

Awe Under the Stars: Participant Experiences from Community Dark-Sky Programs

Troy D. Allan, EdD, MFA
Sadie Wilde, MPH
Anna Gilliam

Utah State University Extension

Abstract

This phenomenological study explored participant experiences during community dark-sky programs, with attention to emotional well-being, reflection, learning, and social connection. Data were collected from written reflections (N = 25) during guided stargazing events held at national and state parks and a rural ranch in Utah. Thematic analysis revealed five interconnected themes: emotional shifts and inner peace, connection to nature and the cosmos, curiosity and learning about astronomy, nostalgia and self-reflection, and social engagement. Findings suggest that dark-sky programming may offer a meaningful Extension-based approach for supporting perceived well-being, environmental awareness, and community connection.

Introduction

Access to mental health care remains a persistent challenge in rural communities across the United States. In Utah, the average wait time to see a licensed mental health provider is 37 days, and nearly half of adults experiencing mental illness receive no formal treatment (Utah Behavioral Health Coalition, 2024). Similar patterns exist nationally, where approximately 53% of adults with mental illness receive no treatment (National Alliance on Mental Illness [NAMI], n.d.). Geographic isolation, professional shortages, and stigma surrounding mental health services further complicate access to care.

These challenges are particularly relevant in Utah, where 24 of the state's 29 counties are classified as rural. Residents in these counties experience disproportionately high rates of stress, suicide, and social isolation compared

with urban populations (Utah Department of Health & Human Services, 2024). These disparities underscore the value of accessible, nonclinical community programming that can complement, but not replace, professional mental health services.

Nature-based experiences have increasingly been examined in relation to emotional resilience and well-being. Encounters with natural environments have been associated with reduced stress, improved mood, and enhanced psychological functioning. Experiences of awe, often elicited by vast natural environments, have also been associated with reduced anxiety, increased prosocial behavior, and greater life satisfaction (Bai et al., 2021; Monroy & Keltner, 2023). Awe may encourage humility and perspective shifts through the "small self," a psychological state in which individuals perceive themselves as part of a larger whole (Stellar et al., 2018). Research with military veterans, at-risk youth, and college students further suggests that awe experienced in nature may be associated with indicators of emotional well-being (Anderson et al., 2018).

Dark-sky environments, landscapes protected from excessive light pollution, may offer distinctive settings for awe-based experiences. Observing the night sky can expose individuals to a sense of vastness that encourages reflection, curiosity, and perspective (Glasspool, 2025). These environments therefore represent promising contexts for community programming that integrates astronomy education, environmental awareness, outdoor experience, and opportunities for reflection.

Purpose

The purpose of this study was to explore how adult participants described their experiences during guided community dark-sky programs, with particular attention to perceived emotional responses, reflection, learning, and social connection.

Literature Review

Awe is commonly triggered by perceptually vast stimuli that challenge existing mental frameworks and require cognitive accommodation (Yaden et al., 2016). Such experiences often shift attention away from immediate concerns and toward a broader perspective. One mechanism to explain the effects of awe is the experience of the “small self” (Stellar et al., 2018). This shift in perspective has been associated with increased humility, prosocial behavior, and openness toward others.

Studies examining nature-based awe experiences demonstrate that exposure to awe-inducing environments, such as mountains, forests, and expansive night skies, can produce measurable improvements in emotional well-being across multiple populations (Anderson et al., 2018). Research examining night-sky observation suggests that stargazing can stimulate curiosity, wonder, and emotional engagement with the natural world (Barnes & Passmore, 2024; Barragan & Meltzoff, 2024).

Nighttime nature experiences have also been associated with reduced stress and improved emotional clarity (Bell et al., 2014). Together, these findings suggest that dark-sky environments may provide accessible contexts for awe experiences that support reflection, emotional

regulation, and social connection. Despite growing research on awe and nature-based interventions, relatively little work has examined how community-based dark-sky programs influence participant experiences. This study contributes to addressing that gap.

