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Songs Before Sirens: Ornithotherapy as A Tool for Stress Reduction and Academic Support

Między syrenami a ptasim śpiewem: orniterapia jako narzędzie redukcji stresu i wsparcia akademickiego

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Abstract

Background. Attention Restoration Theory posits that natural environments restore depleted cognitive resources, while recent evidence confirms that birdwatching yields mental health, cognitive, and social benefits. Aim. This hypothesis-generating pilot study examined whether a curriculum-embedded birdwatching program is associated with changes in self-reported stress, academic focus, creative blocks, and social connection among students studying under wartime conditions in Kyiv, Ukraine. Methods. Twenty-three audiovisual arts undergraduates (mean age = 20.4 years; 14 women, 9 men; no prior birdwatching experience) completed approximately 10 hours of guided birdwatching across five sessions. A single-group retrospective pretest–posttest survey assessed four constructs using 10-point scales. Open-ended responses captured qualitative mechanisms. Results. Significant pre–post changes were observed: Perceived Stress decreased (d = 3.71), Academic Focus increased (d = 2.46), Creative Blocks decreased (d = 2.93), and Social Connection increased (d = 2.33). These large effect sizes should be interpreted as upper-bound estimates given potential demand characteristics inherent to the retrospective design. Qualitative analysis identified attentional anchoring,

affective regulation, and social co-regulation as key mechanisms. Conclusions. A compact birdwatching curriculum integrated into an arts program at a crisis-affected university appears feasible and educationally valuable. The observed associations warrant further investigation using controlled designs to establish causal efficacy.

Keywords

birdwatching, ornithotherapy, ecotherapy, mental health, resilience, creative pedagogy, war, higher education, SDG 3: Good Health and Well-beeing, SDG 4: Quality Education

Streszczenie

Tło. Teoria odnowy uwagi (Attention Restoration Theory) zakłada, że kontakt ze środowiskiem naturalnym sprzyja regeneracji zdolności poznawczych, z kolei najnowsze dane empiryczne potwierdzają, iż obserwowanie ptaków przynosi korzyści w zakresie zdrowia psychicznego, funkcjonowania poznawczego oraz dobrostanu społecznego. Cel. Niniejsze badanie pilotażowe służące generowaniu hipotez miało na celu sprawdzenie, czy włączenie obserwacji ptaków do programu kształcenia wiąże się ze zmianami w zakresie deklarowanego stresu, zdolności koncentracji podczas nauki, blokad twórczych oraz poczucia więzi społecznej wśród studentów studiujących w Kijowie (Ukraina) w warunkach wojny. Metody. Dwudziestu trzech studentów studiów licencjackich na kierunku sztuki audiowizualne (średni wiek = 20,4 roku; 14 kobiet, 9 mężczyzn; brak wcześniejszego doświadczenia w obserwacji ptaków) odbyło pod kierunkiem prowadzącego ok. 10 godzin obserwacji w ramach pięciu sesji. Zastosowano retrospektywny schemat pomiaru przed–po w jednej grupie, wykorzystując ankietę oceniającą cztery zmienne w 10-punktowych skalach. Odpowiedzi na pytania o charakterze otwartym pozwoliły uchwycić jakościowe mechanizmy oddziaływania. Wyniki. Zaobserwowano istotne zmiany między pomiarem przed i po: spadek poziomu odczuwanego stresu (d = 3,71), wzrost koncentracji podczas nauki (d = 2,46), zmniejszenie nasilenia blokad twórczych (d = 2,93) oraz wzrost poczucia więzi społecznej (d = 2,33). Tak duże wielkości efektu należy traktować jako potencjalnie zawyżone oszacowania, ze względu na możliwy wpływ efektu oczekiwań, charakterystycznego dla retrospektywnego schematu badania. Analiza jakościowa wskazała trzy kluczowe mechanizmy: zakotwiczenie uwagi, regulację afektywną oraz współregulację społeczną. Wnioski. Skrócony program obserwacji ptaków, zintegrowany z kształceniem artystycznym na uczelni funkcjonującej w warunkach kryzysu, wydaje się możliwy do wdrożenia i wartościowy dydaktycznie. Zaobserwowane zależności uzasadniają prowadzenie dalszych badania z wykorzystaniem schematów kontrolowanych, umożliwiających weryfikację skuteczności przyczynowej.

Słowa kluczowe

obserwacja ptaków, orniterapia, ekoterapia, zdrowie psychiczne, odporność, pedagogika twórczości, wojna, szkolnictwo wyższe, Cel Zrównoważonego Rozwoju 3: Dobre zdrowie i jakość życia, Cel Zrównoważonego Rozwoju 4: Dobra jakość edukacji

Introduction

The landscape of higher education in Kyiv, Ukraine, is now defined by profound and persistent disruption. For students, the pursuit of knowledge is perpetually interrupted by the sounds of war: air-raid sirens, distant explosions, and a constant stream of digital alerts. This state of chronic stress is not merely a psychological burden; it is a direct impediment to the cognitive processes essential for academic success, particularly in creative disciplines like audiovisual arts, which demand sustained focus and imaginative exploration. In this context, the need for effective coping strategies represents both a psychological and pedagogical imperative.

