

Article

Thinking Outside the Park: Connecting Visitors' Sound Affect in a Nature-Based Tourism Setting with Perceptions of Their Urban Home and Work Soundscapes

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Abstract: This study examined the potential for Perceived Affective Quality (PAQ; pleasantness, eventfulness, familiarity) soundscape measures developed within urban settings to enrich current soundscape management approaches within protected areas (PAs). Drawing on the premise that people bring experiences from other life contexts into PA settings and PA visitors are increasingly coming from urban areas, research integrated urban visitors' soundscape perceptions of their home and work acoustic environments with their perceptions of acoustic environments in PAs. Two-phased survey research (n = 333) separated visitors into urban density groups and compared PAQ variables across home, work, and PA contexts. Significant differences resulted, both in ratings of the three acoustic contexts (PA, home, work) for all three PAQ components and between urban density groups. The importance of pleasantness was confirmed across all contexts; however, alone, this dimension lacked sufficient contrast to interpret the complexity of soundscape perceptions, especially considering diverse Healthy Parks, Healthy People (HPHP) visitor experience scenarios and goals. Thus, managers should consider (1) additional PAQ variables that can provide more useful and contrasting information; (2) incorporating methods that integrate PAQ measures across visitors' different acoustic contexts, and (3) including urban density measures within HPHP research.

Keywords: soundscapes; protected areas; perceived affective quality; Healthy Parks, Healthy People (HPHP); urban density; sustainable tourism



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1. Introduction

The global Healthy Parks, Healthy People (HPHP) initiative connects human health and natural ecosystem protection through research and programming [1]. The HPHP concept relates the variety of health benefits people derive from access to nature to how connections with nature foster greater interest in and support for protecting the health of natural ecosystems [2,3]. Within the HPHP initiative, researchers have recognized natural sounds as an important part of protected area (PA) biodiversity preservation and high-quality visitor experiences, providing numerous health benefits and the potential for increasing people's connection with nature, especially in the context of increasing urban density (UD) [4–7]. In response to urbanization and disconnects between people and nature [6,8], HPHP research has focused on ways to reconnect people living in urban environments to natural settings and their health benefits [9,10]. Understanding how urban visitors perceive the acoustic dimensions of their experiences in nature and the benefits that natural soundscapes provide are important for HPHP goals.

The research documents positive relationships between nature connection, attachment to place, and personal environmental behaviors, including support for conservation [11–14].

Several conceptual models within the literature (place attachment, nature connections) explain how positive visitor experiences in nature-based tourism destinations can foster place effect and motivate park citizenship [5,15–18].

The International Union for the Conservation of Nature—World Commission on Protected Areas (IUCN WCPA) HPHP Best Practice Guidelines have called for PA managers to “think outside the park” [19] (p. 19), emphasizing the importance of moving beyond the practice of measuring visitor satisfaction toward understanding what makes a visit meaningful and enjoyable. Similarly, Ramkissoon et al. [16] identified potential benefits of contextualizing satisfaction levels with a richer consideration of demographic backgrounds in order to better understand and segment visitors. This work draws on the premise that people bring experiences from other life contexts into PA settings; thus, in addition to understanding visitor motivations and desired outcomes [20,21], we can learn much about urban visitors to PAs by studying their environments, preferences, and habits outside the park environment. Moreover, soundscape researchers across a range of contexts have recognized the importance of integrating perceptual tools to achieve a better understanding of the interrelations between humans, biodiversity, and the built environment in relation to sound [5,7,22]. Advancing toward this focus aligns well with the goals of the IUCN WCPA HPHP Best Practice Guidelines [19], which emphasize the importance of moving beyond normal contexts to gain a more holistic understanding of visitor perception, affect, and meaning.

The current research responds to this need by examining the potential for the Axelsson et al. [23] Perceived Affective Quality (PAQ) measures to enrich the understanding of urban visitors’ experiences within the natural acoustic environments of the Coyhaique National Reserve (CNR), in northwestern Chilean Patagonia. We pose that a better understanding of the daily lives of urban visitors and of the role urban density plays in visitor perceptions is needed. Expanding the context of our understanding of urban tourists in Patagonian PAs may inform more effective management approaches and facilitate advances in the HPHP global agenda by potentially helping to reconnect urban dwellers and nature. PA soundscape research methods that better integrate perceptual measures used across various visitor contexts outside of the PA may assist in these endeavors.

2. Literature Review

2.1. *Evolving Methods, Tools, and Models for Integration across a Wider Range of Soundscape and Participant Contexts*

PA soundscape-focused research began with concerns regarding the negative impacts of anthropogenic noise on biodiversity and visitor experiences. These concerns came to public attention with the U.S. National Park Overflight Act of 1987. This act focused on the negative impacts of technological noise associated with air traffic flights over national parks [24] and has fostered increased attention on the importance of protecting natural sounds and soundscapes. In the subsequent decades, a significant research effort has concentrated on understanding relationships between the health of natural systems and increasing anthropogenic noise levels in and around PAs [25–27]. Typically, different methods are used to study natural systems and human systems (visitor experiences) within PAs. PA natural systems acoustic monitoring and research normally focuses on the characterization and measurement of the sound environment in combination with behavioral observation of populations of interest [28–30]. The United States National Park Service (USNPS) protocols include objective measures of sound, such as duration and dBA, to measure the extent of particular sounds [31]. However, while there have been some notable exceptions [32–37], PA visitor experience research has typically relied on perceptual measures, incorporating physical measurement of the sound environment with much less frequency.

Current soundscape evaluation in PAs provides managers with little contextual information to inform their HPHP-related infrastructure and programming decisions. Most PA soundscape research has focused on understanding visitor perceptions of appeal and/or

acceptability during brief intercepts [32,38–41] or in the context of laboratory experiments [42–46]. While acceptability ratings can help managers determine appropriate thresholds for soundscape monitoring programs, understanding how different people perceive quality and derive benefits from acoustic aspects of their nature experiences requires additional depth and context [47]. Human-focused soundscape research has a much longer trajectory in urban planning and design, where it has influenced the evolution and management of urban settings, including roads, built environments, open areas, and green spaces amongst other features [23,48–50].

While objective sound measures are fairly straightforward, given internationally established standards and PA protocols, current practices and perceptual tools differ across different acoustic contexts. These differences are not necessarily inappropriate. While soundscape and acoustics researchers across both urban and PA settings agree about the value of common tools and measures, they also share the assumption that soundscape preferences are critically dependent on context. Accordingly, what is optimal in one place may be different from another, and condition preferences and responses may vary temporally and across user groups or populations [38]. A better understanding of how people interpret soundscape quality in the different acoustic settings they encounter may help inform the potential and development of integrated measures.

2.2. Perceptual Attribute Measures of Soundscape Quality Perception Models in Urban and PA Soundscape Research

Between 2000 and 2010, a series of studies helped to evolve the understanding of the perceptual attributes of urban soundscapes through verbal descriptors that were obtained by open-ended questionnaires and/or semantic differential assessment methods [49–51]. Although studies differed, some common themes emerged. For example, pleasantness arose as the most important factor in most studies, followed by a factor related to the temporal structure of the soundscape, often described as eventfulness, and a factor relating to auditory expectation, described as familiarity [49].

