Severe challenging behavior exhibited by individuals diagnosed with developmental disabilities is a persistent problem in the lives of these individuals and their families.¹ This severe, challenging behavior puts individuals engaging in it and those around them at particular risk for injury and other adverse effects. These challenging behaviors sometimes appear random or unpredictable to observers. However, there are ways of assessing these behaviors that allow individuals to predict when and why they might occur.

Imbiriba and colleagues² explicate the importance of assessing and treating severe challenging behavior. They then explore the use of wearable technology in predicting occurrences of aggressive behavior, including self-injurious behavior and emotional dysregulation, exhibited by individuals with autism spectrum disorder residing in psychiatric inpatient units. In short, participants wore biosensors that measured their cardiovascular activity, electrodermal activity, and motion. Then, physiological data were correlated with the occurrence of challenging behavior. Research staff also collected data on aggressive behavior that automatically synced with biosensor data. The authors’ method involved several models of analysis, including logistic regression, support vector machines, neural networks, and domain adaptation. The best-performing overall classifier, logistic regression, predicted the occurrence of challenging behavior 3 minutes before it occurred in approximately 80% of circumstances.

The work of Imbiriba et al² expands on previously conducted studies examining the association between physiological markers and challenging behavior. The continuation of this line of research shows promise for its eventual utility in practice. It is good to see researchers picking up this topic and moving it forward after some time. Freeman and colleagues³,⁴ conducted research, descriptive in nature, examining the association between certain physiological events and challenging behavior. Although the data produced by these 2 older studies are interesting, the findings have not been applied clinically, at least not that we are aware of.

This may be due to the limited utility of wearable technology in the prediction of challenging behaviors. The biggest limitation is the inability, at least for the moment, to provide instantaneous alerts to the occurrence of challenging behavior. However, there are other empirically based methods that can be used in the moment to predict and then treat challenging behavior. Barring medication and other physiological-focused treatments, behavior analytic techniques are the matchless, evidenced-based practice currently used to predict, assess, mitigate, and reduce aggressive or challenging behavior.

Behavior analytic techniques focus on the identification of environmental factors that surround problem behavior. Namely, this approach determines the antecedent, or what happens before the challenging behavior, and the consequences, or what happens after the challenging behavior. These antecedents and consequences, when occurring in tandem with challenging behavior, can predict why that behavior may be occurring, or better said, predict the function of that behavior. Possible functions of behavior include gaining access to attention or tangible items and escaping from tasks or demands. Challenging behavior may also serve an automatic or sensory function (ie, engagement in the behavior itself is what maintains or reinforces the behavior). Which function a challenging behavior serves is identified via a functional assessment in which conditions thought to be influencing the occurrence of a behavior are experimentally manipulated.⁵
Once a function is identified, environmental events that surround problem behavior can be addressed. For example, if a child engages in severe head banging to gain access to the attention of caregivers, peers, or others in the environment, one can teach an alternative, desirable, functionally equivalent behavior (eg, tapping someone on the arm) that can be used to access that attention. Furthermore, that behavior is predictable based on these environmental events. This behavioral technology that identifies environmental events surrounding problem behavior and subsequently predicts them has been studied and used for nearly 40 years.6

These effective behavioral technology methods and wearable technology methods differ greatly but have the opportunity to complement one another in their application. The true value of wearable technology methods may be in identifying antecedent events to challenging behavior (ie, antecedent environmental components that evoke or precede these physiological symptoms). Imbiriba and colleagues2 measured the latency from an antecedent physiological response to the occurrence of challenging behavior. It would be incredibly beneficial to identify what environmental event occurred when that antecedent physiological response began. Identifying these events would help to describe and predict environmental events surrounding challenging behavior with the goal of controlling and addressing these behaviors via behavioral treatment (eg, addressing environmental variables or teaching skills to navigate these environmental events). Freeman and colleagues3,4 had hypothesized the utility of this technology in the functional assessment of challenging behavior within the natural environment (vs a clinical or contrived setting).

Perhaps of greater value, wearable technology could provide insight in complex cases when environmental events contributing to the occurrence of challenging behavior are not easily identifiable, as suggested by Imbiriba et al.2 Although results of functional assessment are often clear and show a predictable pattern of behavior, there are times when that technology does not provide sufficient information to treat challenging behavior. This may occur when individuals have complicated learning histories or when variables playing a crucial role in evoking challenging behavior are not readily observable. These cases thus appear to be more unpredictable than others (or are said to occur out of the blue and without provocation). In these instances, wearable technology models could offer valuable information to clinicians.

Wearable technology as examined by Imbiriba et al2 and Freeman et al3,4 should complement existing and effective behavioral technology. The ecological validity of the technology evaluated in these studies is strong. However, we contend that this technology should be but 1 tool in the toolbox, with existing behavioral technology offering many additional, well-established tools. When these tools are used together, they can contribute to clinicians’ ability to predict severe challenging behavior exhibited by individuals with developmental disabilities and identify variables contributing to the behavior, thereby giving these individuals a higher likelihood of successful treatment outcomes.
REFERENCES