Nature-based interventions (NBIs) present a compelling solution to stress-related impairments in academic settings. Attention Restoration Theory (ART), developed by Kaplan and Kaplan (1989), posits that natural environments restore depleted directed attention through four key qualities: being away, fascination, extent, and compatibility. Stress Recovery Theory (SRT) complements this framework by emphasizing physiological stress reduction through exposure to natural settings (Wang et al. 2024). Systematic reviews confirm that engagement with natural environments yields significant antidepressant effects and mood improvements across diverse populations (Coventry et al. 2021; Shanahan et al., 2019). NBIs enhance emotional and cognitive functioning through restorative settings, making them effective for addressing stress, anxiety, and related health issues (Johansson, Juuso & Engström 2022).

For young people facing heightened psychological distress from prolonged conflict, accessible therapeutic outlets are critically important for fostering resilience (Shanahan et al. 2019; Menhas et al. 2024). The integration of culturally relevant, community-driven ecotherapy programs can be particularly effective, as it connects youth with nature's restorative properties while strengthening social cohesion (Hinde, Bojke & Coventry 2021).

Ornithological observation, also known as birdwatching, emerges as a particularly potent form of nature engagement. A recent comprehensive review by Andrews, Ammirati, and Andrews (2025) demonstrates that birdwatching – variously termed contemplative birding,

therapeutic ornithology, or slow birding – yields consistent benefits across the domains of mental health, cognitive functioning, social connection, and conservation engagement. Participating in birdwatching involves identifying species, predicting behaviors, and attending to environmental changes, which can enhance concentration and support a meditative state conducive to mental clarity and emotional stability (Taylor et al. 2022).

The benefits of birdwatching are multifaceted. Research has shown that greater perceived biodiversity is directly linked to higher self-reported well-being (Dallimer et al. 2012), and that birdwatching practice strengthens human-nature connectedness (Patrício et al. 2025). When practiced in groups, birdwatching cultivates social interaction and community, counteracting feelings of isolation (Ilagan et al. 2022; Tryjanowski et al., 2024). Longitudinal evidence confirms that leisure and social activities positively impact mental health across populations (Takeda et al. 2015; Tomioka et al. 2017). Furthermore, birdwatching offers distinct educational advantages that enhance scientific literacy and observational skills (Britton et al. 2024). Recent studies on college campuses have confirmed that birdwatching specifically yields higher gains in subjective well-being and greater reductions in distress than more generic nature walks (Peterson et al. 2024).

Additionally, research in medical education has demonstrated that birdwatching supports pattern recognition and visual analysis skills relevant to clinical diagnosis (Koontz & Heitkamp 2022; Collins 2021; Grimalt, Murawiec & Tryjanowski 2023; Murawiec & Baranowski 2025), suggesting potential cross-domain transfer to other disciplines requiring sustained visual attention.

Research Problem and Aim. Despite growing evidence for the psychological benefits of birdwatching, its application within formal higher education curricula – particularly in crisis contexts – remains underexplored. The research problem addressed in this study concerns whether a brief, structured birdwatching intervention can be effectively integrated into an arts curriculum to support students experiencing chronic war-related stress. The aim of this hypothesis-generating pilot study was to examine whether a curriculum-embedded program of ornithological observation is associated with changes in self-reported stress, academic focus,

creative blocks, and social connection among students studying under wartime conditions.

Based on the theoretical and empirical literature reviewed above, four hypotheses were formulated:

H1: Participation in the structured birdwatching program will be associated with a significant reduction in self-reported Perceived Stress.

H2: Participation in the program will be associated with a significant increase in self-reported Academic Focus.

H3: Participation in the program will be associated with a significant reduction in self-reported Creative Blocks.

H4: Participation in the program will be associated with a significant increase in self-reported Social Connection.

1. Methodology

1.1. Research Design, Participants, and Sampling

This investigation employed a single-group, retrospective pretest–posttest design to evaluate a short, curriculum-embedded ecotherapeutic intervention under wartime constraints. This design is appropriate for hypothesis-generating pilot research but precludes causal inference; observed associations may reflect demand characteristics, memory artifacts, expectancy effects, or secular trends rather than intervention effects.

A retrospective design was selected for two methodological reasons: (1) response-shift research suggests that participants' understanding of constructs (e.g., what constitutes "stress" in a wartime context) may evolve through intervention experience, making post-hoc "then" ratings more valid comparators than pre-intervention baselines (Howard 1980); and (2) operational constraints during active air-raid alert periods made reliable baseline administration impractical. At the end of the intervention, students rated their "then" (before) and "now" (after) states on identical 10-point scales once they shared a concrete experiential frame for constructs.

Data sources comprised an anonymous end-of-course questionnaire, brief written

reflections captured immediately after sessions, and contemporaneous field notes taken by the instructor. No physiological measures were collected; the outcomes reflect lived experiences and self-reports.

Inclusion criteria were: (1) current enrollment in the Audiovisual Arts and Media Production program at Taras Shevchenko National University of Kyiv, (2) presence during the five-week teaching block, and (3) provision of informed consent. No exclusion criteria were applied beyond enrollment status.

All enrolled undergraduates in the cohort were invited to participate; twenty-three students consented (mean age = 20.4 years, SD = 1.2; 14 women, 9 men). Participants represented multiple home regions of Ukraine, including Kyiv City/Oblast (n = 7; 30.4%), Eastern oblasts including Kharkiv and Donetsk (n = 6; 26.1%), Southern oblasts including Kherson, Zaporizhzhia, and Odesa (n = 4; 17.4%), and Other/Western oblasts (n = 6; 26.1%). None reported prior birdwatching experience or special interest in ornithology at baseline.

