April 2023

More than Words: Using Children's Literature to Promote Self-Awareness in the Primary Grades

Vicki L. Luther
Mercer University, luther_vl@mercer.edu

In 1986, a book of short essays entitled *All I Really Need to Know I Learned in Kindergarten: Uncommon Thoughts on Common Things* was published. Written by Robert Fulghum, it became a best seller and sold millions of copies throughout the United States and internationally. The first essay, for which the book is named, tells of life lessons that are learned at the commencement of formal education. Play nicely. Share. Respect others. Be kind (Fulghum, 1986). Such lessons parallel the concept that social interactions are paramount to learning (Vygotsky, 1978). However, while these were, and still are, pivotal aspects of social interactions in both childhood and adulthood, the primary classroom of today looks vastly different than that from four decades ago, and this difference has been manifested through ways that reading and language arts are now taught in the primary grades.

Fulghum's (1986) reflections seem to be but a distant memory in the history of public education, as the often-idealized world of naptimes and play has been replaced with more structured, assessment-focused learning environments. Wohlwend (2022) posits that the loss of play and less-structured learning within primary classrooms is a direct result of the notion that literacy learning should be more serious and thoughtful in nature. Other researchers have long recognized a heightened emphasis on high-stakes accountability in our literacy instruction (e.g. Bassok et al., 2016; Meens & Howe, 2015). Yet while the educational landscape has changed, literacy events should still be socially constructed and fostered (Diehl, 2005; Vygotsky, 1978). Connecting literacy with elements of social and emotional skillsets enhances both language development and social understandings (Bennett et al., 2016). Data show the connectivity between linguistical and socioemotional fundamentals; such foundational skills are paramount for higher-level competencies in English language arts (Barber & Klauda, 2020).

While many psychologists and educators have long recognized the benefits of implementing social and emotional learning in classrooms (Taylor et al., 2017), the pandemic has thrust its importance into the forefront of many academic discussions. Recognition of the necessity for socioemotional learning may now be even more critical due to the ramifications of COVID-19. The negative impacts of the pandemic can be seen in P-12 students' social, emotional, and cognitive understanding. Young children in particular had limited understanding of what was occurring, making for a confusing and stressful time in their lives (Giannotti et al., 2021), and the lack of social interactions during the height of the pandemic caused feelings of isolation, separation, and anxiety in many children (Van Lancker & Parolin, 2020). Socioemotional skills allow children to express and manage their feelings in appropriate ways in order to build and sustain relationships with others (Darling-Churchill & Lippman, 2016), yet in a

recent national survey, 33% of teacher participants reported concern for their students' social and emotional well-being due to the effects of the pandemic (Schwartz et al., 2021).

There have been a large number of studies conducted on the ramifications of the pandemic. For instance, according to 2022 data from the National Center for Education Statistics (NCES), 87% of the P-12 public school administrators who participated in the School Pulse Panel survey (n=846) reported that the COVID-19 pandemic negatively impacted the social and emotional development of students during the 2021–2022 school year, 70% of participants reported the need for more school training to support students' socioemotional development, and 84% of survey participants either agreed or strongly agreed that students' behavioral development has been negatively impacted since the beginning of the pandemic. In another study, Bowyer-Crane et al. (2021) found that over 90% of participants expressed concern over the impact of students' language development and social development due to the pandemic. Similarly, Pizarro-Rioz and Ordóñez-Camblor have discussed the negative impact of the pandemic on the well-being of children's social, emotional, cognitive, and behavioral processes (2021). Difficulty in expressing oneself linguistically can be linked to problematic behavior in children; this is a critical issue currently being manifested within early childhood classrooms (Chow et al., 2018).

Social Emotional Learning (SEL)

Social and emotional learning is a core component of lifelong learning; such learning is critical for academic success and for college and career readiness (Common Core State Standards, 2010). According to the Collaborative for Academic, Social, and Emotional Learning (CASEL), social and emotional learning can be categorized as one's development in the application of skills that allow for the management of emotions, achievement of goals, the forming and maintaining of relationships, and the progression into an advantageous identity of self (CASEL, 2021). Social-emotional learning centers around five interrelated competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. Self-awareness is defined as "the abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts" (CASEL, 2020, p. 2). Sutton (2016) describes self-awareness as a means in which individuals can recognize inward, internal feelings of self as well as one's external interactions with others. While all five are critical in students' development, self-awareness is often seen as a most fundamental trait (Rochat, 2003).

