



Research

The “desire to have it all”: multiple priorities for urban gardens reduces space for native nature

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ABSTRACT. The majority of the world’s population now lives in cities, where reduced levels of native biodiversity, coupled with fewer opportunities for people to experience nature, are expected to result in an urban public increasingly disconnected from the natural environment. Residential gardens have great potential to both support native species and allow people daily contact with nature. Embracing the epistemological assumption that urban residents’ interactions with nature in their gardens and parks may be complex, unpredictable, contradictory, and context-dependent, we used an interpretative phenomenological analysis approach to explore the human relationship with urban nature in a New Zealand city. We conducted 21 semi-structured “go-along” interviews to facilitate a deeper understanding of participants’ personal experiences of nature in parks and gardens. Interviews revealed a tension between stated values and concrete actions affecting urban biodiversity in private gardens. This value-action gap stemmed from the multiple purposes and values that people hold for their gardens, which do not necessarily align with conservation of native nature. By recognizing that urban residents hold multiple values and want their gardens to fulfill multiple purposes, local authorities aiming to promote nature conservation in cities can design wildlife gardening programs that meet these multiple needs and reconcile conflicting priorities.

Key Words: *connection to nature; extinction of experience; gardens; interpretative phenomenological analysis; urban biodiversity; urban greenspace; value-action gap; wildlife gardening*

INTRODUCTION

Over half the world’s population lives in cities (United Nations 2018) and in New Zealand the number exceeds 86% (World Bank 2018). As people shift to cities, so do potential sources of conservation action in the form of votes, finances, volunteers and future conservation leaders (Dunn et al. 2006). Scholars have argued that direct, personal experiences of the natural world are necessary to foster a willingness to care for nature (Chawla 1998, Pyle 2003, Miller 2005), and these experiences further promote human health and wellbeing (Curtin 2009, Keniger et al. 2013). As so many people move to cities, it follows that most human experience of nature will take place in an urban setting.

Urbanization often results in a reduction of native biodiversity through habitat destruction and degradation (McKinney 2006). Diminished levels of biodiversity in cities, coupled with the loss of opportunities for people to experience natural areas, have led to what Pyle (1993) termed the ‘extinction of experience.’ This is a theoretical vicious cycle of increasing separation from the natural world, as new generations grow up in cities with ever decreasing levels of biodiversity (Belaire et al. 2015).

Despite these challenges, there is a growing recognition of the potential contribution greenspaces in cities can make to the conservation of native biodiversity (Aronson et al. 2014, Ives et al. 2016). In many countries, residential gardens represent a significant proportion of urban greenspace (Loram et al. 2007, Goddard et al. 2010). In Dunedin, New Zealand, gardens cover 36% of the urban area (Mathieu et al. 2007), reflecting the fact that New Zealand homes have traditionally had relatively large gardens. Given the extent of residential gardens in cities, wildlife gardening practices, which involve planting native species and removing environmental weeds, can provide a system of habitat patches and corridors throughout the urban matrix, contributing

to the conservation of native species (Goddard et al. 2010, Lerman and Warren 2011). To make a significant contribution to conservation, however, biodiversity focused gardening would need to be adopted by a large proportion of urban residents (van Heezik et al. 2012).

Urban landscapes are complex and fragmented, comprising multiple land uses under different owners and forms of governance (Picket et al. 2011, Mumaw et al. 2017). They are often characterized by plant communities wholly determined by human choice (Hope et al. 2003). In urban greenspaces, decisions on what to plant depend on aesthetic preferences, social conventions, the perceived economic value of the land, and the political system within which people operate (Nassauer 1995a, Lewis et al. 2018). Such human choices in cities are driven by a wide range of motives and trends, which are unlikely to align with sustaining native nature and biodiversity (Larson et al. 2009).

The findings presented here are part of a larger study investigating the current status of nature connection and the extinction of experience among residents of a New Zealand city. The aim of this larger study was to explore the experiences, meanings, and personal connections linking people to local greenspaces. In this paper, we focus on the tensions revealed by our interviewees between stated values and concrete actions affecting native biodiversity, and how these played out in urban greenspaces in general, and residential gardens in particular. We consider the implication of these tensions for the ability of private gardens to provide habitat for native species. We posed the following primary research questions: How do residents experience and think about nature in their city? What do they notice, what experiences do they seek out? These questions are open and exploratory; no theory was being tested or proposed. We also posed the following secondary, theory-driven, research questions:

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1. Are people gardening to attract native wildlife? Do people perceive gardens as potential wildlife habitat?
2. Does the type of park frequently visited influence perceptions of nature and gardening practices?
3. Are restoration volunteers more inclined to garden for native wildlife, compared to frequent park visitors not engaged in restoration?