Gender and region of origin were recorded for sample characterization purposes. Given the small sample size (N = 23) and lack of theoretical basis for predicting differential effects, no hypotheses regarding gender or regional differences were specified.

1.2. Setting

Field activities took place primarily in the O.V. Fomin Botanical Garden of Taras Shevchenko National University of Kyiv, a 22.5-hectare historic urban greenspace situated directly behind the University's Main Building and bordering the Universytet metro vestibule. The garden’s heterogeneous plantings and mature canopy create a dense visual and acoustic environment that is suitable for novice observers. Ten observation zones were designated across the garden, corresponding to distinct microhabitat types: canopy zones with dense tree coverage (Zones 1, 2), understory zones with shrub and lower vegetation (Zones 3, 4), edge habitats representing transition areas (Zones 5, 6), open lawn (Zone 7), water feature (Zone 8), dense shrubs (Zone 9), and the main entrance/path junction serving as a gathering point (Zone 10). Figure 1 presents a site schematic with observation zones and microhabitat classifications.

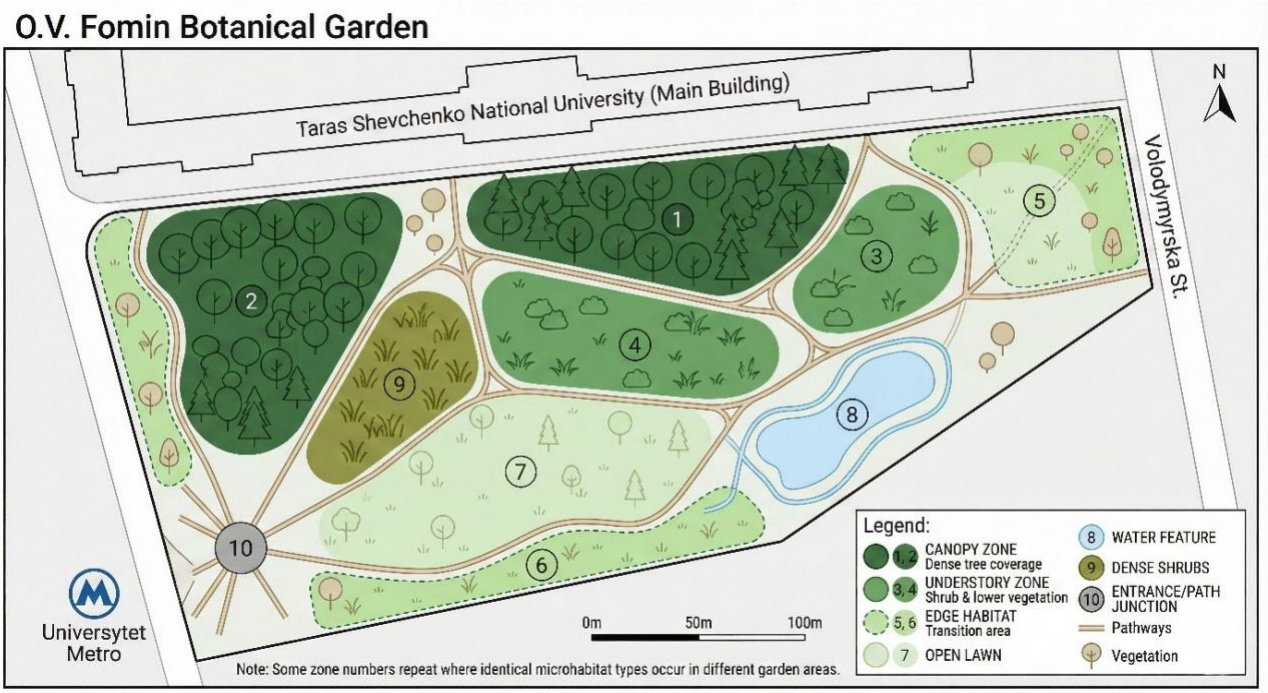

Figure 1. Site schematic of the O.V. Fomin Botanical Garden showing ten observation zones corresponding to distinct microhabitat types. The garden (22.5 hectares) is situated adjacent to the main university building and Universytet metro station. Note: Some zone numbers are repeated where identical microhabitat types occur in different parts of the garden. *Source:* Author's elaboration based on publicly available cartographic data.

1.3. Intervention Program

The birdwatching program was embedded within an existing Audiovisual Arts and Media Production course as a five-week practical module. Sessions replaced standard studio time and were framed as applied training in observation, framing, and ethical field practice. Student attendance was required for regular coursework; participation in the research survey was voluntary and did not affect academic standing.

The program consisted of five sessions over five weeks: four 90-minute on-campus sessions (totaling 6 hours) and one 4-hour off-site field trip to a nearby wetland, which allowed for a comparison of urban and wetland soundscapes. Total contact time was approximately 10 hours. Individual attendance ranged from 8 to 10 hours (M = 9.6 hours, SD = 0.7), with 91% (21/23) completing all sessions, including the off-site trip.

Each on-campus session followed a standardized micro-structure to enhance intervention fidelity: (1) a 5-minute centering and safety brief; (2) a 45-minute slow "transect"

walk with periodic 10-minute “sit-spot” listening blocks; (3) role rotation among spotter, primary observer/photographer, second observer, and note-taker; and (4) a 10-minute group debrief. Sessions were held on Tuesday mornings (10:00–11:30) and were facilitated by the course instructor (the author).

