Research Article Critique

Sydney Hess

Sacred Heart University

OT 503 A: Introduction to Research

Professor Morgan Villano, MPA, MSPS, OTR/L

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The article being reviewed in this paper is “Weighted Blankets and Sleep Quality in Children with Autism” by authors Bryan M. Gee, Victoria Sharp, and Amy Williams (Gee et al., 2021). The purpose of the article is to analyze whether there is a relationship between the use of a weighted blanket and the quality of sleep in children with two specific learning disabilities. In this single-subject ABA design with pre- and post-test phases, the two four-year-old participants studied had a medical diagnosis of ASD, exhibited behavior associated with sensory over-responsivity, and experienced sleep disturbances. The data sets were gathered through quantitative sleep assessments and qualitative caregiver-reported questionnaires. As a result of the study, the researchers discovered that although the weighted blanket had a minimal effect on overall sleep patterns, the blanket improved morning mood and resulted in a notably shorter time to fall asleep for one of the participants. This study is particularly significant because its main strength lies in emphasizing the need to explore evidence-based interventions for children with ASD who experience sleep disturbances, highlighting the importance of ongoing research on how sensory-based strategies, such as weighted blankets, can enhance sleep quality and mood.

Despite limited evidence exploring potential interventions to improve sleep quality through sensory-based methods, the researchers still reported findings from the use of weighted blankets in both adult and pediatric studies (Gee et al., 2021, pp. 1-3). Although there are not enough sources to definitively confirm or refute these findings—which highlights another strength of the research, as the researchers identified this area as under-researched—a notable weakness is that the results of this study conflict with previous research in children. For instance, Gringras et al. (2014) raise questions about the generalizability of their findings and whether the observed improvements in mood and sleep onset reflect actual effects or individual variability. In contrast, other research conducted on adults supports the findings of this article, which may

cause more confusion for the reader (Chen et al., 2014). Furthermore, the references cited by Gee et al. (2021, pp. 13-15) are concerning, as the earliest appropriate reference should have been from 2016, within the ideal five-year range for research (SNHU, 2025). Considering the article being critiqued was written in 2021, only 11 out of the 40 sources met this criterion; this suggests that some of the findings may be unreliable due to their outdated nature (Gee et al., 2021, pp. 13-15). Moreover, approximately half of the sources were secondary, which is problematic because relying on sources without original data can weaken the argument, as publication bias may be a concern (Ingram, 2025). On the contrary, some may interpret the use of multiple secondary sources as a strength, as it enables a time-efficient understanding of the research topic through expert interpretation, corroboration, and contextualization (Rashid, 2023).

The study investigated whether the use of a weighted blanket would help children with ASD in their sleep disturbances, exhibiting tactile and auditory behavioral indicators of over-responsivity (Gee et al., 2021, p. 3). This is a single-subject ABA design with pre- and post-tests, as it requires examining the results of each child separately to conclude the efficacy of the intervention (Brown, 2022, p. 117). The independent variable was the application of the weighted blanket, while the dependent variable was sleep quality, encompassing sleep onset latency, sleep duration, the number and duration of naps, the number of nighttime wakings, and morning mood. First, the procedure involves a pre-test, during which caregivers of the participants provide subjective reports on their child's sleep behaviors, sensor processing tendencies, and difficulties (Gee et al., 2021, p. 3). Next, the A(1) Phase requires caregivers to complete a daily, non-standardized survey to track their child's sleep patterns, including bedtime, total sleep time, frequency of nighttime awakenings, and morning mood. In the Intervention B Phase, the study subjects went to sleep at night, while their caregivers continued to complete the

daily surveys. In the A(2) Post-test Withdrawal Phase, the weighted blankets were terminated, and the caregivers kept filling out daily surveys for a total of 8 days. Since the design monitored personalized sleep patterns and behavioral responses to the weighted blanket over time under a single-subject ABA design with pre- and post-tests under its proper requirements, it is appropriate for the research question involving two children with ASD.

On the other hand, it is crucial to consider that single-subject designs have a significant issue with generalizability because findings from a small sample of only two individuals are not strong enough evidence to draw consistent conclusions (Brown, 2022, p. 117). Regarding concerns for each phase, Gee et al. (2021, p. 5) utilize the Sensory Processing Measure-Preschool auditory and/or tactile subtests (SPM-P) and Children's Sleep Habits Questionnaire (CSHQ) in the pre-test phase, relying on subjective parent reporting, which had the potential to yield inaccurate visual findings or introduce response bias (Brown, 2022, p. 150). During the A(1) phase, the sleep environment was not documented. This is important because single-subject designs should be carried out and recorded under consistent environmental conditions to ensure that any changes in sleep behavior are due to the intervention, rather than external influences (Brown, 2022, p. 117). Similar to the issue in the pre-test, the B phase is problematic due to experimenter bias and the expectation that the blanket should improve the child's mood over time, which may influence the caregiver's reports (Brown, 2022, p. 91). During the final phase, known as A(2) withdrawal or post-test, the removal of the blanket, the intervention, should have removed the improvements made to the children (Brown, 2022, p. 117). Nevertheless, some positive effects persisted even after the blanket was removed (Gee et al., 2021, p. 7), contradicting the expectation that the improvements should either diminish or return to baseline

levels. These issues complicate the determination of whether the weighted blanket intervention genuinely caused the observed and charted changes.