Self-Awareness and Students

Self-awareness is often the first competency discussed, as it is through such cognizance that one can truly learn and grow. Therefore, "increased awareness of the self is both a tool and a goal" (Fenigstein et al., 1975, p. 522). It is through self-awareness that children are able to recognize their emotions, gain confidence in their abilities, and build self-efficacy. The development of self-awareness allows students to recognize their capabilities and learn who they are and what they can be. In such mindfulness, students learn about themselves as social beings, and by increasing such traits, students are able to become more involved in their own learning processes while enhancing reading skills (Ennis et al., 2018). As reading abilities become enhanced, text complexity strengthens, and as children learn to read, they must be aware of characters' thoughts and feelings by using their own theories and thought processes. The readers' "theory of mind is what allows them to draw inferences about intents, goals, and emotions" (Shanahan, 2020, p. S241). However, it begs to question whether children will truly be able to comprehend characters' "intents, goals, and emotions" if they are unable to recognize and analyze their own (p. S241).

Therefore, developing an understanding of emotions, behaviors, and self-regulation must begin early in a child's life (Bockmann & Yu, 2022). Today's young students may not even remember life pre-pandemic, so it is imperative that educators look at the social and emotional toll that this has had on young learners. One way that pre-kindergarten through second grade teachers can represent self-awareness is through the use of picture books appropriate for the grade levels and age groups.

Self-Awareness in Texts

Books are more than words. They serve as a reflection into the world around and into ourselves, as texts can serve as mirrors if "the reader sees some aspect of themselves reflected" (Heineke et al., 2022, p. 277). Just as it is critical for students to see themselves through literature (Bishop, 1990), it is equally important for students to gain self-awareness for them to see themselves as identifiable reflections of who they are and what they can become (Rochat, 2003). While literacy reflections can help children to recognize aspects of themselves through physical representations and culture, family, and community, children's literature can also show emotional characteristics, allowing students to recognize emotional aspects of both the characters and themselves. Literature can help students to connect with characters and can support students' engagement and efficacy, as "emotional reflections inspire readers to connect with characters and classmates in various ways" (Heineke et al., 2022, p. 277).

Children's literature is a gateway into an appreciation of the reading process, yet it can sometimes be easy to forget how books make children feel. Engaging stories can be used to help young children engage in reflective practices and critical understandings in a safe and efficient environment. As children begin their years in formal education, they must be able to learn about who they are and how they individually fit into the "big picture" of school. Each child is unique, and the primary grades are a time for students' personalities to unfold. Therefore, allowing students opportunities to see themselves in high-quality literature (Bishop, 1990) allows students to love—and live—their identities. At this age and stage, children's books should be read-aloud daily, and the implication of social-emotional themes, including self-awareness skills, should be discussed (Alberton Gunn et al., 2022). According to Kozak and Recchia (2018), the reading of fictional texts can give children sociocognitive learning opportunities; this is critical for primary-grade students as they are simultaneously learning to navigate academics and social and emotional constructs.

There are a large number of high-quality children's literature selections that can be used to teach self-awareness components while simultaneously teaching important literacy components. Additionally, such books can be used as a vessel for comprehension, reflection, and discussion.

The following is a brief list of literature that can be used to teach self-awareness components for children. This is in no way an exhaustive list of all of the high-quality selections that can be used to explore self-awareness. These books were selected based on the content, age-and grade-level appropriateness, and suitability for read-aloud purposes. While some of these were written decades ago, many were published more recently.