Facilitation emphasized minimal directiveness, the “hush gesture” for shared listening, ethical fieldcraft (non-disturbance, no playback, generous distances, avoidance of nests), and compliance with university safety guidance during air-raid alerts, including immediate shelter when required and a buddy system for headcounts upon regrouping.

Students used personal smartphones or cameras, and where needed, department-loaned binoculars and telephoto lenses. Technical support from the interdepartmental teaching laboratory was available for basic configuration and safe handling. The photography component served dual pedagogical and research functions: (1) as a curriculum-aligned creative output assessed within the Audiovisual Arts course, and (2) as an engagement indicator and source of qualitative data on skill development. The collaborative album creation was designed as a mechanism to consolidate gains in social connection.

The intervention combined contemplative observation with structured recording. This design choice reflected evidence suggesting that active engagement (identification and documentation) may enhance, rather than diminish, restorative benefits (Peterson et al. 2024). Recording was designed as a minimal-burden tick-box noting rather than extensive journaling, allowing sustained attentional focus while providing an audit trail of species encounters.

To scaffold recognition and provide a simple audit trail of encounters, the class employed pocket 'bulletin' checklists listing twenty-five common park- and city-dwelling birds of Kyiv with bilingual common names (Ukrainian and English) and Latin binomials, with checkboxes for “seen,” “heard,” and “photographed.” Students ticked items in the field; the sheets were collected at the end of the session and returned after aggregation.

1.4. Measures

The primary outcome measures were four self-report constructs, each operationally defined as follows:

Perceived Stress: Self-reported general stress level and tension experienced in daily life, rated on a scale where 1 = very low stress and 10 = very high stress. Example items: (1) “How would you rate your overall stress level in daily life?” (intensity); (2) “How much does stress interfere with your ability to function normally?” (impact).

Academic Focus: Self-reported ability to concentrate on coursework and academic tasks, operationalized as the capacity to sustain attention during study sessions and complete assignments without excessive distraction, rated on a scale where 1 = very difficult to focus and 10 = very easy to focus. Example items: (1) “How easily can you concentrate when studying or working on assignments?” (capacity); (2) “How often do you lose focus or get distracted during academic tasks?” (frequency, reverse-scored).

Creative Blocks: Self-reported frequency of difficulty initiating or sustaining creative work, operationalized as subjective experiences of being “stuck,” uninspired, or unable to generate ideas for audiovisual projects, rated on a scale where 1 = very infrequent blocks and 10 = very frequent blocks. Example items: (1) “How often do you experience difficulty starting or continuing creative projects?” (frequency); (2) “How much do creative blocks interfere with your coursework?” (impact).

Social Connection: Self-reported sense of belonging and interpersonal connection with peers in the academic cohort, rated on a scale where 1 = very disconnected and 10 = very connected. Example items: (1) “How connected do you feel to your classmates?” (belonging); (2) “How comfortable are you collaborating with peers on group tasks?” (collaboration comfort).

Each construct was assessed using two items: one measuring frequency/intensity and the other measuring impact/difficulty. The two items were averaged into a subscale score. The two-item subscales were developed by the author based on face-valid operationalizations of constructs relevant to the study aims. While we report Cronbach’s alpha for transparency (α = .81–.91 across subscales), inter-item correlations (r = .72–.85) may be more appropriate indicators of reliability for two-item scales. The complete instrument and scoring are provided in Appendix A.

The instrument also included three open-ended prompts ("Most memorable moment"; "Species or behaviors that made the strongest impression"; "Transfer to coursework") and a brief self-assessment of species recognition. Students could omit any item or decline permission to quote their reflections.

1.5. Procedure and Data Analysis

The anonymous questionnaire was administered on paper in Ukrainian immediately after the final session and used the retrospective "then–now" frame. Students were asked to rate how they felt before the program began ("then") and at present ("now") on identical scales for each construct. Questionnaires were placed in sealed envelopes and opened only after course grading was complete, ensuring separation between research participation and academic evaluation.

Quantitative analysis. For each subscale, the pre–post difference was treated as the unit of inference. Paired-samples t-tests with two-sided $\alpha = .05$ were computed, and standardized mean change was reported as Cohen's d with 95% confidence intervals. Assumptions were inspected using histograms and Q–Q plots. Nonparametric Wilcoxon signed-rank tests were conducted as robustness checks and yielded convergent results: Perceived Stress ($Z = -4.20$, $p < .001$), Academic Focus ($Z = -4.12$, $p < .001$), Creative Blocks ($Z = -4.17$, $p < .001$), and Social Connection ($Z = -4.02$, $p < .001$). Attendance was recorded to describe dose; exploratory dose–response analyses were prespecified but treated as secondary.

Item-level missingness was minimal: 2 of 184 possible responses (1.1%) were missing across all subscale items. One participant omitted one item from the Creative Blocks subscale; another omitted one item from the Social Connection subscale. In both cases, the available item was used as the subscale score; no imputation was performed.

Qualitative analysis. Open responses and field notes underwent reflexive thematic analysis following Braun and Clarke (2006). A deductive codebook reflecting the study's aims (calm/grounding, attentional focus, creative inspiration, social interaction, and biodiversity knowledge) was applied first, followed by inductive subcoding for emergent themes, such as

species-specific "acoustic anchors" and contextual war-related remarks. The author coded iteratively with memoing; an audit trail of dated analytic notes was maintained, and discrepant cases were explicitly retained in theme summaries.