These secondary research questions resulted from a review of the literature and resulting theories. They are secondary because the flexible, open nature of qualitative data collection meant we could not guarantee we would be able to answer them (Smith et al. 2009).

Because our focus was an in-depth, detailed exploration of individuals' everyday experience of urban nature, we used an interpretative phenomenological research approach (IPA; Smith et al. 2009, Pietkiewicz and Smith 2014). IPA was developed in the 1990s, but incorporates concepts with much longer histories from three areas of the theory of knowledge: phenomenology, hermeneutics, and idiography (Smith et al. 2009). IPA has primarily been used in health and counselling psychology to explore experiences of health, illness, sex, sexuality, psychological distress, life transitions and identity (Smith et al. 2009). We are unaware of any studies that use this approach to investigate human-nature relationships in cities and therefore present a brief introduction to IPA below.

BACKGROUND AND FRAMEWORK

Phenomenology seeks to understand a situation or phenomenon as experienced by an individual in order to discover its deeper meaning in the context of the whole of human experience (Van Manen 1984, Baker et al. 1992). The researcher attempts to see the world and the phenomenon under investigation from their participants' point of view. The key objective is seeking to understand how people make sense of their lifeworld, enabling them to describe their experiences in their own terms, rather than according to predefined categories (Smith et al. 2009, Pietkiewicz and Smith 2014).

The "interpretative" aspect of IPA recognizes that humans are "sense-making" creatures and acknowledges that both the participant and the researcher are involved in the analysis, the interviewees through their verbal accounts and the researcher through their interpretation of them. IPA involves a double hermeneutic: the researcher attempts to make sense of the participant, who is attempting to make sense of their experiences (Smith and Osborn 2003).

IPA is idiographic because it is committed to understanding the particular, that is, how particular experiences are understood and interpreted by particular people in a particular context. An idiographic approach further requires a commitment to detail and depth of analysis; the process is highly time-consuming and sample sizes are relatively small. IPA posits that the particular is related to the general. According to Warnock (1987), a deeper exploration of the particular takes us closer to the universal. Smith (2004) argued that the details of the individual have the potential to bring us closer to significant, universal aspects of a shared humanity. This view was voiced by Schleiermacher (1998:92-93), who stated that "everyone carries a minimum of everyone else within themselves." IPA starts with detailed analyses

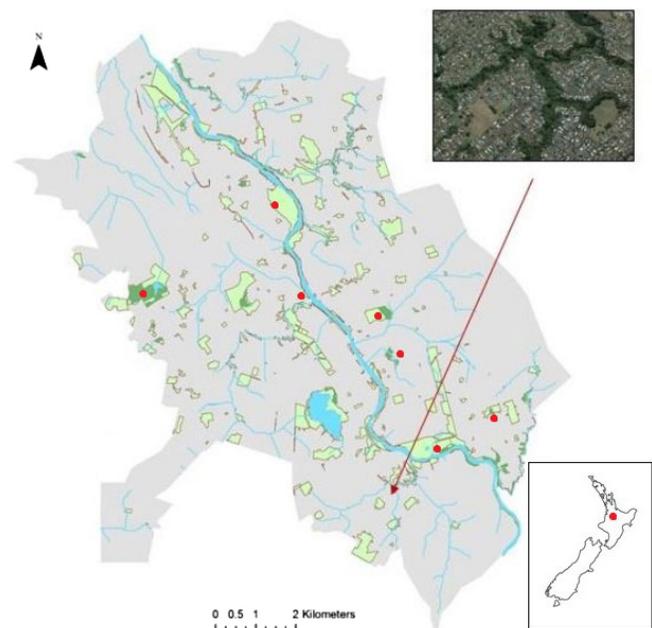
of particular cases before tentatively making more general claims. The broader relevance of accounts from single cases stems from the understanding that phenomena in the social world are not isolated, discrete, or static. Instead, human experiences and actions are created and understood within a common world that is simultaneously general and particular (Schraube and Højholt 2019). Hence, in IPA the wider significance of one's qualitative study can be enlarged through theoretical generalization or by connecting research findings to academic scholarship (Hodgetts et al. 2019).

METHODS

Site description

This study took place in Hamilton, New Zealand's fourth most populous city, which encompasses approximately 110 km² of land on the banks of the Waikato River (Fig. 1). Hamilton was originally settled by Māori approximately 800 years ago, followed by European settlers in 1864. They began to alter New Zealand's unique flora and fauna through hunting, land clearance, and the introduction of predatory mammals to an island archipelago that previously had none (King 2005). From the 1860s, acclimatization societies began introducing non-native birds, including Starlings (*Sturnus vulgaris*), Skylarks (*Alauda arvensis*), and Blackbirds (*Turdus merula*; Walrond 2008).