Method

Research Design

This study employed a qualitative phenomenological design to explore how participants made meaning of their experiences during community dark-sky programs. An interpretive phenomenological orientation informed the study’s attention to awe, reflection, and connection, while thematic analysis provided a systematic process for identifying patterns across participant accounts.

Program Design and Educational Framework

The events were organized as community outreach programs through the Utah State University Extension Dark Sky Project. The program was designed as a nonclinical educational experience that integrated astronomy education, environmental awareness, guided observation, and reflective engagement. It was not designed or delivered as mental health treatment.

Each gathering combined three core elements. First, facilitators led participants in astronomical observation within a low-light environment. Second, interpretive discussion connected the observed night sky with astronomy concepts and awareness of dark-sky environments. Third, participants were given time for personal reflection and shared conversation under the night sky. The educational aims were to encourage

curiosity about astronomy, increase awareness of the nighttime environment, and create structured opportunities for reflection and social connection. The framework was experiential and participant-centered: scientific information was presented in the context of direct observation, and participants could engage by observing, listening, asking questions, conversing, and reflecting. For Extension educators interested in adaptation or replication, the core structure includes a suitable low-light setting, guided astronomical interpretation, environmental context, and intentional time for individual and group reflection. The program's educational and experiential components should be distinguished from clinical interventions or therapeutic services.

Study Sites

Data were collected between February and April 2025 during community dark-sky gatherings held at four locations in Utah: Capitol Reef National Park, Goblin Valley State Park, Bryce Canyon National Park, and Wild Red Clover Ranch in Koosharem.

The first three locations are designated International Dark Sky places. The ranch site offered similarly low light pollution conditions (Bortle Class 1-2). Each gathering included guided astronomical observation, interpretive discussion, and time for reflection under the night sky.

Participants

Participants were adult volunteers attending public stargazing programs promoted through community newsletters, social media, and partner organizations. Participation in the research component was voluntary and separate from participation in the public programming. A total of N = 25 participants submitted

written reflections included in the analysis. Participant demographic characteristics were not incorporated into the present analysis; therefore, the study does not make claims that the sample represents the broader rural population or all dark-sky program participants.

Data Collection

Participants responded to open-ended prompts including: "What did you notice or feel during tonight's experience?" and "How did this experience influence your thoughts, memories, or sense of connection?" Field notes documented environmental conditions, group interactions, and observational insights. An online journal was also used for reflections after the program. These materials captured participants' subjective accounts; they were not clinical screening, diagnostic, or outcome measures.

Data Analysis

Data were analyzed using IPA combined with reflexive thematic analysis. The analytic process included familiarization with the dataset, line-by-line coding, theme development, and cross-case comparison across sites. Qualitative analysis software (QAS), NVivo, assisted with data organization. Insight7 was also used as a supplemental tool to identify recurring language patterns within reflections. Software-generated patterns were treated as analytic aids rather than findings; final thematic interpretation remained researcher-driven. Peer debriefing with a secondary qualitative researcher enhanced analytic rigor. Peer debriefing with a secondary qualitative researcher enhanced analytic rigor.

Ethical Considerations

This study was approved by the Utah State University Institutional Review Board (IRB Protocol #14756). Participation was voluntary and all reflections were anonymized.

Results

Analysis of participant reflections revealed five interrelated experiential themes describing how dark-sky encounters shaped emotional, cognitive, and relational experiences: emotional shifts and inner peace; connection to nature and the cosmos; perspective shifts regarding personal challenges; nostalgia and self-reflection; and social engagement. These themes frequently overlapped within participant narratives. Experiences of awe were often accompanied by emotional calm, deep reflection, and increased openness toward others. The findings represent participants' descriptions and interpretations of their experiences rather than measured clinical or therapeutic outcomes.