Axelsson et al. [23] built on earlier work by defining a PAQ model that has become recognized as one of the most influential urban soundscape quality frameworks. Axelsson et al. [23] had 50 participants rate 116 plausible adjectives to describe sounds across a variety of soundscape recordings to develop their principal component model of PAQ. Their framework identified pleasantness, eventfulness, and familiarity as the three main soundscape components, which explained 50, 18, and 6% of the total variance in ratings, respectively [23]. Adjectives including “comfortable”, “appealing”, and “inviting” described the pleasantness component. The eventfulness component comprised adjectives such as “lively”, “full of life”, and “mobile”. The familiarity component included “commonplace”, “common”, and “real”. Axelsson et al. [23] and subsequent researchers dropped the familiarity component from PAQ measures due to the low proportion of variance it explained. Nevertheless, they suggested that “this third component may still be important to basic research, for instance, in cross-cultural comparisons of soundscape perception” [23] (p. 2843).

Since its publication in 2010, the Axelsson et al. [23] two-component model of PAQ has received more than 460 citations and has been validated and further refined within a variety of urban contexts [48,52–55]. Nevertheless, this model has received little consideration within PA soundscape research. In practice, there are some commonalities between PA perceptual methods and the Axelsson et al. [23] PAQ model. For example, appeal has been widely used in PA soundscape research to measure aspects of pleasantness [41,47]. PA sound prevalence data may contribute to the understanding of the temporal structure of the soundscape; however, its focus on individual sounds/noises differentiates it from the soundscape level descriptor of eventfulness [47,49]. Thus, the temporal measure of eventfulness used in the Axelsson et al. [23] model may enhance the understanding of PA visitors’ experiences by providing additional context.

Although the role of human sounds (e.g., human voices) has been found to contribute to both pleasantness and eventfulness in the Axelsson et al. [23] model, there is still much to

learn about anthroponic and non-mechanized human sounds within a PA context. For example, the third component of familiarity was dropped from the main Axelsson et al. [23] model because variances in familiarity scores were low, even though the study included excerpts from a large variety of urban soundscapes. As such, Axelsson et al. [23] concluded that, in general, participants found urban soundscapes familiar. Very unusual sounds would be required to cause notable natural variation in familiarity ratings. Nevertheless, for many visitors, anthroponic and even non-mechanized human sounds would be considered unusual within the PA setting. For other visitors who are less familiar with the sounds of natural settings, wind, wildlife, or waterfall sounds may be considered exotic or even overwhelming. Since the Axelsson et al. [23] original model is not yet understood in a PA context, there is no way to judge whether adaptations and improvements made to the original model in urban settings would be suitable. For this reason, the current study applies all three of the dimensions (pleasantness, eventfulness, and familiarity). Understanding how PA visitors perceive pleasantness, eventfulness, and familiarity across a range of the acoustic settings they experience may help to clarify some of these questions.

2.3. Research Purpose and Questions

Tools and measures capable of accounting for contextual and temporal differences are needed to enable a more holistic understanding of visitors' acoustic preferences within their daily lives. As such, the current study's objective was to examine the potential for the Axelsson et al. [23] PAQ measures to enrich the understanding of urban visitors' experiences within natural PA acoustic environments.

An increasing number of researchers have identified the importance of considering how UD affects health and well-being [56–59]. For example, Aquino and Gainza [60] identified density as the best single variable for summarizing urban characteristics. Thus, we separated the study participants into urban density groups (DGs) and compared soundscape perceptions between the DGs based on the UD of their home cities. We sought to compare PAQ ratings for pleasantness, eventfulness, and familiarity within participants' home and work soundscapes with their ratings of the soundscapes they experienced in the CNR. The research questions (RQ) were centered on developing a better understanding of how these national tourists' everyday urban living conditions related to their perceptions of CNR soundscapes:

- RQ1—How do PAQ soundscape ratings compare between the CNR, home, and work contexts?
- RQ2—How do prevalent sounds compare across the DGs, within the CNR, home, and work contexts?
- RQ3—Is there a relationship between UD and the PAQ soundscape ratings for the contexts of the CNR, home, and work?
- RQ4—How do PAQ soundscape ratings compare between DGs?

3. Materials and Methods

3.1. Study Area

Institutional Review Board approval was obtained from a partnering U.S. midwestern university, as well as project approval from the agency in charge of administering Chile's National System of Natural Protected Areas, the Chilean National Forestry Corporation (CONAF). Data were collected using a 2-phase process: Phase 1 involved an in-person intercept visitor survey within the CNR, and Phase 2 involved a follow-up online survey conducted with a subsample of those same participants (Figure 1).

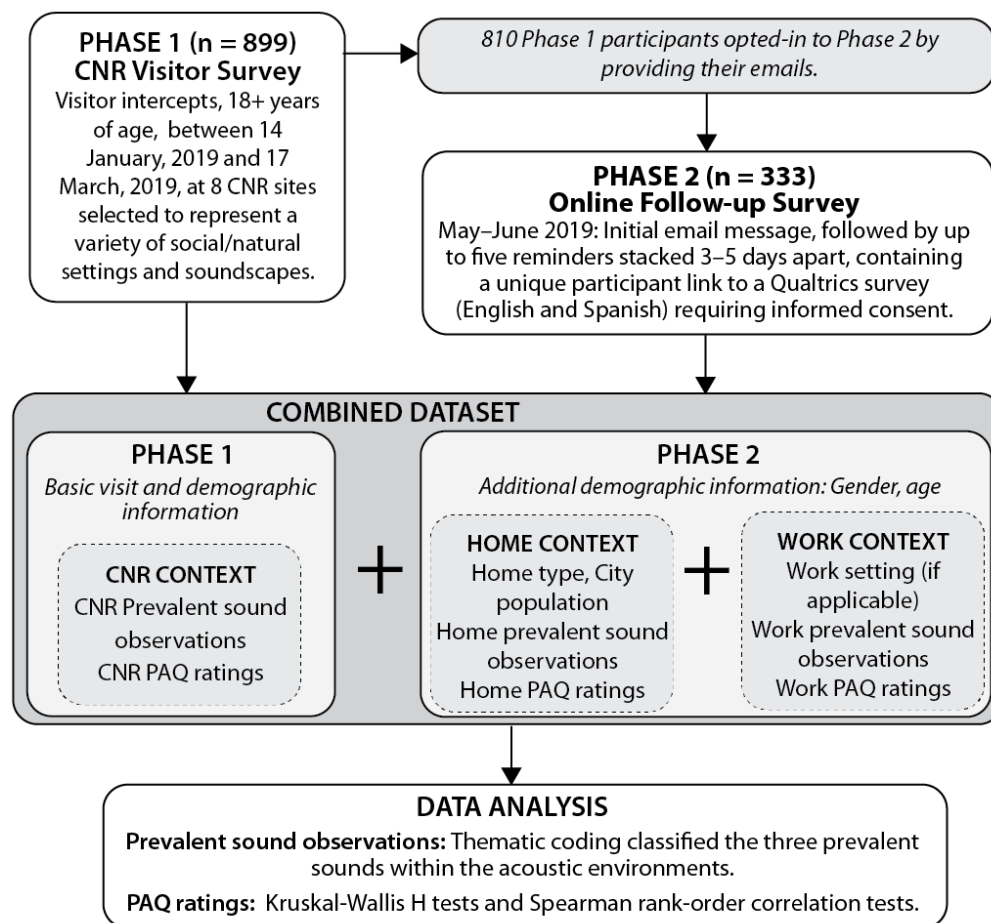


Figure 1. Study design diagram.