The qualitative component served to illuminate mechanisms underlying quantitative findings rather than to test hypotheses directly. Specifically, the thematic analysis explored how participants experienced stress reduction (H1), which aspects of observation supported focus (H2), how creative processes were affected (H3), and which social dynamics emerged (H4).

Triangulation was achieved through: (1) data source triangulation (survey open responses, contemporaneous field notes, photographic records), (2) method triangulation (quantitative scales and qualitative responses), and (3) time triangulation (field notes captured during sessions; reflections captured immediately post-session; retrospective survey at program end). We acknowledge that investigator triangulation was not employed, which represents a limitation.

1.6. Ethical Considerations

This study was conducted as an evaluation of routine pedagogical practice embedded within an existing university course. According to Ukrainian legislation on higher education and research ethics, evaluations of educational programs using anonymized voluntary feedback do not require formal ethics committee approval when: (a) participation is voluntary, (b) data are anonymized, (c) no sensitive personal information is collected, and (d) no intervention beyond standard educational practice is introduced.

The study adhered to the ethical principles of the Declaration of Helsinki (World Medical Association 2013). The following procedural safeguards were implemented: (1) verbal informed consent was obtained from all participants prior to data collection; (2) questionnaires were fully anonymous with no identifying information collected; (3) completed questionnaires were placed in sealed envelopes and stored securely until after course grades were finalized, ensuring complete separation between research participation and academic evaluation; (4) participation in the survey was voluntary and had no bearing on course grades or academic

standing; (5) students were informed of their right to withdraw at any time without consequence.

The research design and data collection procedures were reviewed and approved by the Head of the Department of Cinematography and Television Arts at Taras Shevchenko National University of Kyiv, who served as the institutional authority responsible for ensuring ethical conduct of pedagogical research within the department. Photographic contributions to the student album were made with the photographers' explicit written permission.

2. Results

2.1. Quantitative Outcomes

The analytic sample comprised 23 undergraduates in Audiovisual Arts and Media Production. Attendance was high across sessions; 21 of 23 (91%) joined the single off-site day trip, and all participants completed the end-of-course survey. Table 1 provides an overview of the study sample.

Table 1. Participant Profile (N = 23)

This table presents the demographic and baseline characteristics of the 23 study participants. The sample was predominantly female (60.9%), with participants originating from various regions of Ukraine, including conflict-affected Eastern and Southern oblasts (43.5% combined). None of the participants had prior birdwatching experience.

Characteristic	Category	N	%
Gender	Women	14	60.9
	Men	9	39.1
Age (years)	Mean (SD)	20.4 (1.2)	–
	Range	19–23	–
Region of origin	Kyiv City/Oblast	7	30.4
	Eastern oblasts*	6	26.1
	Southern oblasts**	4	17.4
	Other/Western oblasts	6	26.1
Prior birdwatching	Yes	0	0.0
	No	23	100.0
Off-site attendance	Participated	21	91.3

Characteristic	Category	N	%
	Did not participate	2	8.7

[*] *Eastern oblasts include Kharkiv and Donetsk regions.*

***Southern oblasts include Kherson, Zaporizhzhia, and Odesa regions.*

Across the full sample, retrospective pre–post comparisons showed significant changes in all four outcome variables, consistent with all four hypotheses. Table 2 presents means, standard deviations, t-tests, and effect sizes.

Table 2. Pre–Post Comparisons for Primary Outcome Variables (N = 23)*

This table displays the pre-post comparisons for four primary outcome variables measured on 10-point scales. All variables showed statistically significant changes ($p < .001$) with large effect sizes ranging from $d = 2.33$ to $d = 3.71$, with the largest change observed for Perceived Stress.

Variable	Pre M (SD)	Post M (SD)	Δ M	t(22)	p	d	95% CI
Perceived Stress	8.2 (1.1)	4.5 (0.9)	−3.7	12.14	<.001	3.71	[2.44, 5.08]
Academic Focus	4.8 (1.3)	7.9 (1.2)	+3.1	−8.91	<.001	2.46	[1.58, 3.41]
Creative Blocks	7.5 (1.4)	3.8 (1.1)	−3.7	9.87	<.001	2.93	[1.88, 4.04]
Social Connection	5.5 (1.5)	8.8 (1.3)	+3.3	−7.56	<.001	2.33	[1.49, 3.22]

*** *M = mean; SD = standard deviation; Δ M = mean change; d = Cohen's d for paired data; CI = confidence interval. All scales ranged from 1 to 10. For Perceived Stress and Creative Blocks, lower scores indicate better outcomes; for Academic Focus and Social Connection, higher scores indicate better outcomes. Given the retrospective single-group design, effect sizes should be interpreted as upper-bound estimates reflecting potential demand characteristics and expectancy effects.*

Perceived Stress (H1): Perceived Stress decreased by 3.7 points on average, from $M = 8.2$ ($SD = 1.1$) to $M = 4.5$ ($SD = 0.9$); $t(22) = 12.14$, $p < .001$, Cohen's $d = 3.71$, 95% CI [2.44, 5.08]. Individual change scores ranged from −6 to −1 points (Mdn = −4; all participants showed reductions). This large observed change is consistent with H1, though the design precludes causal attribution.