Fig. 1. Map of Hamilton City showing the distribution of native forest (dark green), parks and golf courses (light green), and gully streams feeding into the Waikato River (blue). Top inset: Mangakotukutuku Gully (Google Earth), bottom inset: location of Hamilton in New Zealand. Red dots mark the location of sites visited in this study. Map adapted from Clarkson et al. 2018, with permission.



The temperate rainforests and wetlands of the Hamilton area were largely destroyed during urban development. Widespread habitat destruction continues to this day, although at a slower pace since

the establishment of the Resource Management Act of 1991 (Coleman and Clarkson 2010). Currently only 2.1% of Hamilton is covered in native vegetation (Clarkson et al. 2007), the lowest percentage for any New Zealand city.

Hamilton possesses a network of branching gullies, covering approximately 7% of the city area (Cornes et al. 2012). Gullies represent the major remaining undeveloped greenspace in an otherwise highly built-up environment, and are currently a central focus for the restoration of the city's native vegetation (Clarkson and McQueen 2004). Gully beautification was the goal of pioneering restoration projects, which began in Hamilton in the 1960s, initiated by private landowners (Coleman and Clarkson 2010). In 2000, the Gully Restoration Programme was formulated by Hamilton City Council to encourage gully restoration on private and public land, in conjunction with the promulgation of a gully reserves management plan in 2001 (Hamilton City Council 2007). Reconstruction of native habitat in Hamilton was further advanced in 2004 when 60 ha of public land were dedicated to the establishment of Waiwhakareke Natural Heritage Park (Clarkson et al. 2012).

With an estimated population size of 160,911 (Statistics New Zealand 2018), Hamilton is the third fastest growing urban area in New Zealand. According to the 2018 census figures, Hamilton's population is 63.6% Pākehā/European, 23.7% Māori, 18.5% Asian, 6.1% Pacific Peoples, and 2.2% Middle Eastern, Latin American, and African (Statistics New Zealand 2018). Dairy, manufacturing, the provision of health services, education, and scientific research make up the key local industries.

Participants

The study was conducted from March to May, 2017 with 21 Hamilton residents, seven for each of the three categories: restoration volunteers, frequent visitors to parks dominated by native vegetation (bush parks), and frequent visitors to parks dominated by non-native vegetation. Restoration volunteers were members of ecological restoration groups, whose activities include clearing environmental weeds, planting natives, and conducting predator control of invasive mammals in Hamilton public parks. In IPA, participants are selected because they have personally experienced the phenomenon under investigation. The participants represent a perspective, not a population. In our study, our focus was on residents' experiences of urban nature and we selected people who engage with urban nature on a daily basis. The three groups were chosen because we wanted to explore whether restoration volunteers who work in a given park have a different relationship to it than people who walk through the park on a regular basis. We also wanted to explore whether the vegetation in the park (native or introduced) influences residents' experiences.

Restoration volunteers were recruited by contacting leaders of ecological restoration groups, and park users by distributing flyers to houses within 400 meters of parks and by word of mouth (snowball sampling). Sixteen participants were women and five were men. Ages ranged from 28 to 73. The majority identified as Pākehā (New Zealanders of European descent), with three Māori (the indigenous population of New Zealand), one Fijian, and one Indian. Code names, type of park visited, ethnicity, gender, and age range of participants are presented in Appendix 1. Eighteen participants were homeowners; their properties consisted of a stand-alone house surrounded by garden, the most common type

of urban property in New Zealand (van Heezik et al. 2012). Three participants rented the same type of property.

Ethical approval for this study was granted by the University of Waikato Faculty of Science and Engineering Human Research Ethics Sub-committee. Participants gave informed consent to participate in the study.

Data collection and analysis

Semi-structured "go-along" interviews (Carpiano 2009) were used to explore participants' experience of nature in their neighborhood park and home garden. The go-along interview method is a variation on qualitative interviewing techniques and is used for exploring and improving understanding of people's experiences of their local neighborhood (Carpiano 2009). According to Carpiano (2009:264), "the researcher is 'walked through' people's lived experiences of the neighborhood." Interviewees were asked to give the researcher a tour of the park they visit regularly, followed by a tour of their garden. During the tours, participants were asked about the plants and animals they encounter in these greenspaces, their importance, and the ways in which they engage with them (the full interview schedule is presented in Appendix 2). The interview schedule was used flexibly, allowing the participants to guide the conversation to topics most important to them, and the researcher to follow up on matters arising that were not part of the original schedule. This is in keeping with an IPA approach, where interviewees are encouraged to speak and reflect freely, sharing their stories, thoughts, and feelings in their own words (Smith et al. 2009). Interviews lasted between 30 minutes and 2 hours, were audio-recorded with permission, and transcribed verbatim. Participants were given pseudonyms to protect confidentiality.