3.2. Phase 1: Intercept Visitor Survey

The Phase 1 intercept visitor survey was situated in the Aysén Region of Chile, 1650 km (1025 miles) south of Santiago, the nation's capital, in the iconic area of Patagonia. Aysén is the third largest of Chile's 15 administrative regions, with 108,494 km², including the entire northern and part of the southern Patagonia icefields, making it one of Chile's most remote and extreme zones. Aysén has the lowest level of population density amongst Chile's regions; more than half of the regional territory is contained within PAs. Over the last decade, Aysén has evolved as an iconic nature-based tourism destination and visitation to the region's PAs has more than tripled. The largest portion of visits are associated with national travelers from other areas of the country with high levels of UD. This paper combines 2 surveys of visitors to the 6531-acre CNR, one of the most heavily visited regional PAs, located only 5 km from the regional capital of Coyhaique.

The reserve is situated along the eastern summit of the Cinchao mountain, which is part of the southern reaches of the Andes range, positioned between the Patagonian fjords and the eastern pampas that continue into Argentina. The natural conditions of the Reserve are far from pristine, as several sectors are dominated by non-native reforestation stands planted to shore up soils after large forest fires. Nevertheless, visitors are also able to experience significant expanses of mature second-growth native forests, lagoons throughout the Reserve, and above-treeline scree along the summit, putting them in direct contact with many of the emblematic natural aspects of Chilean Patagonia and its varied ecosystems. There were 8 sampling sites selected within the CNR to represent a variety of geographical conditions and soundscapes (Figure 2).

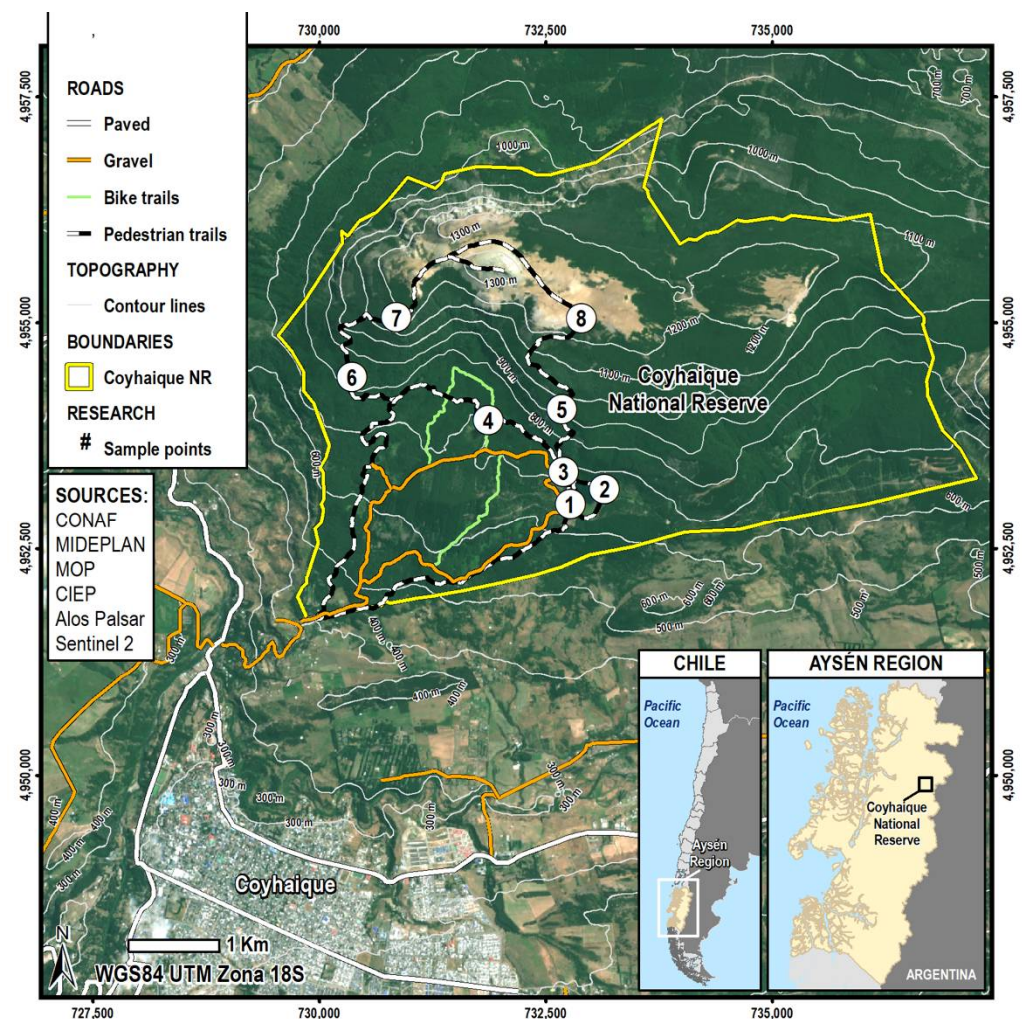


Figure 2. Map of the Coyhaique National Reserve and the 8 sample sites.

3.3. Participants

CNR visitors were recruited to participate in the intercept surveys conducted over 63 days between 14 January and 17 March 2019. The data collection was completed at 8 sites within the CNR, chosen to represent a variety of ecosystems, soundscapes, and visitor experiences. Field interviewers attempted to recruit all visitors who passed through the sampling points except for large groups and repeat visitors. A total of 1108 visitors were intercepted and 899 completed surveys were obtained, resulting in a response rate of 81.1% and representing a robust sample, even though it is not a representation of all visitations throughout the year.

This study includes visitation and demographic information, prevalent sound observations, and PAQ ratings from the CNR intercept survey. Prevalent sound observations were collected through a listening activity where surveyors directed participants away from any accompanying visitors to a comfortable, dry place to sit, relax, and observe the surrounding sounds for two minutes, and then to recall and list the sounds they heard. Building on the theory devised by Axelsson et al. [23], participant ratings of soundscape pleasantness, eventfulness, and familiarity were used as a measure of PAQ. Pleasantness, eventfulness, and familiarity were rated on 9-point scales on a continuum ranging between terms depictive of contrasting perceptions for each scale. The pleasantness scale ranged from “unpleasant” to “pleasant”; the eventfulness scale ranged from “uneventful, unexciting, empty, without contrast, immobile” to “eventful, lively, full of life, various, dynamic, messy”; and the familiar scale ranged from “unfamiliar, rare” to “familiar, common, commonplace”.

3.4. Phase 2: Follow-Up Online Survey

Intercept survey participants were invited to provide their email addresses for a follow-up web-based survey about soundscapes, and 810 volunteered. The Phase 2 objective was to develop a better understanding of visitors by comparing their own responses between the 2 research phases. Online surveys were completed from May to July 2019. Following strategies for maximizing participation [61], up to 5 reminders followed the initial invitation, timed 3 to 5 days apart. The email messages contained a link leading to the Qualtrics survey, which was available in both English and Spanish. A total of 333 surveys were completed, resulting in a 42.7% response rate after 30 unusable email addresses were discounted.

The online survey collected additional demographic information (gender and age), details about the participants' home (city population, home type) and work settings, prevalent sounds within their home and work acoustic environments, and participant ratings of the soundscape PAQ at their home and work. PAQ questions utilized the same format (pleasantness, eventfulness, and familiarity on a 9-point scale) for both the on-site and online surveys.