Academic Focus (H2): Academic Focus increased by 3.1 points, from M = 4.8 (SD = 1.3) to M = 7.9 (SD = 1.2); $t(22) = -8.91$, $p < .001$, Cohen's d = 2.46, 95% CI [1.58, 3.41]. Change scores ranged from +1 to +5 points (Mdn = +3).

Creative Blocks (H3): Creative Blocks decreased by 3.7 points, from M = 7.5 (SD = 1.4) to M = 3.8 (SD = 1.1); $t(22) = 9.87$, $p < .001$, Cohen's d = 2.93, 95% CI [1.88, 4.04]. Change scores ranged from −6 to −1 points (Mdn = −4).

Social Connection (H4): Social Connection increased by 3.3 points, from M = 5.5 (SD = 1.5) to M = 8.8 (SD = 1.3); $t(22) = -7.56$, $p < .001$, Cohen's d = 2.33, 95% CI [1.49, 3.22]. Change scores ranged from +1 to +6 points (Mdn = +3).

A responder analysis indicated that 87% (20/23) of participants reported a ≥2-point reduction in Perceived Stress, suggesting practically meaningful change for the majority. However, without validated cut points for the study-developed scales, claims of clinical significance cannot be made.

Students' self-reported species recognition improved substantially. Before the intervention, participants reported identifying an average of 2 local bird species; after the intervention, this increased to 12, representing a sixfold gain in biodiversity literacy.

2.2. Species and Calming Impacts

Six species were most frequently cited as having a particularly calming effect: Thrush Nightingale (Luscinia luscinia), European Robin (Erithacus rubecula), Great Tit (Parus major), Eurasian Blackbird (Turdus merula), Blue Tit (Cyanistes caeruleus), and Common Chaffinch (Fringilla coelebs). Table 3 summarizes the proportions of calming impact alongside post-course recognition accuracy.

Table 3. Species Most Frequently Cited as Calming, with Post-Course Recognition Accuracy (N = 23)*

This table presents the six bird species most frequently cited by participants as having a calming effect. The Thrush Nightingale ranked highest for calming impact (74%), while the Blue Tit showed the highest post-course recognition accuracy (92%).

Species (English)	Species (Latin)	Calming (%)	Recog. (%)	Microhabitat	Dominant cue
Thrush Nightingale	Luscinia luscinia	74	83	Dense understory	Rich, varied song
European Robin	Erithacus rubecula	56	87	Shaded understory	Song & contact calls
Great Tit	Parus major	48	91	Canopy, edges	Repetitive calls
Eurasian Blackbird	Turdus merula	44	86	Canopy, tall trees	Mellow song
Blue Tit	Cyanistes caeruleus	36	92	Canopy	Sharp calls
Common Chaffinch	Fringilla coelebs	31	85	Canopy, edges	Cascade song

** Calming impact reflects the percentage of students who spontaneously mentioned the species in response to the open-ended prompt. Recognition accuracy is the percentage of individuals who correctly identified the species on the post-course checklist.*

2.3. Qualitative Themes

The qualitative analysis revealed four interlocking themes: attentional reset, sound-anchored affect regulation, collaborative learning, and creative transfer. These themes illuminate the mechanisms underlying the quantitative outcomes.

Attentional Reset (supporting H1 and H2). Students consistently contrasted sirens with identifiable birdsong, describing a shift from diffuse vigilance to goal-directed listening. The Thrush Nightingale was the primary acoustic anchor: “The sirens demand attention for survival; the nightingale asks for attention for life” (R07, F, Eastern oblast). Close encounters with European Robin supported the same mechanism – quiet proximity without perceived threat.

Affective Regulation (supporting H1). Several respondents associated Eurasian Blackbird song with immediate down-regulation (“shoulders dropping”). A student from Kherson oblast wrote about the nightingale: “After a night of alerts, the first notes of the nightingale felt like the city was breathing again.”

Collaborative Learning (supporting H4). Peer routines effectively focused attention. The “hush gesture” quickly gained popularity; by the third session, these cues frequently preceded

accurate, consensual identifications. One student described the shift: "It changed from 'the teacher will tell us' to 'let's confirm together'" (R11, M, Eastern oblast).

Creative Transfer (supporting H2 and H3). Creative transfer was practical: editing rhythm and sound design were "scaffolded" by learned motifs. "The great tit taught me to hear structure; later that day, I built rhythm into my sound design" (R03, F, Kyiv).

Cognitive Reframing. "Cognitive reframing" emerged as an inductively derived theme from the qualitative analysis of open-ended responses. Participants described shifts in how they perceived environmental sounds – from undifferentiated noise to meaningful signals. One student summarized: "When I did not know any birds, the garden was background. After week three, it felt like reading subtitles on a film I'd already seen – suddenly it had meaning" (R06, F, Kyiv). This reframing appeared to contribute to both Academic Focus (by providing attentional anchors) and the reduction of Creative Blocks (by offering templates for structured listening).

Contextual Remarks about War. This theme emerged inductively from participant responses that explicitly mentioned war-related factors. Students emphasized that bird encounters reframed rather than denied risk: "It did not cancel the alert, but it stopped the panic spike" (R20, M, Southern oblast). For one participant from Kherson region, simply walking through forested areas felt extraordinary: "At home, the woods are mined. Here I was just happy to walk under trees and breathe" (R16, M, Eastern oblast).