Following transcription, each interview was examined in detail; this involved reading and re-reading the transcription and listening to the interviews multiple times. The next step was initial note taking, reviewing every word, phrase, sentence, and paragraph, highlighting anything of interest in the transcript, attempting to describe why it is important, and recording key words, phrases, and questions that arose during the reading. Emergent themes were then developed by focusing on connections, relationships, and patterns in the initial notes. A summary of the interview was written before moving to the next case and repeating the process. The next stage of the analysis involved identifying shared themes, patterns, and individual variations between the accounts.

Three main themes and multiple sub-themes emerged from the interviews (Table 1). Below, we illustrate the shared themes, with particular examples from individuals. Because our sample size was larger than that typically recommended for IPA (three to six participants), we had to be selective in choosing examples and quotes that best encapsulate and reflect the core of the participants' experiences of urban nature. Also, we compare our findings with the current literature, examining to what extent our results are supported by previous studies.

FINDINGS AND DISCUSSION

Tension between native and non-native in urban greenspaces

Although almost all interviewees (19) voiced an appreciation for native plants, this did not necessarily result in the preferential planting of natives, and most gardens were dominated by

Table 1. Overview of the main themes and sub-themes that emerged from the interviews.

Themes	Sub-themes
Tensions between native and non-native plants in parks and gardens	Allocation of separate spheres for native and non-native plants
	Gaining gardening inspiration from restoration activities and walks through bush parks
	Competing values held for gardens - productivity (fruits and vegetables), variety and color (typically introduced flowers and leaves), unique New Zealand natives, habitat for birds and other wildlife, compensation for global habitat destruction, practical considerations
Tension between tidy and messy and how much of each is acceptable in the garden	Lawns as unquestioned necessity, symbol of order and tidiness
	Large trees as source of conflicting emotions and values
Evidence of wildlife gardening with a particular focus on birds	Enjoyment of birds and other wildlife does not necessarily result in concrete action (e.g., protection from cats, gardening for wildlife) but untidiness in gardens is tolerated if seen to benefit birds or other wildlife
	Birds as a source of enjoyment, part of daily life, at times taken for granted

introduced species (*personal observation*). Similar findings were described by van Heezik et al. (2012) in their study of Dunedin homeowners, whose gardens were dominated by exotic species despite the participants' voicing a preference for native plants, highlighting the gap between stated values and practical choices (Kollmuss and Agyeman 2002). Similarly, Doody et al. (2010) found that Christchurch residents claimed to value native plants but would remove them as weeds if they grew as self-dispersed seedlings in their gardens.

Five participants spoke of being inspired to plant more natives in their gardens either through their engagement with a restoration group or frequent walks through bush parks. Keira had acquired native plants during her many years of participation in planting days at Waiwhakareke, Leathan collects native seedlings for her garden during walks through the university grounds, and Siobhan collects native seeds from her local bush park. Seeing a large silver fern in this same bush park inspired Siobhan to buy her husband one for his birthday. Artair remarked that he likes all plants irrespective of their country of origin: "I'm not like some people that are totally native focused, I like all plants basically, and if I like a plant then I'll have it." However, he later commented that becoming a member of a restoration group had resulted in his being more appreciative of native plants, increasing his knowledge of what natives could grow in his garden.

Ten of our participants had areas in their gardens designated for native plants. Siobhan had decided to plant only natives in her front yard, Ngaire had a section along her house for shade-tolerant species, Artair saw his gully as an area that should be native, and Breena dug up all the native seedlings that appear on her lawn and moved them to one corner of the garden. Seonaid commented, "I get a lot of natives self-seeding in my garden because of birds, and I sometimes come and replant them down by the river to try and help them." This allocation of separate spheres for native and non-native plants seemed to be one way

that residents, wanting the colorful flowers of introduced plants as well as a productive vegetable garden and fruit trees, reconcile these desires with their conviction that planting natives is important. In contrast to the study by Doody et al. (2010), our interviewees did not remove self-seeding native plants as weeds, but rather moved them to what they saw as an appropriate location, either in their garden or a nearby park.

Growing fruits and vegetables was important to the vast majority of interviewees (19), the same number that also appreciated native plants. There was a tension between these two values because vegetable gardens need light, while native plantings create shaded conditions. Keira commented, "I do want production and you know you have to have things in the sun to get fruit and stuff. But I do like having the natives as well." For Laren and Taan, planting things they could eat was a higher priority than planting natives. Ngaio had planted 22 fruit trees and declared, "I just love the idea of growing my own food ... I used to be much more into growing native stuff but you know, you've got to be a bit practical when you actually want to grow veggies and fruit as well." Kaelin described the multiple values she holds for her garden: "I want to have the whole food chain here rather than just the fruit trees. What's important to me actually is also feeding myself out of the garden, so I like to have the trees for some fruit, and some things for food plants for birds." These examples reveal that growing one's own food is a high priority for New Zealand gardeners, at times competing with their desire to grow native plants, and the garden has to accommodate both values. This desire to "have it all," as two respondents described it, was well illustrated by Balfour:

It's a bit of a jumble but it works ok ... I do have a preference for natives because it's nowhere else. If we don't look after it and care for it, no one else is going to ... But I do enjoy deciduous trees as well, non-natives. It's quite nice looking through here, you get a mix of natives

and non-natives, and it's quite nice in an urban setting. But I don't like going into a reserve and seeing maples or something growing ... I've got a garden that's a combination of deciduous and native, and that's lovely too, I like it a lot really.