3.5. Data Analysis

Thematic coding classified the 3 prevalent sounds perceived by participants within each of the acoustic environments (CNR, home, work), using the themes of geophonic, biophonic, and anthrophonic sounds to be consistent with existing acoustic [62,63] and PA research [24,64–66]. The coding was completed separately by 3 investigators, who later compared their coding results in an effort to validate the process. Any coding discrepancies were discussed among the group until consensus was achieved. Discrepancies tended to occur when a sound was caused by an interaction between the coding themes. For example, wind blowing on a participant's clothing involves an interaction between geophonic and anthrophonic sounds. We agreed to code those sounds by their causing effect, so in this case, the sound was coded as geophonic because wind was causing the person's clothing to move.

The soundscape PAQ variables were measured using ordinal and interval scales and data for several variables were not normally distributed, therefore, requirements for parametric tests were not met and non-parametric comparisons were selected. Kruskal–Wallis H Tests were completed to test for differences in eventfulness, familiarity, and pleasantness ratings between the home, work, and CNR contexts. Post-hoc pairwise comparisons with Bonferroni-adjusted significance values were completed to identify which specific groups significantly differed. Spearman rank-order correlation tests were completed to assess the relationship between the Axelsson et al. [23] soundscape ratings at home, work, and within the CNR, and urban values. A $p < 0.05$ was considered statistically significant.

4. Results

4.1. Participant Characteristics and DGs

The study sample held relatively equal gender representation, with 52.4% female and 47.6% male participants (Table 1). The majority of participants (73.8%) were between 18 and 35 years of age, lived in single-family homes (69.3%), and worked in office settings (69.1%). Table 1 describes the study sample by DG, while Figure 3 shows the sample dispersion by DGs within Chile.

The UD was defined by the number of people living per square kilometer in the city where the respondent lived. Urban densities were identified by matching the cities of origin that visitors reported during their visits to the CNR with the city population and superficies data (km²) from the Chilean National Institute of Statistics [67], based on the 2017 Chilean national census. Since we were unable to identify previous studies that categorized participants based on UD, we aligned the study's figures with the Chilean National Institute of Statistics' [68] definitions of city types and identified breaks in the data that correspond with differences in the defined city scales.

Table 1. Participant demographics by urban DG.

	DG 1		DG 2		DG 3		Full Sample	
	≤ 3999 ppl/km ²		4000–5999 ppl/km ²		≥ 6000 ppl/km ²		n	%
	n	%	n	%	n	%		
Gender								
Female	57	50.40%	38	60.30%	78	50.60%	173	52.40%
Male	56	49.60%	25	39.70%	76	49.40%	157	47.60%
Total	113	100%	63	100%	154	100%	330	100%
Age								
18–25 years	38	33.60%	23	36.50%	58	37.20%	119	35.80%
26–35 years	40	35.40%	26	41.30%	60	38.50%	126	38.00%
36–45 years	22	19.50%	5	7.90%	20	12.80%	47	14.20%
46–55 years	8	7.10%	5	7.90%	13	8.30%	26	7.80%
56+ years	5	4.40%	4	6.30%	5	3.20%	14	4.20%
Total	113	100%	63	100%	156	100%	332	100%
City population								
0–2000 (rural)	0	0%	0	0%	0	0%	0	0%
2001–5000 (town)	1	0.90%	0	0%	0	0%	1	0.30%
5001–200,000 (city)	94	83.20%	20	31.70%	1	0.60%	115	34.60%
200,001–500,000 (major city)	9	8.00%	25	39.70%	2	1.30%	36	10.80%
500,001–1,000,000 (large urban area)	9	8.00%	18	28.60%	0	0%	27	8.10%
1,000,001+ (metropolis)	0	0%	0	0%	153	98.10%	153	46.10%
Total	113	100%	63	100%	156	100%	332	100%
Home Type								
Single-family house	72	80%	41	74.50%	81	60%	194	69.30%
Apartment	12	13.30%	8	14.50%	48	35.60%	68	24.30%
Collective housing unit	6	6.70%	6	10.90%	6	4.40%	18	6.40%
Total	90	100%	55	100%	135	100%	280	100%
Work Setting								
From their home	3	3.60%	3	5.50%	8	6.30%	14	5.30%
Residential setting	4	4.80%	5	9.10%	7	5.60%	16	6.00%
Office setting	62	73.80%	32	58.20%	89	70.60%	183	69.10%
Outdoors	2	2.40%	7	12.70%	6	4.80%	15	5.70%
Not employed	13	15.50%	8	14.50%	16	12.70%	37	14.00%
Total	84	100%	55	100%	126	100%	265	100%

The final DGs were the following: DG1 = ≤ 3999 people/km² (represents rural areas, towns, and cities, such as Coyhaique); DG2 = 4000–5999 people/km² (corresponds with major cities and large urban areas, such as Concepcion and Valparaiso); and DG3 = ≥ 6000 people/km² (corresponds with metropolis areas, such as Santiago). Most of the participants in DG1 (83.2%) lived in smaller cities, with populations between 5001 and 200,000. DG2 included participants from a range of urban settings and had higher percentages of female participants (60.3%), younger visitors (77.8%), and participants working outdoors (12.7%) as compared with the other groups. DG3 was composed almost entirely of participants from Santiago, the nation's capital metropolis. Within this group, a much higher percentage of participants lived in apartments (35.6%, versus 13.3% in DG1, and 14.5% in DG2).

