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Time, Vastness, and Belonging: Outcomes from a Teen Dark-Sky Curriculum Pilot in Colorado

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Abstract

This article reports on a program evaluation of Skyward – Part One, a Utah State University Extension curriculum that promotes adolescent mental well-being through immersive, awe-based dark-sky experiences. Findings indicate the program effectively supported emotional regulation and perspective-taking, demonstrating strong potential for replication of awe-based youth mental-health programming across Extension settings.

Introduction

Adolescents today face alarming rates of anxiety, depression, and emotional dysregulation, often linked to social media use, digital overstimulation, and reduced time in restorative natural environments (Twenge & Campbell, 2018; Nesi & Prinstein, 2015). According to Utah's Statewide Needs Assessment (Narine, 2023), youth mental health remains one of the most critical issues statewide, with rural youth experiencing limited access to behavioral health services. Additionally, limited interaction with natural environments has been associated with poorer mental health outcomes among children and adolescents (Tillmann et al., 2018).

Recent studies demonstrate that awe, a self-transcendent emotion elicited by vast or profound experiences, can promote emotional regulation, empathy, and stress reduction (Keltner & Haidt, 2003; Stellar et al., 2015). Yet few evidence-based programs intentionally integrate awe experiences into youth wellness education. Immediate action is needed to develop accessible, nature-based interventions that cultivate awe, reduce digital overload, and foster emotional connection. The Skyward program addresses this gap by combining dark-sky immersion and reflective facilitation to enhance adolescent well-being.

Response & Target Audience

Utah State University (USU) Extension developed *Skyward – Part One* to address the gap in accessible, awe-based mental wellness programs for adolescents. The curriculum integrates evidence-informed practices in mindfulness, nature immersion, and reflective dialogue to foster emotional regulation and connection. In July 2025, eight adolescent girls (ages 12–16) took part in a dark-sky retreat at Grand Mesa, Colorado, an International Dark Sky Park. The program was led by USU Extension faculty in collaboration with The Nature Connection and Colorado Dark Skies. Activities included guided discussions on teen mental health, sensory grounding exercises, and a silent stargazing walk to cultivate present-moment awareness and awe. Participants completed the Awe Experience Scale (AWE-S) before and after the program.

The Skyward – Part One program involved eight adolescent girls (ages 12–16) from rural communities in western Colorado, where access to youth mental health and enrichment programs is limited. Participants came from diverse socio-economic backgrounds, with several attending through community scholarships provided by The Nature Connection. Each girl participated in about three hours of face-to-face dark-sky programming, including group discussions, mindfulness activities, and guided observation. Interaction was highly participatory, focusing on collaboration, emotional reflection, and peer connection. The program successfully reached its target audience, rural adolescents facing social and digital pressures, with full attendance and active participation throughout all sessions. This pilot was preceded by a pilot program at Great Basin National Park with 12 adolescent boys from Utah.

Outcomes & Impact

Evaluation data from *Skyward – Part One* provides strong preliminary evidence that awe-based, nature-immersion programs can enhance emotional regulation and perspective-taking among adolescents. Following the guided dark-sky experience, participants completed the Awe Experience Scale (AWE-S; Yaden et al., 2019), assessing five dimensions of awe: Time perception, vastness, connection, self-transcendence, and embodied awe.

Among these, *Time* perception received the highest ratings ($M = 4.7$ of 7), with participants frequently describing sensations of slowing time, calmness, and temporary relief from daily pressures. Comments such as “*time slowed*” and “*a calm came over me*” reflected participants’ shift into present-moment awareness, a key mechanism of emotional regulation. Perceived *Vastness* also scored high (mean = 4.4), as several teens expressed that their “*worries felt smaller*” when viewing the night sky. These outcomes support existing research linking awe to reduced rumination and increased well-being (Stellar et al., 2015).

Connection and oneness were also moderately endorsed ($M = 4.4$), while *Self-transcendence* and *Embodied* awe received lower ratings ($M = 3.3$). This pattern suggests adolescents more readily experience cognitive forms of awe, shifts in time, scale, and perspective than embodied or transcendent forms, possibly due to developmental and linguistic factors.