Balfour identified the uniqueness of New Zealand plants as the reason for his appreciation for them. Planting native species is often advocated as a way to re-establish regional and national identity (Feagan and Ripmeester 2001). In New Zealand, native plants started becoming fashionable in the second half of the 20th century, a trend that Longhurst (2006) and Jay and Stolte (2011) attribute to European New Zealanders' (Pākehā) changing perceptions of their country, no longer seeing it as an English colony but as an independent Australasian-Pacific nation proud of its unique biological heritage. Balfour further described a sense of personal responsibility and duty of care for the preservation of these unique species. Similarly, Siobhan was inspired by her friend, a restoration ecologist, to view her garden as an opportunity to support native biodiversity: "once I learnt how important native plants are, how important they are for the ecosystem, I kind of thought, well, I've got a backyard, I can do my bit. So that's when I started collecting native seeds." Participants in studies of urban green roofs (Loder 2014) and sustainable gardening (Kiesling and Manning 2010) voiced similar concerns over human destruction of the environment and saw these spaces and gardening choices as compensation for this destruction.

Balfour's quote also highlights that the mix of native and introduced plants is seen as acceptable in an urban setting, but undesirable in bush remnants. This same mentality can be seen on the finer scale of the city, with certain areas such as gullies and patches of remnant forest seen as spaces that should be dominated by natives, while in gardens and parks it is acceptable to have a mix. Similar views were found in a study by Selge et al. (2011), where certain non-native species were acceptable when found "in the right place," but undesirable when found in areas viewed as "pristine."

The colorfulness of introduced flowers and leaves was brought up by five participants as adding variety to a garden. Certain native plants were specifically chosen because of their flowers. Balfour described disagreements he has with his wife over what to plant; he prefers natives, but his wife asserts that they have no color and instead prefers introduced plants with pretty flowers. Caitrin was torn between her enjoyment of autumn colors in her neighborhood park and her awareness that the trees are not from New Zealand:

I get that all of these are European trees, or American ... We go through fads in trees. But I guess that's the problem, isn't it? People mix indigenous stuff, here in New Zealand it's kind of imported stuff there [in the park], and I don't know what to think. So I just carry on walking and think, that's a nice tree! I try not to get political about it ... There's a tension there, there's a real tension! But, you know, I think you've just got to compromise, a tree is a tree, and we've got to be really grateful that trees are here and sort out the politics later on.

Large trees in parks are highly valued, no matter their country of origin, and cutting them down is invariably seen as a shame, even

if they are being cut down to make way for natives. Seonaid was particularly passionate about the importance of large old trees, describing their destruction using strong, emotional language: "a huge shock, a massive thing to do, tragic and distressing," which left her feeling "bereft and stunned." She believes their loss detracts from the character of the neighborhood and stressed their importance as habitat for birds. Kendall also valued the bird habitat provided by large trees, commenting that both she and the birds greatly appreciate large trees in parks.

The tension of tidy and messy gardens

While reflecting on the limited amount of native vegetation in their gardens, four participants concluded that they do not have enough room for more planting. What they often meant by this, however, was that there is no more room in the thin strip of vegetation bordering their lawn. Lawns are generally accepted as an obvious and unquestioned necessity, preferred for their perceived ease of maintenance and admission of light. According to Feagan and Repmeester (2001), "the lawn has become deeply internalized as the most appropriate form of organizing private green space." The large trees so greatly valued in urban parks become highly problematic in the garden and are cut down if they are seen to block sunlight or threaten to fall on the house. Inoke's garden had originally been all bush:

When we first moved into this house, it was almost as if it was in the bush ... That whole front yard was just totally covered in bush right up to the windows. So most of what's there we've actually pushed back a bit ... because it was way too dark for us, so we took a lot of it out but kept some of the stuff around the edges ... it was just far too dark for us and also there was no grass, so that's why we did what we did.