Emotional Shifts and Inner Peace

Participants described a noticeable emotional shift during and after stargazing. They frequently reported feeling calmer and more balanced, suggesting the experience provided a temporary reprieve from everyday pressures. One participant described the experience as restoring emotional balance: "I started the week with more calmness. I feel more inner peace and more patience with myself and others. The experience helped me feel balanced again." Another participant connected the experience directly to managing stress and racing thoughts: "I am a type A busy type and being there at the moment helped me decompress and be in the moment. I do deal with depression and

take medication for it. The event gave me a much-needed break from racing thoughts and worry. During the event I was able to see myself in a different space. The week has started much calmer for me, the Monday rush has felt less stressful." Participants also described the stillness of the environment itself as emotionally regulating: "I was surprised at the different types of quiet sitting there gazing at the sky. Other than the conversations people in the group were having, the stillness and quiet gave my racing mind (usually) time to reset." Together, these reflections suggest that dark-sky experiences can create moments of emotional regulation and psychological pause within otherwise fast-paced daily routines.

Connection to Nature and the Cosmos

Participants frequently described feeling connected to something larger than themselves. The vastness of the night sky appeared to evoke a sense of belonging within the natural world and the broader universe. One participant explained this connection simply: "Being in nature makes me feel there is so much more to the world than me and my problems." Another participant described a broader sense of human continuity: "I feel connected to all the people that came before me. Ancient architecture will fall and crumble but we can look at the same sky that they were looking at." Participants also reflected on the rarity and significance of experiencing a truly dark sky environment. The experience of cosmic scale often created a feeling of humility and perspective: "Down here we are so small that things really don't matter. I feel so small the vastness of the universe makes my problems feel small." These reflections suggest that encounters with the night sky foster both ecological awareness and existential reflection, connecting

individuals to both the natural environment and human history.

Perspective Shifts Regarding Personal Challenges

Participants frequently reported that viewing the night sky helped them reconsider their personal challenges and worries. The vastness of the universe often reframed everyday concerns, making them feel less overwhelming. One participant described this shift: "I felt less distressed about the events of the world or country, they seemed much less significant." Another participant described how the experience encouraged a broader reflection on life and meaning: "This experience was similar in that it filled me with awe and elevated life. But it differed from others I've had because of the focus and intention to just come and be. Having a dedicated and scheduled time to do nothing but contemplate the universe and its vastness elevated my life view and filled me inside with a sense of joy and contentment." Some participants also described the experience as renewing gratitude and appreciation for their lives: "I just feel more grateful to God for my life. A metaphor may be like being woken up from sleep. Everything seems better after a good night's sleep. You have energy to make it through the day." These reflections illustrate how intentional time spent contemplating the night sky may facilitate cognitive reframing and emotional renewal.

Nostalgia and Personal Reflection

For several participants, the experience of stargazing triggered memories from earlier stages of life. These nostalgic recollections often deepened participants' emotional connection to the experience. One participant reflected on childhood memories connected to stargazing: "The sky comes alive with energy and a life

form. It reminds me of being a young child, we used to gather around a campfire as kids and our uncle would pull out his laser and he would tell us stories about the stars. It brings me back to those memories." These reflections highlight how encounters with the night sky may reconnect individuals with earlier experiences of curiosity and wonder, reinforcing personal meaning through memory and storytelling.

Social Engagement and Shared Experience

Although some participants initially arrived at the events feeling withdrawn or preoccupied, many described becoming more socially open as the evening progressed. One participant explained: "At the beginning of the study I wanted to keep to myself and felt a little antisocial. I came to the experience feeling very consumed by my life's problems." Over time, this participant described becoming more engaged with those around them. "After some time, I found myself opening to the people around me. I was happier to engage with others. Toward the end of the evening, I found that my problems seemed much smaller, the world's problems seemed smaller. I was more compassionate, and more engaged with others and patient with life." Another participant summarized the social impact of the experience as a sense of connection: "I feel like the word that kind of encompasses so much is connection. Connection. Because I feel connected to the universe, but I also feel connected to new people... So, I just feel like it's a connection both big." These reflections suggest that shared awe-based experiences may foster social openness and interpersonal connection, even among individuals who initially arrive seeking solitude.