Name of Book	Name of Author/Illustrator	Components
Chrysanthemum (1991)	Kevin Henkes	Self-confidence, self-esteem, bullying, self-love
Enemy Pie (2000)	Derek Munson; Tara Calahan King	Showing kindness, being a friend, not judging others
Grumpy Monkey (2018)	Suzanne Lang; Max Lang	Feeling blue and mad, having bad days, being able to express emotions

How Do Dinosaurs Say I'm Mad? (2013)	Jane Yolen; Mark Teague	Anger, learning how to calm down after being upset
I am Enough (2018)	Grace Byers; Keturah A. Bobo (2018)	Being kind, respecting self and others
I am OK to Feel (2022)	Karamo Brown and Jason "Rachel" Brown; Diobelle Cerna	Identifying emotions such as anxiety and fear, expressing emotions appropriately
I Believe I Can (2020)	Grace Byers; Keturah A. Bobo	Self-confidence, self-esteem, self-acceptance
I'm Happy-Sad Today (2019)	Lory Britain; Matthew Rivera	Emotions can change; feelings can be mixed
I Need a Hug (2015)	Aaron Blabey	Kindness, friendship, respect of others, judging others
Linus the Little Yellow Pencil (2019)	Scott Magoon	Sharing, working together, collaboration
Madeline Finn and the Library Dog (2016)	Lisa Papp	Building self-confidence (in learning to read), friendship, developing patience
Madeline Finn and the Shelter Dog (2019)	Lisa Papp	Working together, kindness, empathy
Madeline Finn and the Therapy Dog (2020)	Lisa Papp	Friendship, empathy, perseverance, helping others
Most Perfect You (2022)	Jazmyn Simon; Tamisha Anthony	Self-acceptance, self-confidence
Perfect (2019)	Max Amato (2019)	Fear of making errors, working together, acceptance of self and others
Ruby Finds a Worry (2021)	Tom Percival	Feelings of worry and stress, identifying and

		recognizing causes of worry
Scaredy Squirrel (first in series); 2008	Mélanie Watt (2008)	Fear of the unknown, feeling afraid of new situations, stress and worry
Speak Up, Molly Lou Melon (2020)	Patty Lovell; David Catrow	Speaking up for others and for self, friendship, self-esteem
Thank You, Omu! (2018)	Oge Mora	Sharing, being thankful, showing kindness, cultural appreciation
That Rule Doesn't Apply to Me! (2016)	Julia Cook; Anita DuFalla	Recognizing the need for rules, showing respect for others and for self
The Bad Seed (2017)	Jory John; Pete Oswald	Self-acceptance, having a better attitude, recognizing emotions, behaviors
The Boy with Big, Big Feelings (2019)	Britney Winn Lee; Jacob Souva	Anxiety, sensitivity, strong emotions
The Day You Begin (2018)	Jacqueline Woodson; Rafael Lopez	Self-acceptance, self-esteem, self-love, feeling different
The Girl with Big, Big Questions (2021)	Britney Winn Lee; Jacob Souva	Persistence, curiosity, self-motivation, a desire to learn
The Good Egg (2019)	Jory John; Pete Oswald	Self-care, acceptance of self and others, behaviors
The Good Egg and the Talent Show (an "I Can Read" leveled book); 2022	Jory John; Pete Oswald	Self-acceptance, kindness, friendship, helping others
The Invisible Boy (2013)	Trudy Ludwig; Patrice Barton	Friendship, kindness, feelings of inclusivity and exclusivity,

		differences in personalities
Thelma the Unicorn (2015)	Aaron Blabey	Self-acceptance, friendship, self-love
The Name Jar (2003)	Yangsook Choi	Self-acceptance, cultural appreciation, respect of self and others, belonging
The Smart Cookie (2021)	Jory John; Pete Oswald	Self-confidence, self-esteem, self-respect
The Sour Grape (2022)	Jory John; Pete Oswald	Forgiving others, friendship, learning to not hold grudges
The Way I Feel (2005)	Janan Cain	Recognizing feelings and emotions, learning how to appropriately express emotions
Wemberly Worried (2010)	Kevin Henkes	Stress, worry, managing fears
When Sophie's Feelings are Really, Really Hurt (2015)	Molly Bang	Being made fun of and criticized, feelings of sadness, self-esteem
When Sophie Gets Angry…Really, Really Angry… (1999)	Molly Bang	Managing anger, recognizing emotions
When Sophie Thinks She Can't (2018)	Molly Bang	Feelings of inadequacies (in math skills), self-confidence, self-efficacy
Wilma Jean, the Worry Machine (2012)	Julia Cook; Anita DuFalla	Learning to cope with anxiety and fear
Yoko (1998)	Rosemary Wells	Respecting others and self, cultural appreciation, friendship, self-acceptance