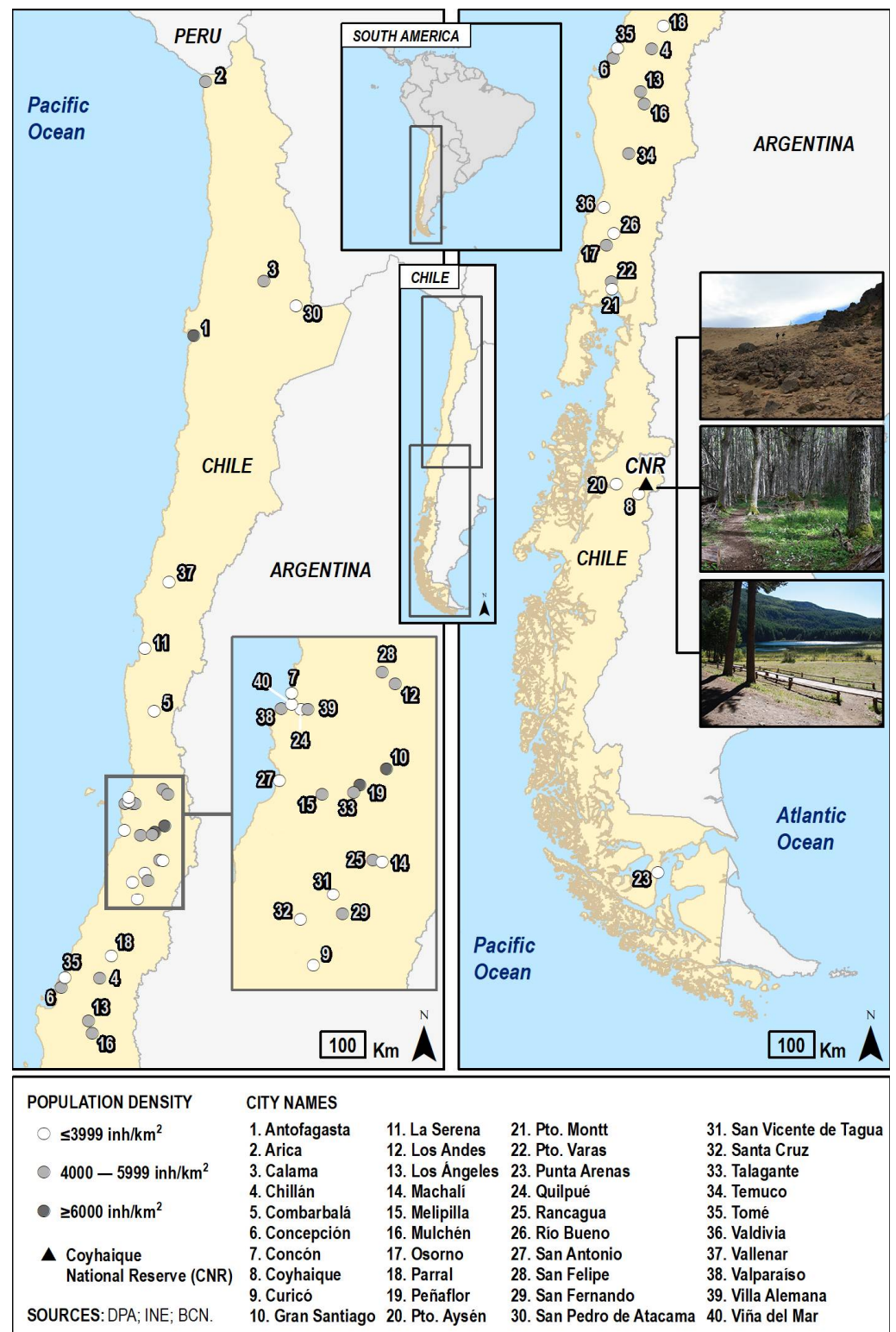


Figure 3. UDs of participants’ home cities and locations with reference to the CNR within Chile.

4.2. RQ1—How Do PAQ Soundscape Ratings Compare between the CNR, Home, and Work Contexts?

Significant differences were found for all three PAQ components (pleasantness, eventfulness, and familiarity) between the CNR, home, and work contexts (Table 2). Among these, pleasantness had the largest effect size ($\eta^2 = 0.57$). Post-hoc pairwise comparisons indi-

cated that both pleasantness and eventfulness were rated significantly higher in the CNR than in either the home or work contexts ($p < 0.001$), which did not significantly differ. Familiarity, in contrast, was rated significantly higher at home than in the work or CNR contexts ($p < 0.001$), which did not differ. Overall, the mean pleasantness rating for the CNR was the highest of all the pleasantness, eventfulness, and familiarity ratings across the three contexts (home, work, and the CNR), followed by eventfulness for the CNR, and then familiarity for home (Figure 4). In contrast, the mean work pleasantness rating was the lowest of all the soundscape ratings.

Table 2. Mean rank scores and Kruskal–Wallis H Test results showing differences in pleasantness, eventfulness, and familiarity rating scores between the CNR, home, and work contexts.

	CNR		Home		Work		H	df	p	η^2
	N	M Rank	N	M Rank	N	M Rank				
Pleasantness	332	598.62	258	279.23	209	233.57	453.82	2	<0.001	0.57
Eventfulness	333	547.21	260	298.96	212	304.08	223.64	2	<0.001	0.28
Familiarity	333	373.85	260	462.8	205	360.9	30.50	2	<0.001	0.04

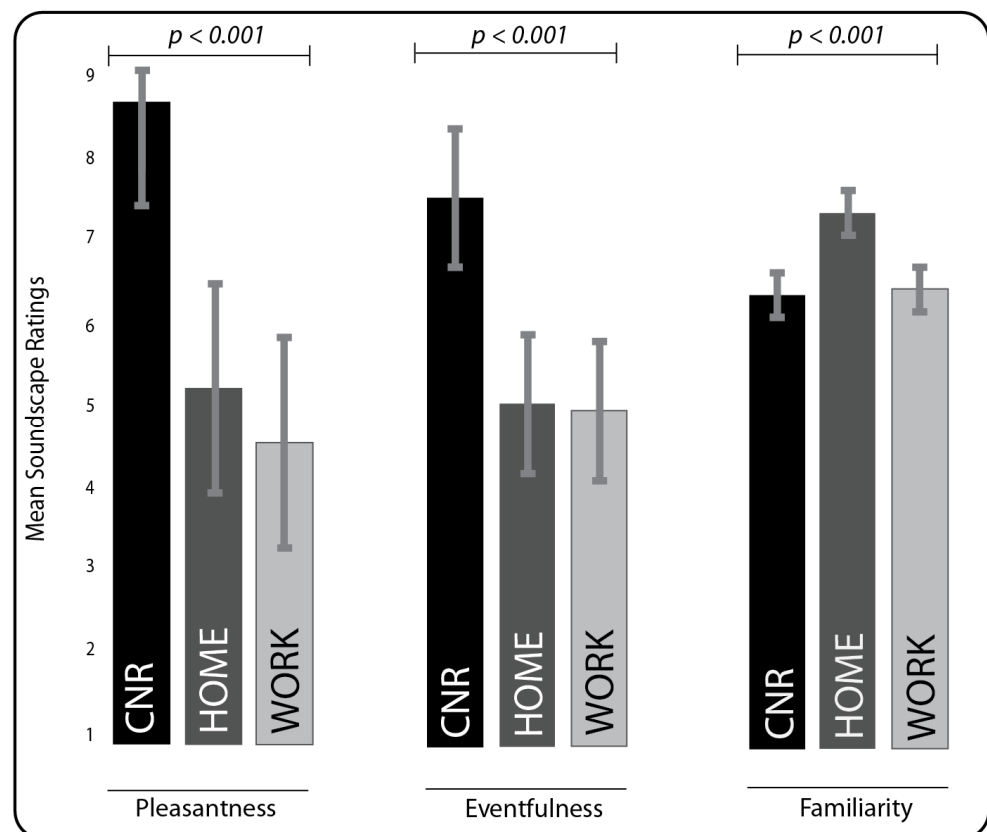


Figure 4. Mean pleasantness, eventfulness, and familiarity scores across the CNR, home, and work contexts, calculated on a 9-point Likert-type scale.

4.3. RQ2—How Do Prevalent Sounds Compare across the DGs, within the CNR, Home, and Work Contexts?

Figure 5 shows the proportion of prevalent sound themes perceived within the CNR, home, and work environments by participants who reside within different UDs. While there was no consistent trend in the prevalence of geophonic sound perceptions in the CNR based on residence density, there were clear trends of decreasing geophonic sounds in both home contexts (23.1%, 14.8%, and 5.7%, respectively) and work contexts (11.6%, 7.8%, and 2.8%, respectively). Considering biophonic sounds within the CNR, DGs 1 and 3 reported similar prevalence (25.1% and 25.2%, respectively), and DG2 reported a larger

amount (32.0%). Biophonic sounds for the home context appeared to be somewhat less prevalent in DG3 as compared with the other groups (30.6%, 32.0%, and 25.8% for DGs 1, 2, and 3, respectively). There were also fewer reports of biophonic sounds in work contexts for DG3 (4.5% compared to 10.1% for DGs 1 and 2). Anthrophonic sounds for both home and work settings increased in prevalence as city density increased from lowest to highest density (home: 46.3%, 53.1%, 68.5%; work: 78.2%, 82.2%, 92.6%).