2.4. Photography Documentation

The photography documentation serves multiple functions aligned with the research aims: (1) demonstrating skill development relevant to the Creative Blocks and Academic Focus outcomes; (2) providing evidence of biodiversity encounters relevant to the educational component; (3) illustrating the collaborative process relevant to Social Connection; and (4) documenting intervention fidelity.

Students produced images using a mix of personal gear and equipment loaned by the interdepartmental teaching laboratory. Technical settings were standardized, and post-

processing followed a light-touch workflow consistent with documentary practice. Students' reflections revealed learning transfer: "Once I learned to lock focus through leaves, my attention stopped jumping; editing later felt less chaotic" (R12, M, Western Oblast).

3. Discussion

This hypothesis-generating pilot study demonstrates that a compact, curriculum-embedded program of ornithological observation is associated with large self-reported changes for students learning under war conditions. The observed associations were consistent with all four hypotheses: participation in the birdwatching program was associated with reductions in Perceived Stress (H1, d = 3.71) and Creative Blocks (H3, d = 2.93), and increases in Academic Focus (H2, d = 2.46) and Social Connection (H4, d = 2.33). However, given the single-group retrospective design, these large effect sizes should be interpreted as upper-bound estimates; the true intervention effect may be substantially smaller after accounting for demand characteristics, expectancy effects, and memory artifacts. The majority of students (87%) reported a change of ≥2 points on a 10-point scale, suggesting practically meaningful change. Figure 2 presents a comprehensive model that integrates the theoretical foundations, intervention parameters, a hypothesized three-stage mechanism, and observed outcomes.

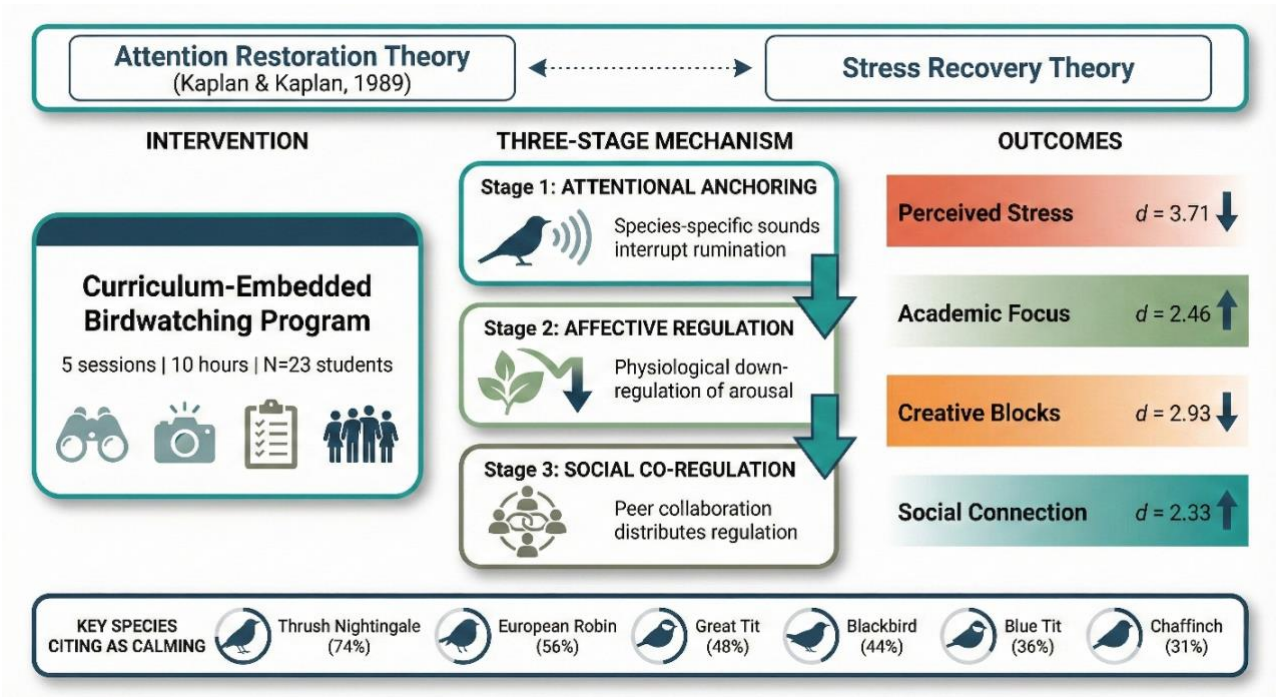

Figure 2. Comprehensive ornithotherapy intervention model: from theory to outcomes. The model depicts the theoretical foundations (Attention Restoration Theory, Stress Recovery Theory), intervention parameters (5 sessions, 10 contact hours, N = 23), the three-stage mechanism (attentional anchoring, affective regulation, social co-regulation), and quantitative outcomes with effect sizes (Cohen's d). The bottom panel presents the six bird species most frequently cited by participants as "especially calming." Effect sizes represent upper-bound estimates given design limitations.

The findings align with and extend recent systematic reviews. Andrews, Ammirati, and Andrews (2025) identified consistent evidence that birdwatching – whether termed contemplative birding, therapeutic ornithology, or slow birding – yields benefits across mental health, cognitive, and social domains. Our study provides context-specific evidence that these benefits can emerge even under conditions of chronic war-related stress and can be achieved through brief, curriculum-embedded interventions, rather than in clinical or recreational settings.