Short-term outcomes demonstrate increased emotional awareness, reduced stress, and improved capacity for reflection. Medium-term effects, based on literature (Gordon et al., 2017; Loton & Waters, 2017), are expected to include enhanced resilience, empathy, and self-efficacy. Feedback from participants and partners also revealed environmental considerations, moonlight, temperature, and comfort, which will inform future implementation.

Public Value & Next Steps

The Colorado *Skyward* pilot affirms that awe is not a luxury; it is a vital, underused resource for adolescent mental wellness. Even brief exposure to vast, quiet, and phone-free environments can help teens slow down, reframe perspective, and experience calm. These outcomes demonstrate measurable progress in addressing Utah’s identified youth mental health needs through accessible, evidence-informed Extension programming. For Extension professionals, *Skyward*

illustrates a replicable model grounded in four principles: Nature as co-therapist, structure matters, unplugging is essential, and language shapes meaning.

Table 1

Core Principles of the Skyward Awe-Based Youth Mental Health Model

Principle	Key Idea	Description
Nature as Co-Therapist	Awe through immersion	Wild, immersive environments evoke awe most reliably, helping participants reconnect with self, others, and place.
Structure Matters	Ritual and safety	Consistent structure, clear rituals, and psychological safety foster reflection and openness during experiences.
Unplugging is Essential	Digital separation	Presence and attention emerge when participants disconnect from digital distractions, creating space for authentic engagement.
Language Shapes Meaning	Developmental connection	Meeting teens where they are developmentally through relatable language enhances insight, understanding, and connection.

As *Skyward* evolves, future modules will integrate embodied practices, creative reflection, and longitudinal evaluation to measure sustained impact. Planned expansion across Utah and neighboring states will build facilitator capacity and align sessions with optimal environmental conditions. We believe that by protecting awe-inspiring places such as Grand Mesa's night skies, we protect the psychological well-being of future generations. Awe, when cultivated intentionally, becomes both a feeling and a form of care, one that reconnects youth to time, vastness, and belonging.

References

- Gordon, A. M., Stellar, J. E., Anderson, C. L., McNeil, G. D., Loew, D., & Keltner, D. (2017). The dark side of the sublime: Distinguishing a threat-based variant of awe. *Journal of Personality and Social Psychology*, 113(2), 310–328. <https://doi.org/10.1037/pspp0000120>
- Keltner, D., & Haidt, J. (2003). Approaching awe, a moral, spiritual, and aesthetic emotion. *Cognition and Emotion*, 17(2), 297–314. <https://doi.org/10.1080/026999303002297>
- Loton, D. J., & Waters, L. E. (2017). The Mediating Effect of Self-Efficacy in the Connections between Strength-Based Parenting, Happiness and Psychological Distress in Teens. *Frontiers in psychology*, 8, 1707. <https://doi.org/10.3389/fpsyg.2017.01707>
- Narine, L. K. (2023). *Utah statewide needs assessment*. Utah State University Extension. <https://extension.usu.edu/employee/program-evaluation/statewide-needs-assessment>

- Nesi, J., & Prinstein, M. J. (2015). Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms. *Journal of Abnormal Child Psychology*, 43(8), 1427–1438. <https://doi.org/10.1007/s10802-015-0020-0>
- Stellar, J. E., Gordon, A. M., Piff, P. K., et al. (2015). Awe and the small self: The effect of awe on prosocial behavior. *Journal of Personality and Social Psychology*, 108(6), 883–899. <https://doi.org/10.1037/pspi0000018>
- Tillmann, S., Tobin, D., Avison, W., & Gilliland, J. (2018). Mental health benefits of interactions with nature in children and teenagers: A systematic review. *Journal of Epidemiology and Community Health*, 72, jech-2018-210436. <https://doi.org/10.1136/jech-2018-210436>
- Twenge, J. M., & Campbell, W. K. (2018). Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive Medicine Reports*, 12, 271–283. <https://doi.org/10.1016/j.pmedr.2018.10.003>
- Yaden, D. B., Kaufman, S. B., Hyde, E., Chirico, A., Gaggioli, A., Zhang, J. W., & Keltner, D. (2019). The development of the Awe Experience Scale (AWE-S): A multifactorial measure for a complex emotion. *Journal of Positive Psychology*, 14(4), 474–488. <https://doi.org/10.1080/17439760.2018.1484940>

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