Potential threats to internal validity include Instrumentation Threat, the Hawthorne Effect, Selection/Assignment Bias, and Maturation (Brown, 2022, pp. 85-87). First, the biggest threat, namely possible Instrumentation Bias, varied in the number of days within each phase, resulting in inconsistent measurement conditions. Furthermore, as previously stated, SPM-P and the CSHQ are both subjective, raising questions about the reliability of the measurements used. The Hawthorne Effect could also have occurred, as the presence of a caregiver who occasionally checked on their children may have influenced the children's sleep behavior, making it difficult to isolate the effect of the weighted blanket. Moreover, Selection/Assignment Bias posed a threat to internal validity because research involving only two participants creates uncertainty about whether the changes were caused by the weighted blanket or by individual differences. Furthermore, Maturation threat, which indicates transformations occur over time, and one type of Maturation threat is relevant within studies among children, could have affected the results (Validity PowerPoint, n.d.). Although the author mentions possible bias within the daily caregiver reports and the issue of the small sample size, the researchers did not consider adjusting these methods to prevent potential threats to internal validity.

External validity threats are also involved. For instance, the study did not involve random assignments to protect against sampling error (Brown, 2022, p. 95). More specifically, convenience sampling was employed by asking for volunteers through the distribution of brochures to local healthcare facilities near Idaho State (Brown et al., 2022, p. 96; Gee et al., 2022, p. 4). As a result of the volunteers being local, it is hard for the reader to generalize the findings to the whole population (Brown et al., 2022, p. 97). Similarly, generalizability is limited

because all participants share the same age, severity of ASD, and similar T-score ranges (Gee et al., 2021, p. 5). Furthermore, Gee et al. (2021, p. 6) mention that the same type of weighted blanket, specifically SensaCalm® blankets, ranging from three to seven pounds, was used by both participants, which poses an ecological threat because it limits the applicability of the results to other types of weighted blankets (Brown et al., 2022, p. 95).

One of the measures used was the SPM-P, which is "a judgement-based rating scale to measure distinct sensory processing patterns [tactile, vestibular, auditory, visual, etc.], praxis, and social participation among preschool-aged children" and contains an internally consistent t-score of .75 among all factors of sleep efficacy, intensely correlating to the Sensory Profile (Gee et al., 2021, p. 5). While this source is a standardized measure that has been previously streamlined, subjective reporting may compromise its reliability. Similarly, the CSHQ is an efficient, standardized measure widely used in research; however, it is also subjective, despite demonstrating reasonable reliability (.78) and sensitivity (8.0). An additional measure used in the research is the Daily Caregiver survey, which utilizes the online database SurveyMonkey® to promote daily tracking of changes in sleep quality on a five-point Likert scale (Gee et al., 2021, pp. 5-6). Once again, this measure is unreliable because it is non-standardized, and its reliability has not been established. According to Seanor (2024), standard statistical methods, such as ANOVA or regression, should be used; however, PND statistics are employed in their place. Lastly, the Sense sleep app tracked the same dependent variable through a motion tracker attached to the volunteer's pillowcase or sheet, located at the head of their bed. Potential concerns associated with this device include its unknown reliability due to its proprietary design, as it lacks peer-reviewed involvement in clinical interventions, and the risk of instrumentation failure due to the potential for the device to fall off during the night.

The statistical analysis involved in the research was the percentage of non-overlapping data ([PND]; Gee et al., p. 6). PND is a widely used technique in single-subject research to measure the effects of interventions. It involves identifying the most extreme data point during the baseline phase and calculating the percentage of intervention-phase data points that are higher or lower than this value, depending on whether the aim is to increase or decrease the behavior. Using PND is an appropriate source for statistical analysis because PND is specifically utilized within small data sets in single-subject design studies (Gee et al., 2021, p. 9). Particularly in this research, PND lists the small data sets for the two children from the A1 phase through the A2 Phase.

In conclusion, this study indicates that weighted blankets might help improve sleep quality and morning mood in young children with ASD (Gee et al., 2021, pp. 12-13). Nonetheless, it also points out key issues for single-subject sleep studies in this group, such as the small sample size and unstable baseline, which make interpreting the results challenging. It suggests that further research should explore flexible baseline phases, use wearable tech to objectively monitor sleep, and expand caregiver education to account for sleep variability. Furthermore, increasing the sample size to include children of various ages and severity levels of ASD, as well as testing different weighted blanket options, could enhance the applicability and clinical significance of the findings. For occupational therapists, this research highlights the importance of considering behavioral, sensory, and environmental factors that contribute to sleep problems. It suggests that while weighted blankets are a feasible option, they may not consistently benefit all children with ASD. Overall, the study highlights the need for further research into evidence-based sleep strategies for children with ASD, especially those with sensory over-responsiveness.

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