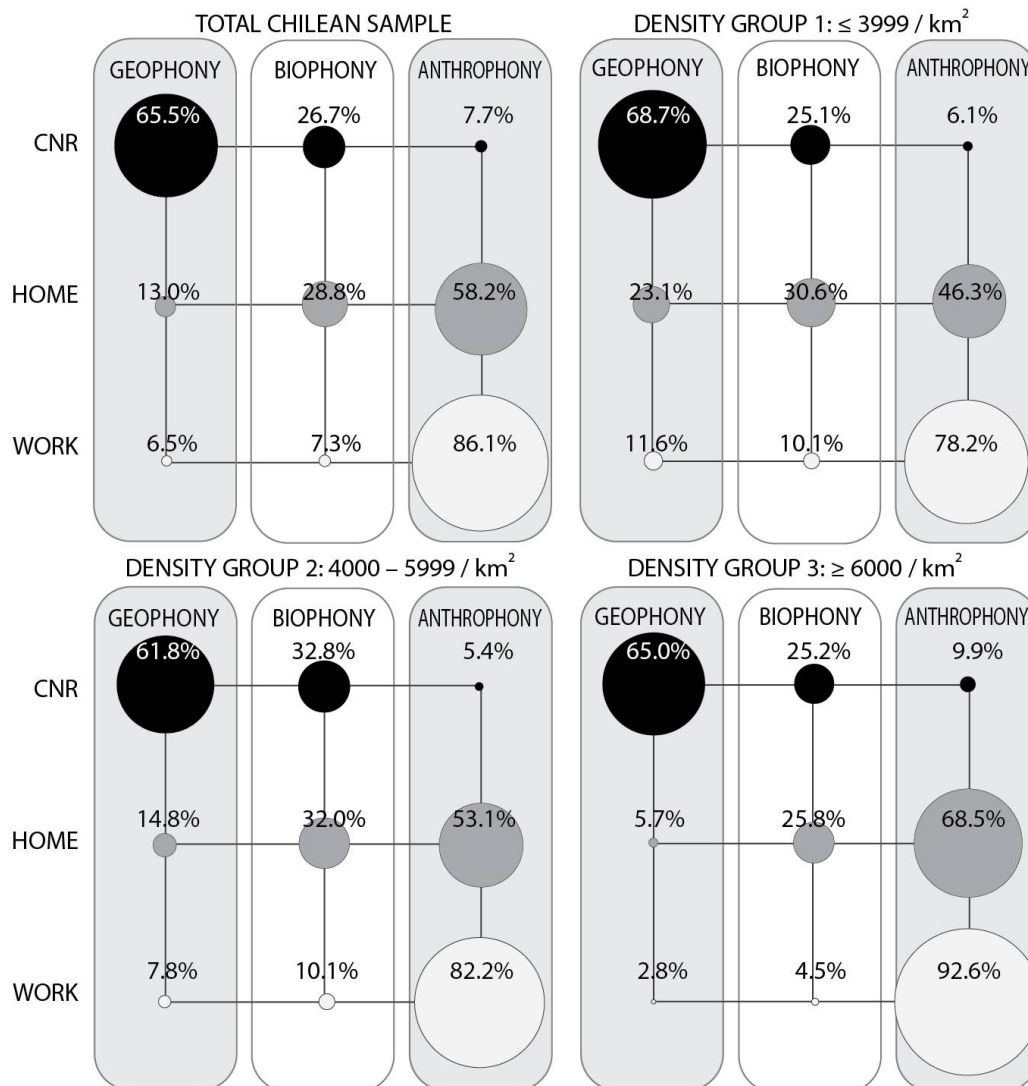


Figure 5. Percentages of sounds perceived by geophony, biophony, and anthrophony categories, within the CNR, home, and work contexts, for the total sample and the three DGs.

4.4. RQ3—Is There a Relationship between UD and PAQ Soundscape Ratings for the Contexts of CNR, Home, and Work?

Results of Spearman rank-order correlation tests indicated significant negative correlations between UD and CNR pleasantness, CNR familiarity, home eventfulness, and work pleasantness (Table 3). In contrast, UD was significantly positively correlated with home familiarity. Pleasantness and eventfulness ratings were significantly positively correlated within all three of the CNR, home, and work contexts. Familiarity was significantly positively correlated with pleasantness and eventfulness at home and work, but no significant correlation was found between familiarity and pleasantness or eventfulness within the CNR context.

Table 3. Correlation matrix between urban densities and soundscape pleasantness, eventfulness, and familiarity ratings at CNR, home, and work.

	1. CNR Pleas- antness	2. CNR Event- fulness	3. CNR Fa- miliarity	4. Home Pleas- antness	5. Home Event- fulness	6. Home Fa- miliarity	7. Work Pleas- antness	8. Work Event- fulness	9. Work Fa- miliarity	10. UD
1. CNR Pleasantness										
2. CNR Eventfulness	0.29 **									
3. CNR Familiarity	0.11	0.16 **								
4. Home Pleasantness	0.07	0.02	0.25 **							
5. Home Eventfulness	−0.04	−0.02	0.18 **	0.36 **						
6. Home Familiarity	0.05	0.03	0.01	0.20 **	0.05					
7. Work Pleasantness	−0.03	0.00	0.16 *	0.30 **	0.21 **	0.05				
8. Work Eventfulness	−0.08	−0.05	−0.01	0.13	0.36 **	0.07	0.44 **			
9. Work Familiarity	−0.04	−0.01	−0.05	0.05	0.06	0.38 **	0.16 *	0.03		
10. UD	−0.14 *	−0.09	−0.23 **	−0.32	−0.13 *	0.18 **	−0.20 **	−0.07	0.08	

* $p < 0.05$; ** $p < 0.01$.

4.5. RQ4—How Do PAQ Soundscape Ratings Compare between DGs?

The Kruskal–Wallis H and post-hoc tests revealed several significant differences in soundscape ratings across the CNR, home, and work contexts between the DGs (Table 4). Pleasantness ratings significantly differed between the DGs in all the CNR, home, and work contexts. For the CNR pleasantness ratings, the DG3 ratings were significantly lower than the DG2 ratings ($p = 0.03$) but not significantly different from those of DG1. For home pleasantness ratings, DG3 was significantly lower than both other groups ($p < 0.001$ for both), but DG1 and DG2 did not significantly differ. For work pleasantness ratings, DG3 was significantly lower than DG1 ($p = 0.004$), with no other significant differences between groups (Figure 6).

A significant difference in home eventfulness ratings was identified between the DGs ($p = 0.03$), but pairwise comparisons did not reveal specific significant differences between the DGs. No significant differences were identified in eventfulness ratings for the CNR or work contexts. Significant differences in familiarity ratings were found both for CNR and home contexts. For the CNR, the DG3 ratings were significantly lower than those of the other groups ($p = 0.04$ between DG3 and DG2; $p < 0.001$ between DG3 and DG1). Within the home context, the DG1 familiarity ratings were significantly lower than those of DG3 ($p = 0.02$).

Table 4. Mean rank scores and Kruskal–Wallis H Test results showing differences in eventfulness, familiarity, and pleasantness rating scores between the DGs for each of the home, work, and CNR contexts.