This cultural norm of lawn bordered by trees and shrubs was questioned by three interviewees who were interested in permaculture, which they spoke of as gardening to provide food for insects, people, and wildlife. Kendall declared she is not a fan of lawns, which she sees as masses of mown monoculture, preferring to garden with nature and looking at the landscape in terms of food for people and animals. Similarly, Kaelin believes it is important not to be too tidy, insisting that nature should not be constrained to straight lines and clean borders. She rarely mows what little grass is left in her yard, seeing long grass as important for skinks, worms, and wētā (*Hemideina thoracica*, an endemic insect). She described her gardening style as "muddly," designed to attain ecosystem balance with complex invertebrate communities that will in turn attract birds. She sees the "lawn garden" with perimeter trees as barren and lacking in pollinators and predatory insects.

People feel a strong tension in their views of what is tidy or messy and how much of each is acceptable. A respondent would speak of the importance of allowing things to look a bit wild in the garden one minute, and apologize for its untidiness the next. Because of injury, Cian was unable to spend much time in her garden and her comment on the resulting "messier" garden revealed this tension: "usually we culture the wild woolly look, now we've got the wild woolly look without any culture." Freeman et al. (2012) note how the "informality" of nature appears to be at odds with garden "culture." According to Longhurst (2006), gardens are "improvements" on nature; they are places where nature is controlled and ordered to fit widely accepted social

conventions of what a garden should look like. Studies indicate that people value areas they perceive to be neat, and owners of untidy or messy gardens can be accused of being lazy and irresponsible (Nassauer 1995a, Feagan and Ripmeester 2001). Nassauer (1995b:161) comments that “ecological quality tends to look messy ... What is good may not look good, and what looks good may not be good.” Lindemann-Matthies and Marty (2013) found that although gardens described as wild and chaotic tended to be species rich, they were not considered attractive. Thus, city residents interested in creating messier gardens that would benefit native species will come up against the social norms of large expanses of mown lawns and tidy borders of exotic plants.

Trees were a constant source of conflicting emotions in the present study, described by Balfour as a blessing and a curse, dropping branches and leaves, blocking gutters, and shading houses or vegetable gardens. Balfour spoke of the constant fight between having beautiful trees but keeping them from taking over. While commenting that it was unfortunate, Leathen took it for granted that she could not have large native trees in her garden, instead planting only low-growing species. Marama cut down two large trees in her front yard because they were a source of constant worry during storms. Inoke commented, “our biggest issue, well for me, is the trees. Like we love the trees but they spill all the leaves and it’s not uncommon for me in the middle of autumn to take away 20 wheelbarrows full of those leaves off the front lawn.” Cian was torn between her desire to provide habitat for birds and the practical considerations of large trees or branches falling on her house: “they [family members] all think some of the trees in our garden are too big now and we should cut them out, and they’re probably right but I’m sad because I’ve got to be practical but I like the thought of all the birds perching in here.” Seonaid, for whom the felling of large trees in a park had been a deep emotional blow, spoke of her desire to cut down cabbage trees in her own garden: “we’ve had lots and lots of berries on them, and we’ve had lots and lots of birds feeding on those, and they make a terrible mess underneath and cabbage trees drop tons of leaves and they’re a pain in the neck, and I said to my husband the other day, how would you feel if we cut the cabbage trees down? As much as I love them, they’re in the wrong place.” Similarly, Head and Muir (2005) found that while native trees were often highly valued, they were seen as “out-of-place” when too close to the home.

The interviews revealed a conflicted relationship between what people claimed to value and their actual gardening choices. Respondents greatly appreciated native plants in bush parks, but in their own gardens their conviction of the need to promote New Zealand’s unique biodiversity conflicted with their desire for productivity, color, beauty, variety, and practical considerations. Interviewees’ perceptions of what a garden could be was further constrained by the cultural convention of manicured lawns with tidy borders of colorful exotic flowers. This cultural convention that equates ordered gardens with responsible, hard-working residents, makes it difficult for people to reconcile messy nature with tidy gardens. People had a strong sense of where various plants belong: a native plant might be highly valued in a bush park or the appropriate shady spot in the garden but become a weed when it self-sows on the lawn. Large trees were highly valued in parks but became sources of constant frustration in gardens. Thus, the value of a plant did not depend solely on its country of

origin, but also on the type of space it occupies, and the priorities or uses people see as desirable for that space.

Evidence of wildlife gardening

In six instances, features that were described as untidy, scruffy, messy, or weedy are tolerated if they were seen to benefit birds or invertebrates, a finding that challenges Nassauer’s (1995b) suggestion that residents may value songbirds in suburban environments, but are unlikely to value the woody habitats they require. Deoiridh leaves “scruffy-looking” dying flowers because they attract finches. She described this as her concession to bird feeding: “the fact that I leave them here is for the birds, I couldn’t say that I actually grew them for the birds.” Similarly, Keira was going to cut off dead sunflower heads until she realized the goldfinches were enjoying them. The flowers had originally been put in because of their color; she had not realized the birds would be attracted to them. Aindrea leaves fallen branches and leaves, putting them in the garden or mowing them into the lawn, “all deposited there to feed the birds.” He also allowed his vegetable garden to be overrun by weeds when he noticed greenfinches using the seeds to feed their chicks: “so they’re pretty much just in there all day every day taking seeds off the weeds to feed their chicks, that’s a good use for a garden.” He also left a wisteria growing on his garage for an endemic insect: “even though I dislike that vine intensely I don’t want to cut it out because it’s a great home for wētā.” Siobhan decided to leave in flaxes that she described as messy-looking because they were attracting Tūi (*Prosthemadera novaeseelandiae*), an endemic bird.