The integration of quantitative and qualitative findings suggests a three-stage mechanism extending Attention Restoration Theory (Kaplan & Kaplan 1989). First, attentional anchoring: distinctive bird sounds provided "targets" for selective attention, interrupting ruminative scanning. Students contrasted siren noise with birdsong and reported that learning to identify sounds transformed backgrounds into legible cues, aligning with evidence that identification skills are linked to well-being (Dallimer et al. 2012; Phillips et al. 2023). Second, affective regulation: students described down-regulation of arousal, consistent with studies showing nature engagement improves mood and reduces stress (Murawiec, Tryjanowski & Nita 2021; Peterson et al. 2024).

Notably, Murawiec, Łukiańska, and Barganowski (2025) demonstrated that even in psychiatric populations with severe mental illness, ornithological therapy regulated emotions and fostered community – paralleling our findings in a differently-stressed but non-clinical population. Third, social co-regulation and meaning-making: field routines, such as group

"hush gestures" and peer co-spotting, distributed regulation across the cohort, strengthening belonging (Ilagan et al. 2022) and enabling collaborative authorship.

The improvements in Academic Focus and reductions in Creative Blocks are particularly notable given recent scoping review evidence for nature-creativity connections across settings (Vella-Brodrick et al. 2024) and emerging evidence linking birdwatching to pattern recognition and visual analysis skills.

Research in medical education has shown that bird species recognition training improves diagnostic pattern recognition in radiology (Koontz & Heitkamp 2022), clinical visual analysis (Collins 2021), and ECG interpretation (Murawiec & Baranowski 2025). The 'jizz' concept in birdwatching – rapid holistic identification based on overall impression – parallels clinical gestalt (Grimalt, Murawiec & Tryjanowski 2023). For audiovisual students, birdwatching functioned as applied training in patient framing, rhythmic patterning, and ethical presence – skills directly portable to cinematography and post-production.

Several low-cost design principles emerged. First, place the intervention in an accessible, biodiverse site near the campus to maximize encounter rates and minimize logistical burdens. Second, teach a "species ladder": begin with abundant, vocally distinctive species (Great Tit, Blue Tit, Chaffinch) and progress to subtler targets; use mnemonics and repeated "slow-walk" transects. Third, make learning social: rotate roles, use nonverbal signals to maintain shared attention, and emphasize non-disturbance. Fourth, close with creation: the collaborative photo album transformed coping into contribution and consolidated social gains.

Limitations. Several caveats temper interpretation. The single-group, retrospective pretest–posttest design is vulnerable to memory artifacts and demand characteristics, which can potentially inflate observed associations. The retrospective design was selected due to response-shift considerations and operational constraints; however, we acknowledge that a prospective measurement with a waitlist control would provide stronger causal inference. Critically, the large effect sizes ($d = 2.3–3.7$) should be interpreted with caution; such magnitudes are unusual in psychological research and are likely due to design-related inflation rather than true

intervention effects. Self-reported outcomes lacked physiological indicators or performance tasks, and there was no control group or randomization.

Additionally, the non-validated, study-developed two-item scales preclude claims regarding clinical significance; the term "practically meaningful" is used advisedly to describe changes that participants subjectively experienced as consequential, not to imply established clinical thresholds. High participation (91%) may indicate self-selection bias, and the instructor-researcher role introduces potential halo effects. External validity is limited by sample size and seasonality. Future studies should employ stepped-wedge designs or randomized waitlist controls, include comparison activities (e.g., generic nature walks), combine subjective with objective measures (e.g., cortisol, attention tasks), and compare passive observation with documentation protocols to isolate active ingredients. Investigator triangulation and larger samples enabling subgroup analyses by gender and region would strengthen future work.

Conclusion

This hypothesis-generating pilot study demonstrates that embedding a short, structured birdwatching module into an Audiovisual Arts curriculum is associated with practically meaningful self-reported changes in psychological and educational outcomes for students living and studying under wartime conditions.

The practice of observing and naming birds offered more than a temporary distraction: it created a sustained framework for attentional reset, emotional regulation, and collaborative learning. Students discovered a richer urban biodiversity than they had imagined, reframed their relationship to the city's soundscape, and transferred their ecological attentiveness into creative and academic work.

The intervention also functioned as a pedagogical tool. By combining patient observation, ethical field practices, and visual–aural pattern recognition, it is closely aligned with the core competencies of cinematography and audiovisual storytelling. The culminating

student photo album served both as an act of authorship and as a bridge between ecotherapy and academic evaluation.

Although limited in scope and reliant on self-reports, the findings highlight the potential of lightweight, low-cost ecotherapeutic modules to foster resilience, creativity, and peer connection in crisis contexts. The observed associations warrant further investigation using controlled designs to establish causal efficacy. More broadly, they suggest that cultivating attentiveness to local biodiversity is not only restorative for mental health but also generative for creative practice. Birdwatching offers a dual opportunity: a way to cope with extraordinary stress and a pathway to deeper engagement with the cultural and ecological environment in which students live and create.

Statements

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Institutional Review Board Statement: Participation was voluntary, informed consent was obtained, and no sensitive personal data were collected. Photographs used with permission. The study adhered to the ethical principles of the Declaration of Helsinki.

Data Availability Statement: The complete survey instrument and scoring are presented in Appendix A. https://doi.org/10.5281/zenodo.17034751.

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