	DG 1		DG 2		DG 3		H	df	p	n2
	N	M Rank	N	M Rank	N	M Rank				
CNR Pleasantness	113	172.92	63	180.69	155	154.98	8.72	2	0.01	0.03
Home Pleasantness	80	153.22	52	135.17	127	139.94	27.73	2	0.00	0.1
Work Pleasantness	65	122.78	44	105.49	99	92.06	10.43	2	0.01	0.03
CNR Eventfulness	113	175.22	63	176.45	156	156.16	3.71	2	0.16	0.01
Home Eventfulness	81	138.93	53	145.58	125	117.61	6.98	2	0.03	0.02
Work Eventfulness	64	112.9	45	103.29	102	102.87	1.19	2	0.55	−0.003
CNR Familiarity	113	192.65	63	177.82	156	142.98	19.14	2	0.00	0.07
Home Familiarity	80	110.85	52	135.17	127	139.94	8.2	2	0.02	0.02
Work Familiarity	63	102.06	42	93.56	99	106.57	1.48	2	0.48	−0.002

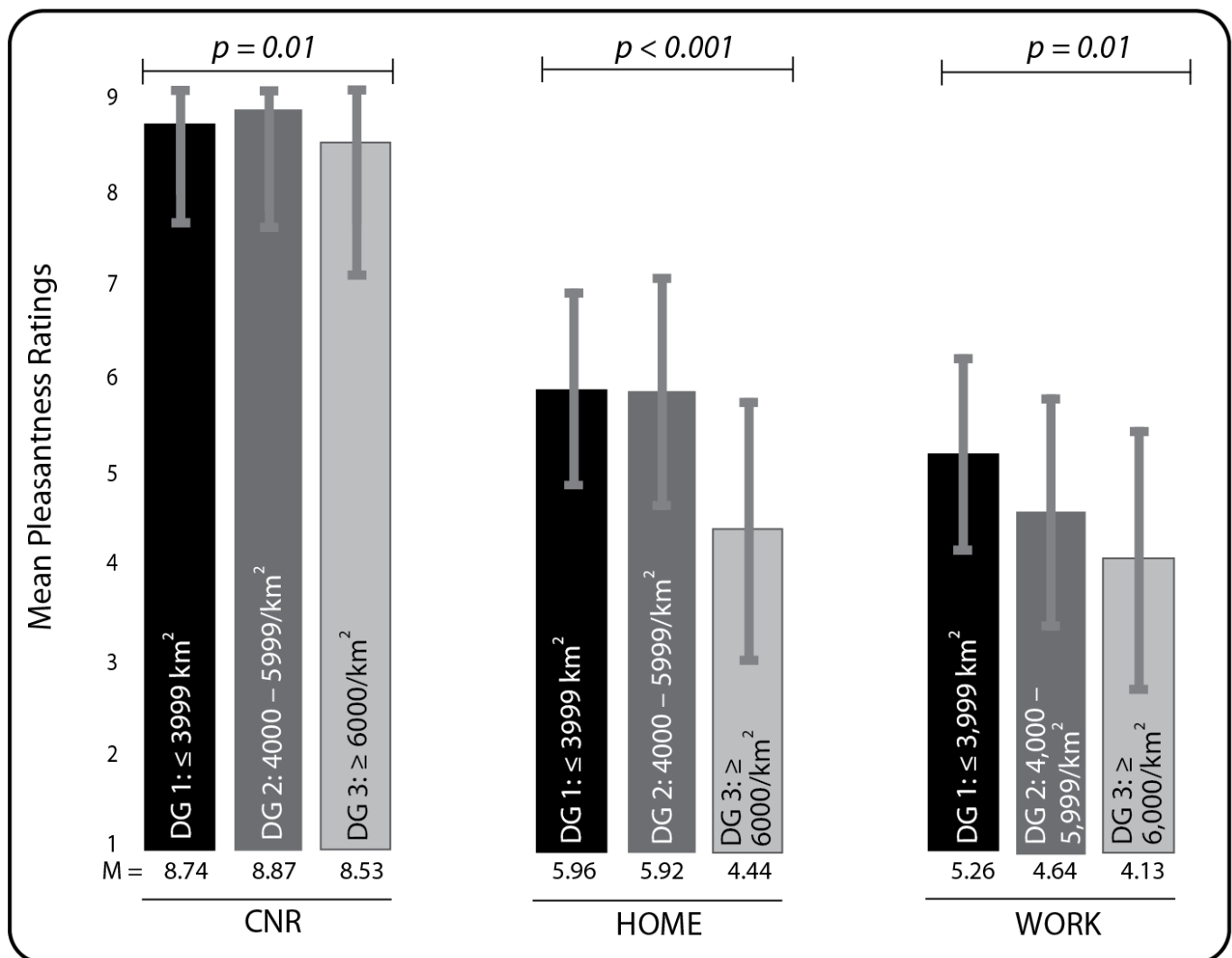


Figure 6. Mean pleasantness ratings of the DGs across the CNR, home, and work contexts.

5. Discussion

5.1. Applicability of the PAQ Framework for Soundscapes (Including Familiarity) in PAs

The CNR soundscape received extremely high pleasantness ratings ($M = 8.69$ on the 9-point scale), significantly higher than the home and work contexts. These results support prior PA research that emphasizes the importance of natural sounds to high-quality PA experiences, as well as the Axelsson et al. [23] findings related to high levels of pleasantness for largely natural soundscapes. Nevertheless, the results surprised the research team, considering that the CNR is located nearby Coyhaique, a mid-sized city, and is considerably less natural, vast, and wild in comparison to some of Patagonia's other PAs. However, it makes sense that the more natural sounds of the CNR soundscape would seem extremely pleasant to our urban sample and could offer the opportunity for these national tourists to develop emotional affect for nature, even though some anthropogenic sounds persisted.

The urban visitors who participated in this study were primarily Chilean tourists visiting the CNR as part of a vacation experience to the remote natural destination of Patagonia. When they visit the CNR, urban visitors have direct exposure to nature and a chance to reconnect with primary sounds like wind, birds, forests, water, and their interactions. This represents a stark contrast to the soundscapes they are exposed to in their daily lives, especially those who live in high-density inner-city areas, where they are isolated from most natural sound sources. CNR soundscapes likely aligned with the visit

motives and desired outcomes they desired for their visit, which would explain the high pleasantness ratings.

High levels of soundscape appeal have been associated with visitor satisfaction [39–41], and overall visit satisfaction, as well as sound-specific appeal, have been found to motivate low-effort pro-environmental behaviors [5,16]. Thus, to advance toward more sustainable tourism practices, it seems particularly important to contextualize soundscape appeal ratings through consideration of visitors' motives and desired experience outcomes [20,21,69]. We recommend that future instruments consider both. While urban national tourists rated the CNR soundscape as highly appealing, international visitors to Chile who are specifically seeking iconic natural Patagonian sensescapes might find the same soundscape less appealing, considering 7.5% of the observed sounds were anthroponic. Moreover, they might perceive a higher percent of anthroponic sounds, based on heightened sensitivity related to those motives. Thus, understanding visitor motives and desired outcomes is likely to provide PA managers with much more useful information when considering soundscape appeal ratings.

Additional PAQ variables should also be considered, as they may provide managers with more useful and contrasting information, especially if considered in a manner that integrates PAQ measures across visitors' different acoustic contexts. For example, eventfulness has not been commonly applied, nor has its meaning been examined within a PA context. Axelsson et al. [23] identified eventfulness through descriptive attributes such as "full of life", "full of content", "exciting", and "festive", which seems out of place for many natural PA environments. In contrast, De Counsel and Botteldooren [49] described high-quality rural soundscapes as having, "a feeling of quietness... determined by intervals of silence where silence itself is defined as the ambiance of a soundscape, the gap or distance, the auditory space between sound events" (p. 888). We were uncertain as to how urban visitors would rate the eventfulness of the natural CNR soundscape and further research is merited. Often, visitors are drawn to PAs and natural soundscapes for their calmness and serenity [66,69], motives that seem more suited to De Counsel and Botteldooren's [49] description of rural quiet soundscapes, in contrast to Axelsson et al.'s [23] attributes of eventfulness. If so, one would expect low eventfulness ratings associating the CNR soundscape as being "uneventful, unexciting, empty, without contrast, and immobile". These are much more similar to De Counsel's and Botteldooren's [49] second-factor descriptors of "not sharp" and "simple". Yet, this was not the case; instead, study participants rated the eventfulness of the CNR as highly "eventful, lively, full of life, various, dynamic", and "messy" ($M = 7.59$ on the 9-point scale), and higher than their home or work contexts.