Yoko Finds Her Way (2014)	Rosemary Wells	Feelings of anxiousness, cultural appreciation, kindness
Yoko Writes Her Name (1998)	Rosemary Wells	Friendship, cultural appreciation, self-efficacy
You are Your Strong (2019)	Danielle Dufayet; Jennifer Zivoin	Self-confidence, self-esteem, recognizing emotions

Through such texts, children can recognize and discuss attributes of appropriate behavior, emotions, and values that are applicable to both the characters and to themselves. Students can also reflect on how they are similar to a particular character, how they differ from a particular character, if they have ever felt the way a character feels, if they would react the way a character reacts to a situation or problem, positive attributes of a particular character, positive attributes of themselves, what lesson a particular character may have learned by going through an experience, and lessons they might learn from the characters, among many others.

Self-Awareness and Teachers

No discussion of self-awareness in the primary grades would truly be complete if we fail to discuss its importance for the teacher as well as for students. Over the past several years, there has been much discussion and debate concerning the science of reading (e.g. Duke et al., 2021; Woulfin & Gabriel, 2022). The science of reading is founded on the knowledge of reading development and research-based instructional processes (Petscher et al., 2020; Woulfin & Gabriel, 2022). However, while this is critical, it is also important that teachers not forget about the "science of self." Social-emotional components should be recognized within the contexts of the science of reading, as socioemotional factors determine reading development and motivation (Duke et al., 2021; Petscher et al., 2020). It would be a travesty to forget the reader in the reading equation; therefore, teachers must create learning environments that allow for social and emotional supports as well as academic supports. Quality reading instructors must look at learning holistically; just as "many fields contribute to knowledge for the teaching of reading (e.g., education, psychology, linguistics, neuroscience, sociology, biology)," many elements go into the complex feelings and socioemotional paradigms associated with reading (Gabriel, 2020, p. 12).

Though self-awareness is a journey of discovery for each person, positive self-awareness must be modeled, particularly in language arts instruction. When we, as adults, are aware of our own emotions, our own feelings of frustrations,

successes, and accomplishments, we can be more reflective in our teaching practices. Teachers in the primary grades can help students begin to recognize emotions being felt during reading. Not only can this be done when students are listening to books being read aloud, this can also be done when students themselves are learning to read. Helping students to recognize the emotions that occur while reading allows for deeper connections, comprehension, and awareness. This permits students to learn to honestly reflect and to assess feelings of frustration, confusion, excitement, understanding, and recognition when reading (Graesser & D'Mello, 2012). Not only can students learn to focus the social and emotional attributes of characters, they can also learn to become aware of who they are and want to be within this literacy space.

Additionally, it is important to note that self-awareness is one of the most evolutionary aspects of child development. Although such mindfulness must be shaped in the early years, one's self-awareness evolves throughout life (Rochat, 2003). Having a growth mindset is a critical aspect of self-awareness (CASEL, 2021). Educators can, and do, face enormous challenges and stress, and emotions can rapidly and vastly differ throughout a day; however, Kwon et al. (2019) found that the perceived and expressed anxiety and negative moods of adults greatly influence the quality of emotions in children. When distress and angst are constant representations of adult emotions, it often leads to adverse behaviors in children (Kwon et al., 2019). Thus, we do not help students develop the ability to understand their own emotions and thoughts if we do not model this for them (CASEL, 2021).

Conclusion: Perhaps Everything Old Should Be New Again

It is impossible to truly say how much of an impact the COVID-19 pandemic has had on the social, emotional, and cognitive well-being of children. However, perhaps this time in history has served a valuable lesson for us. While we will probably never go back to Robert Fulghum's view of kindergarten, this may be the time to go back to some older ways of thinking and complete a "reset" for the young children in our care. Clark (2020) encourages teachers to think in a slower manner; instead of hurrying to ensure that all tasks are completed and all standards met, Clark (2020) posits that we may have to go at a slower pace at this point in time. Though reading instruction of today may look different due to our hurried curricula and heightened accountability, our students' developmental needs must remain a top priority. As Egan and colleagues so wisely state, early childhood teachers must "listen deeply, observe deeply, and connect deeply with children" (Egan et al., 2021, p. 932). Bringing self-awareness to the forefront of our literacy instruction, through thoughtful processes, can give students a strong start in their academic journey.