Although studies have suggested that people who enjoy bird observations in their yards will increase their wildlife gardening efforts to attract more birds (Belaire et al. 2015), none of this study’s participants designed their gardens specifically for birds. The attractiveness of certain features to birds or other wildlife, both native and non-native, was often mainly a happy coincidence. Occasionally, a native tree or flax might be planted with the hope of attracting Tūi. This half-hearted approach to wildlife gardening is illustrated by Balfour: “I planted a kōwhai [*a small native flowering tree*] a few years ago and I thought, well if there are Tūi around they’ll like that, because I know they like those sorts of plants but it didn’t survive. So probably I haven’t done that much, I haven’t planted many things, the majority of things were here when I came.” The participants interested in permaculture tended to focus more on insect diversity and the presence of pollinators, although this in turn is seen as benefiting birds.

Interviewees’ perceptions of neighborhood birds are overwhelmingly positive, irrespective of whether the bird was native to New Zealand. Hearing and observing birds was mentioned by 17 participants, for whom birds are a welcome, though at times taken for granted, aspect of their daily lives, supporting previous claims that wild birds may be the most commonly encountered wild animal in the city (Cox and Gaston 2015). Eleven respondents mentioned enjoying watching birds and their behavior. Taan and her partner regularly put out sugar water and bird seed, “and boy,” she concluded, “it’s fabulous, so many birds, we could just sit there and watch them all day.” Similarly, Cian commented that if she and her spouse are staying in, they will fill up the bird feeder so they can watch the birds. Ngaio listed one of the benefits of building on a porch that she

and her husband can sit outside at night watching the birds come in to roost.

Two respondents were unable to name the birds they saw, with Caitrin asserting, “I can see the birds but I don’t know their names.” When asked what birds he sees in the park, Inoke responded, “those white things, obviously you’ve got your normal, what are they called, those little brown things.” When asked the same question in his garden, Inoke mused, “in one sense, I suppose, you kind of just take birds for granted. It wouldn’t be until they were gone that you’d know that they weren’t there.” Despite the taken-for-granted nature of these daily bird encounters, Inoke spoke of trying to attract Fantails (*Rhipidura fuliginosa*) to their garden and described Swallows (*Hirundo neoxena*) nesting above their door as an experience he and his partner enjoy.

Nine of our interviewees were cat owners, six of whom were also restoration volunteers. Respondents fell into roughly two camps on the question of cat ownership and the impact of cats on native wildlife. As Seonaid put it, the first group is “philosophically against cats” because they see them as incompatible with native wildlife and believe a complete mindset change is needed on cat ownership. Seonaid recognized the tension between those who love their cats and the effects cats can have on local wildlife: “the cat thing, it’s interesting because it’s that tension of people who love them, and they are lovely pets, but they’re also just a dreadful blight on birdlife if they’re allowed to go out and hunt.” Kendall spoke of cats preying on birds and lizards as sad and concerning, concluding that she would rather have more space in the city for native wildlife than domestic cats. Balfour voiced his concern over the neighborhood cats catching birds but conceded that they do control rodents. Deoiridh also recognized the beneficial role of cats in suppressing rodents, but did not feel this justified their predation on native species: “I could never keep a cat. They catch rodents but they catch birds and insects and reptiles, and that’s contrary to my belief system, I think they’re a menace to be honest.” The second group comprised the cat lovers, torn between the enjoyment they got from their cat, and their desire to see more birds and other wildlife in their garden. This tension is illustrated by Keira, who planted native fruiting shrubs hoping to attract lizards, while simultaneously owning three free-ranging cats.

Participants dealt with these conflicting priorities in various ways. Kaelin built a large outdoor enclosure that connects to her house, guarantees the safety and happiness of her cats, and ensures the neighborhood skink and wētā community do not end up on her pillow, an example of a participant’s values leading to concrete action in order to reconcile conflicting priorities. Other respondents reasoned that their cat was too old, was not a good hunter, had never before caught a bird, or would never catch a native bird. Four participants put bells on their cats but do not believe them to be particularly effective.