The concept of familiarity loaded less strongly as a component of soundscape quality in the Axelsson et al. [23] model and was dropped from subsequent applications of the model [48,52]. However, recent work has suggested sound familiarity may be important to the restorative benefits that individuals gain from natural sounds [70]. Additionally, related concepts, including Experience Use History and Recreation Specialization Theory, have demonstrated that previous knowledge and understanding of a landscape can affect sound perceptions [65]. The attributes Axelsson et al. [23] identified as associated with familiarity included, "common", "commonplace", "real", and "familiar". Nevertheless, PA visitation is often motivated by a desire to "escape the daily routine" or to "experience new/different things" [15,69,71]. Study results demonstrated stark contrasts between the magnitude of anthroponic sounds heard within home and work environments, as compared to the CNR (Figure 5). Conversely, natural sounds dominated the CNR soundscape and represented very small amounts of the sounds heard within home and work settings.

These findings, along with the PAQ ratings for familiarity, are supported by Axelsson et al. [23], as they reinforce that the sounds heard in the CNR were not commonplace or familiar to visitors. Therefore, familiarity may represent an important variable within PAs that can help managers understand the level of connectedness visitors have with natural landscapes. Participants rated the familiarity of the CNR soundscape lower than its pleasantness or eventfulness. CNR familiarity ratings were similar to those for

the work context, and significantly lower than their home context. While familiarity was positively correlated with pleasantness and eventfulness in the home and work settings, it was not significantly correlated with either pleasantness or eventfulness within the CNR.

We found these results provoking and believe that further research is warranted to better understand how sound familiarity plays out in a PA context. Perhaps the novelty and naturalness of PAs are invigorating and refreshing for urban dwellers, who may seek or enjoy experiencing a less familiar soundscape. However, lower familiarity ratings found in this study may also be attributed to declining levels of awareness and recognition of natural sounds, resulting from diminished human–nature connections amongst urban visitors. A clearer understanding of these human–environmental relationships may inform destination marketing strategies, as familiarity perceptions and affect may be capable of influencing experiential, emotion-based messaging and campaigns [15,16]. Alternatively, familiarity may align with specialization theory; perhaps a developed interest and focus on particular natural sounds (e.g., a bird watcher’s interest in particular bird calls) may increase visitors’ soundscape familiarity ratings. Interactions between the three PAQ ratings also merit consideration; for example, as familiarity for specific bird calls increases through specialization, the pleasantness of other natural sounds like wind or water, which mask bird calls, may diminish [65].

5.2. Extending Consideration of Visitors’ Experiences outside the PA Context Can Improve HPHP Investigation

The results of this study support the importance of a more integrative consideration of PA visitor demographics that extends beyond commonly considered variables to include characteristics of visitors’ home and work environments. A deeper examination of (a) UD levels and (b) home/work acoustic experiences identified important implications for future HPHP initiatives and strategies.

In terms of pleasantness, participants rated the CNR more pleasant than home and work environments across all three DGs; however, the results indicate a significant negative correlation between the UD and CNR pleasantness ratings. The DG comparisons identified a few differences for DG3. Pleasantness ratings for this group were significantly different from either one or both of the other DGs across all the contexts (CNR, home, and work). UD was also negatively correlated with CNR familiarity. Once again, DG3 was significantly lower than the other two DGs. These differences raise several questions for future HPHP soundscape research, both in Chile and for other urban geographies. What are the factors that affect soundscape perceptions for members of the DG3 visitor group and how do they relate with living in conditions of extremely high UD? Perhaps, having been accustomed to louder or sharper sounds, they have become dulled to the richness of natural sounds or are less mindful of them, or perhaps they are not familiar enough with these sounds to pay them specific attention, so they blend in the background. Understanding these human–environmental relationships may inform more effective HPHP strategies that can increase the therapeutic outcomes of nature and place affect for urban residents within high UDs, leading to positive implications for human health and repeat visit behavior [15–18,56].

As the world’s population (including Chile) continues to shift from rural to urban living [72], the role UD plays in human physical and mental health is increasingly important to consider. The literature documents reasons why UD is an important way to measure home environments, rather than simply noting city population numbers [57–59]. Aquino and Gainza [60] documented how the relationship between UD and socioeconomic conditions plays into the availability of urban attributes such as access to green areas, within the context of Santiago, Chile. However, many unknowns remain with respect to how UD affects residential and work sound environments. For example, traffic patterns and other architectural features, such as the shape of the building blocks, may impact sound exposure, and residents in highly dense urban areas may drive less and opt to walk or take public transportation more, exposing them more to the urban soundscape [73]. Our results suggest the value of considering urban measures within HPHP research, not only in terms of access to desirable green spaces that afford nature’s health benefits but also in terms of

the types of sounds residents are exposed to in their daily lives and how these exposures may influence their experiences in natural settings.

5.3. Limitations

Combining data collection methods (an intercept survey in the CNR, and an online survey for home and work environments) caused a design limitation. However, the study design was guided by previous research findings and is justified within the soundscape literature. Aletta et al. [48] noted that while on-site data collection is preferable, it is appropriate to have participants recall an environment in memory, especially when the research objective focuses on what is typical within a highly familiar environment. Since we were interested in contextualizing findings for the CNR with participants' habitual acoustic environments at home and work, we determined that a combined methods approach was justified. Moreover, this approach helped provide insight into how experiences in home and work environments may influence soundscape perceptions within the natural context of the CNR.

6. Conclusions

This study identified how findings relevant to urban visitors' perceptions of PAQ within the CNR, home, and work acoustic environments can inform PA soundscape management. For example, the overall high appeal of the CNR soundscape suggests the importance of natural sounds and of having natural areas where urban dwellers can escape the dominant anthroponic sounds within their home and work contexts. In addition, although they can tolerate at least smaller levels of anthroponic sounds, it will be important to understand their thresholds for anthroponic sounds in nature and how these might differ from PA visitors coming from more rural or other cultural contexts.

The research serves as an initial exploration of how the Axelsson et al. [23] PAQ measures and findings can inform a more holistic understanding of PA visitors who live and work within a range of UD environments. The work demonstrates the value of both integrating PAQ variables into PA soundscape management and considering visitors' frames of reference beyond the basic demographics that PA researchers tend to consider. The results demonstrate that the UD of visitors' places of residence is an important factor that likely affects visit experiences and soundscape perceptions. In the current study, UD was negatively correlated with CNR pleasantness and familiarity ratings, and participants in DG3 rated the CNR soundscapes as less pleasant compared with those in DGs 1 and 2. Further research should seek to confirm and understand why visitors from high UD locations might find PA soundscapes less pleasant. In addition, to support the HPHP global agenda, PA managers should consider ways to offer experiences that help urban visitors notice and recognize natural sounds to build their familiarity and potentially (re-)establish their emotional affect for the ecosystem services that PAs offer and protect.

Beyond the PA context, the results inform current efforts to integrate PAQ measures across a wider range of acoustic environments and contexts. The results suggest interesting potential for the application of Axelsson et al.'s [23] PAQ measures within PAs; however, for findings to facilitate understanding across contexts and better align urban and PA soundscape work, future research must discern the differences in how people relate to nature and sound within the varied contexts of their lives.

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