References

Alberton Gunn, A., Bennett, S.V., & Peterson, B.J. (2022). Exploring multicultural picturebooks with social-emotional themes. *The Reading Teacher, 0*(0), 1-13. http://doi.org/10.1002/trtr.2145

Barber, A. T., & Klauda, S. L. (2020). How reading motivation and engagement enable reading achievement: Policy implications. *Policy Insights from the Behavioral and Brain Sciences,7*(1), 27–34. https://doi.org/10.1177/2372732219893385

Bassok, D., Latham, S., & Rorem, A. (2016). Is kindergarten the new first grade? *AERA Open, 1*(4), 1-31. https://doi.org/10.1177/2332858415616358

Bennett, S.V., Gunn, A.A., & Leung, C. (2016). Comprehension strategy instruction with literature circles and response journals: Promoting preservice teachers' metacognitive thinking about a multicultural text. *Literacy Practice and Research, 42*(1), 26-33.

Bishop, R. S. (1990). Mirrors, windows, and sliding glass doors. *Perspectives: Choosing and Using Books for the Classroom, 6*(3), ix–xi.

Bockmann, J. O., & Yu, S.Y. (2022). Using mindfulness-based interventions to support self-regulation in young children: A review of the literature. *Early Childhood Education Journal,* 1-11. https://doi.org/10.1007/s10643-022-01333-2

Bowyer-Crane, C., Bonetti, S., Compton, S., Nielsen, D., D'Apice, K., & Tracey, L. (2021). The impact of Covid-19 on school starters (Interim Briefing No. 1). Education Endowment Foundation. https://d2tic4wvo1iusb.cloudfront.net/

Chow, J. C., Ekholm, E., & Coleman, H. (2018). Does oral language underpin the development of later behavior problems? A longitudinal meta-analysis. *School Psychology Quarterly, 33*(3), 337–349. https://doi.org/10.1037/spq0000255

Clark, A. (2020). Towards a listening ECEC system. In C. Cameron & P. Moss (Eds.), *Transforming early childhood in England: Towards a democratic education*. (pp. 134–150). UCL Press. https://doi.org/10.2307/j.ctv1503g6p.15

Collaborative for Academic, Social, and Emotional Learning (CASEL). (2020). *CASEL's SEL framework: What are the core competence areas and where are they promoted?* (2020). https://casel.org/casel-sel-framework-11.2020/

Collaborative for Academic, Social, and Emotional Learning (CASEL). (2021). *Social emotional learning (SEL) competencies.* Institute of Education Sciences.

Common Core State Standards (CCSS). (2010).

http://www.corestandards.org/the-standards

Darling, K., & Lippman, L. (2016). Early childhood social and emotional development: Advancing the field of measurement. *Journal of Applied Developmental Psychology*, *45*, 1-7. https://doi.org/10.1016/j.appdev.2016.02.002

Diehl, H.L. (2005). Snapshots of our journey to thoughtful literacy. *The Reading Teacher, 59*(1), 56-59. https://doi.org/10.1598/RT.59.1.6

Duke, N.K., Ward, A.E., & Pearson, P.D. (2021). The science of reading comprehension instruction. *The Reading Teacher, 74*(6), 663-672. http://doi.org/10.1002/trtr.1993

Egan, S.M., Pope, J., Moloney, M., Hoyne, C., & Beatty, C. (2021). Missing Early education and care during the pandemic: The socio-emotional impact of the COVID-19 crisis on young children. *Early Childhood Education Journal,49*, 925–934. https://doi.org/10.1007/s10643-021-01193-2

Ennis, R. P., Lane, K. L., & Oakes, W. P. (2018). Empowering teachers with low-intensity strategies to support instruction: Self-monitoring in an elementary resource classroom. *Preventing School Failure, 62*(3), 176–189. https://doi.org/10.1080/1045988X.2017.1408055

Fenigstein A., Scheier M. F., Buss A. H. (1975). Public and private self -consciousness: Assessment and theory. *Journal of Counselling and Clinical Psychology, 43*(4), 522–527.

Fulghum, R. (1986). *All I really need to know I learned in kindergarten: Uncommon thoughts on common things.* Ballantine Books.