Discussion

Participants' accounts were characterized by calm, reflection, perspective, connection, and social openness. These findings are consistent with research suggesting that awe can reduce self-focused attention and broaden perspective (Bai et al., 2021). In the present study, however, these patterns were identified through subjective written reflections and should be understood as perceived experiences rather than demonstrated psychological or clinical change. The "small self" offers one useful interpretive framework for understanding participants' descriptions (Stellar et al., 2018). Statements about feeling small in relation to the universe, seeing personal problems differently, and connecting with people across time reflect a shift from immediate self-concerns toward a broader frame of reference. The findings show participants used the language of vastness and connection to make sense of the experience.

The educational design also appears relevant. Guided observation and interpretive discussion offered participants a framework for attending to and understanding the night sky. Astronomy education, environmental awareness, and reflection were therefore experienced within the same program rather than as separate activities. Because the study did not compare program components, it cannot determine the independent effects of educational content, setting, facilitation, or group participation.

Finally, the social dimension of the events highlights the relational character of shared awe experiences. Participants described conversation, openness, and connection with others while also emphasizing individual reflection. This

combination may be especially relevant to Extension programming, which often brings education and community engagement together in accessible public settings.

Implications for Extension Practice

The findings suggest that Extension educators may consider dark-sky programming as a nonclinical community education strategy that integrates astronomy, environmental awareness, direct experience, structured reflection, and shared conversation. The three-part framework used in these events, guided observation, interpretive discussion, and reflection, provides a practical structure that can be adapted to other low-light settings.

Dark-sky programs may also create opportunities to connect environmental literacy with participants' reflections on place, perspective, and community. When educators discuss wellness-related implications, however, they should distinguish participant-reported experiences of calm or connection from clinical mental health outcomes. Such programs may complement broader community wellness efforts, but they should not be presented as substitutes for professional care.

Future Extension evaluations could strengthen the evidence base by documenting program duration, attendance, participant characteristics, instructional activities, and intended learning outcomes consistently across sites. Collecting information on astronomy learning, environmental awareness, awe, nature connectedness, and perceived well-being would also help clarify which aspects of the program are most meaningful to participants.

Limitations

Several limitations shape interpretation of these findings. First, the study included a small sample of 25 adult volunteers who self-selected into public dark-sky events and then chose whether to participate in the research component. Individuals already interested in astronomy, nature, or reflective outdoor experiences may therefore be overrepresented. The findings are not statistically generalizable.

Second, participant demographic characteristics were not incorporated into the analysis. As a result, the study cannot assess how experiences may vary by age, gender, race or ethnicity, socioeconomic context, disability, cultural background, or prior exposure to dark skies. The rural Utah settings, including parks and a ranch with very low light pollution, also limit transferability to urban, suburban, or more light-polluted contexts.

Third, the analysis relied primarily on self-reported written reflections collected during or after the program. Responses may have been influenced by the immediate setting, participant expectations, social desirability, or the wording of the reflection prompts. The study did not include preprogram measures, a comparison group, repeated follow-up, or validated clinical assessments. Accordingly, the findings cannot establish causality, duration of effects, or mental health treatment outcomes.

Future studies could include larger and more diverse participant groups, multiple geographic and light-pollution contexts, systematic demographic reporting, and longitudinal or mixed-method designs. Comparative evaluation of specific program components may also clarify the

respective contributions of astronomy instruction, environmental setting, reflective prompts, and shared group experience.

Conclusion

Community dark-sky programs provide opportunities for astronomy learning, environmental awareness, reflection, and social connection. In this exploratory study, participants described the night sky through themes of calm, vastness, perspective, memory, and shared experience. These accounts suggest that guided dark-sky programming may offer Extension educators a meaningful framework for combining science education and community engagement with opportunities for perceived well-being. The findings should be interpreted as descriptions of participant experience rather than evidence of therapeutic or clinical outcomes.

Author Information

Correspondence concerning this article should be addressed to Troy D. Allan, Utah State University Extension, Old Main Hill, Logan, Utah 84322, 512-763-9502, troy.allan@usu.edu

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