in more depth. Then we described SDT, a theory of human behavior guided by decades of research on human well-being and explored how SOR legislation and implementation undermines students' basic psychological needs of autonomy, competence, and relatedness and therefore is likely to lead to disengagement, disaffection, and poor outcomes (Gabriel & López, 2024; Ryan & Deci, 2017, 2020).

Teachers and leaders would be well served to plan implementation guided by expansive research that is informed by not only the knowledge and skills needed to learn to read but also how people learn, effective pedagogy, and human well-being. SDT informs these areas of inquiry. Let us keep the positive aspects of the SOR policy movement (high-quality curricula, explicit teaching, increased teacher knowledge, consistent assessment, targeted intervention) and implement it with understandings of human well-being from SDT regarding learning (e.g., student choice and collaboration). For example, we recommend that teachers monitor not only student progress data

but also students' interest and engagement in literacy tasks. Extending the examples from Benchmark described above, teachers can incorporate opportunities to engage students in interesting tasks that apply and expand their understanding such as a student debate on cultivating and managing natural resources or applying specific details to bring a book character to life in a character interview. Both activities invite creative thinking and additional study along with opportunities to learn about student viewpoints for further instruction. Infusing reading instruction into disciplinary teaching is another avenue for enhancing the relevance of the content. Explicitly teaching the vocabulary words that students need to engage in a social studies unit adds authenticity to word learning. Collaboratively reading a science text as a class to prepare for an upcoming experiment opens opportunities for reading comprehension instruction that promotes feelings of relatedness and competence.

While SOR policies aim to enhance literacy education through evidence-based practices, their implementation often overlooks critical aspects of effective pedagogy and student motivation as informed by SDT. By mandating uniform instructional approaches that prioritize foundational skills over differentiated and culturally sustaining pedagogies, these policies risk undermining students' autonomy, competence, and relatedness—key drivers of motivation and well-being. To truly benefit students, educators and policymakers must integrate SOR's strengths with SDT principles, fostering environments that support diverse learners through choice, collaboration, and relevance in instruction. By doing so, we can ensure that literacy education not only adheres to scientific rigor but also nurtures the holistic development of students, preparing them for a lifetime of engaged and meaningful learning.

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