Gabriel, R. (2020). The future of the science of reading. *The Reading Teacher, 74*(1), 11-18. doi:10.1002/trtr.1924

Giannotti, M., Mazzoni, N., Bentenuto, A., Venuti, P., & Falco, S. (2021). Family adjustment to COVID-19 lockdown in Italy: Parental stress, co-parenting, and child externalizing behavior. *Family Process, 61*(2), 745-*763*. https://doi.org/10.1111/famp.12686

Graesser, A.C., & D'Mello, S. (2012). Moment-to-moment emotions during reading. *The Reading Teacher,66*(3), 238–242. doi:10.1002/TRTR.01121

Heineke, A.J., Papola- Ellis, A., & Elliott, J. (2022). Using texts as mirrors: The power of readers seeing themselves. *The Reading Teacher, 76*(3), 277 -284. https://doi.org/10.1002/trtr.2139

Kozak, S., & Recchia, H. (2018). Reading and the development of social understanding: Implications for the literacy classroom. *The Reading Teacher, 72*(5), 569-577. https://doi.org/10.1002/trtr.1760

Kwon, K. A., Jeon, S., Jeon, L., & Castle, S. (2019). The role of teachers' depressive symptoms in classroom quality and children's developmental outcomes in Early Head Start programs. *Learning and Individual Differences, 74*, 1-13. https://doi.org/10.1016/j.lindif.2019.06.002

Meens, D. & Howe, K. (2015). NCLB and its wake: Bad news for democracy. *Teachers College Record, 117(*6).

National Center for Education Statistics. (2022, July). More than 80 percent of U.S. public schools report pandemic has negatively impacted student behavior and socio-emotional development. https://nces.ed.gov/whatsnew/press_releases/07_06_2022.asp

Petscher Y., Cabell, S.Q., Catts, H.W., Compton, D.L, Foorman, B.R, Hart, S.A., Lonigan, C.J., Phillips, B.M., Schatschneider, C., Steacy, L.M., Terry, N.P., & Wagner, R.K. (2020). How the science of reading informs 21st-century education. *Reading Research Quarterly, (55)*1, S267-S282. http://doi: 10.1002/rrq.352

Pizarro-Ruiz, J. P., & Ordóñez-Camblor, N. (2021). Effects of Covid-19 confinement on the mental health of children and adolescents in Spain. *Scientific Report, 11*, 11713. https://doi.org/10.1038/s41598-021-91299-9

Rochat, P. (2003). Five levels of self-awareness as they unfold early in life. *Consciousness and Cognition,12*, 717–731. doi:10.1016/S1053-8100(03)00081-3

Schwartz, H.L., Diliberti, M.K., Berdie, L., Grant, D., Hunter, G.H., & Setodji, C.M. (2021). Urban and rural districts showed a strong divide during the COVID-19 pandemic: Results from the second American school district panel survey. RAND Corporation. https://www.rand.org/pubs/research_reports/RRA956-2.html

Shanahan, T. (2020). What constitutes a science of reading instruction? *Reading Research Quarterly, 55*(S1), S235–S247. doi:10.1002/rrq.349

Sutton, A. (2016). Measuring the effects of self-awareness: Construction of the self-awareness outcomes questionnaire*. European Journal of Psychology,12(*4),645-658. doi:10.5964/ejop.v12i4.1178

Taylor, R.D., Oberle, E., Durlak, J.A., & Weissberg, R.P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development, 88*(4), 1156-1171.http://doi.org/10.1111/cdev.12864

Van Lancker, W., and Parolin, Z. (2020). COVID-19, school closures, and child poverty: A social crisis in the making. Lancet Public Health 5: e243–e4. http://doi.org/10.1016/S2468-2667(20)30084-0

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes.* (M. Cole, V. John-Steinter, S. Scribner, & E. Souberman, Eds. & Trans.). Harvard Press.

Wohlwend, K. (2023). Serious play for serious times: Recentering play in early literacy classrooms. *The Reading Teacher, 76*(4), 478-486. https://doi.org/10.1002/trtr.2157

Woulfin, S.L., & Gabriel, R. (2022). Big waves on the rocky shore: A discussion

of reading policy, infrastructure, and implementation in the era of science of reading. *The Reading Teacher, 76*(3), 326-332. http://doi.org/10.1002/trtr.2153