Our respondents showed a strong affinity for birds, ranging from active feeding and birdwatching to the taken-for-granted enjoyment of seeing and hearing birds in their parks and gardens. This enjoyment of birds, however, does not necessarily result in interviewees taking concrete action in their gardens to protect birds from cats or to attract and provide habitat for birds. Instead, the attractiveness of certain features of gardens to birds was usually simply a happy coincidence. This finding once again

highlights the gap between what we value and what we do. Valuing birds did not necessarily lead people to work actively to accommodate, attract, and protect birds in their garden.

SUMMARY AND CONCLUSIONS

The themes brought up by interviewees in our study fell naturally into dichotomies: native and introduced species, tidy and messy, urban and “wild” nature, gardens and parks, values and practicality. Dichotomies are defined as two mutually exclusive and contradictory groups or entities (Merriam-Webster 2021). As suggested by Sprague and Zimmerman (1993), however, we present dichotomies not as exclusive, contradictory categories between which we must choose, but as evidence of the tensions we must struggle to integrate.

The overarching tension in our study was between what people claim to value and their specific actions affecting native biodiversity in their gardens. Billig (1996:209) reflected on this well-recognized gap between attitudes and actions:

Above all, social psychologists have been discomforted to find that general attitudes are poor predictors of people’s actions ... However, from a rhetorical perspective, there may be more to be gained by forgetting prediction and by concentrating upon that gap between the general attitude and the specific action.

In our study, the gap between values and actions appeared to stem from our respondents holding conflicting, competing desires and priorities. Many participants valued native plants, but their gardens were dominated by introduced species, because their decisions on what to plant were influenced by other desires that did not necessarily align with planting natives. Interviewees recognized this “desire to have it all,” with their preference for natives, often resulting from the uniqueness of New Zealand’s biological heritage, competing with their desire for the productivity of vegetable gardens, the variety and color of introduced plants, the social convention of lawns and the impracticality of large trees. The participants in our study hold a range of values and purposes for their gardens that do not always align with creating habitat for native nature.

Mixing native and exotic plants was acceptable in gardens and parks, but not in bush beyond the city limits, highlighting the dichotomy between what in “nature” is seen as acceptable in an urban environment as opposed to “pristine” forests. In contrast to previous studies, however, our respondents were not worried by messy, wild-looking bush parks. The tension between messy and tidy, and how much of each was acceptable, only arose in the context of the participants’ gardens, where the form nature was allowed to take was constrained by widely accepted social conventions of what a garden should look like. Even interviewees influenced by permaculture, who tended to be more at ease with a messy garden, were affected by the manicured garden norm and would apologize for perceived untidiness, highlighting the challenge of overcoming certain cultural norms that will be necessary for wildlife gardening to become a more widespread activity.

Birds in the city were highly valued by the majority of respondents and even those who admitted to taking them for granted appreciated birds as contributing to the meaning and attachments they held for their parks and gardens. These generally positive

attitudes were little affected by the bird's country of origin and did not result in people actively designing gardens for birds or wildlife, or refraining from owning cats or allowing them to roam free, once again highlighting the gap between values and specific actions. We did have one instance, however, where a participant put great effort into reconciling her love of cats and desire to protect wildlife in her neighborhood by constructing a cat enclosure in her garden. We further found that our participants would tolerate certain messy features when they were seen to provide habitat for birds, insects, or lizards, suggesting that valuing wildlife and knowing what habitat features they require can lead to people challenging certain cultural norms.

This research suggests that the residents we interviewed have a strong affinity for nature and wildlife in cities. This is not surprising, given that a third of our interviewees were selected because they were restoration volunteers, and the remaining group were frequent park users. Furthermore, because participation is voluntary, those who were willing to contribute their time to the study tended to be people with an interest in the research topic: nature in cities. Despite valuing native plants and animals, however, respondents' gardening choices were influenced by competing priorities, which led to a disconnect between voiced preferences and actual gardening practices. If we had gathered data only through a survey, we may not have uncovered this contradiction. Three participants were strongly influenced by permaculture because they had attended workshops at Hamilton's environment center, and the knowledge they gained influenced their gardening practices. This finding suggests that community education on the benefits of gardening for native wildlife has the potential to influence gardening choices.

By recognizing that urban residents hold multiple values and want their gardens to fulfil multiple purposes, local authorities aiming to promote nature conservation in New Zealand cities can design wildlife gardening programs that meet these multiple needs and reconcile conflicting priorities. These programs could promote the planting of native groundcover and low-growing shrubs and trees that will not grow large enough to block sunlight to vegetable gardens. Planting recommendations could include native plants that have the colorful flowers many people find attractive, and large trees could be planted at acceptable distances from the home. These gardening recommendations should emphasize the value of native plants to native wildlife, as our study suggests that people are willing to challenge certain cultural norms in order to provide habitat for birds, insects, and lizards. By highlighting the opportunity provided by private gardens to support native biodiversity, these gardening practices could be promoted as a chance for individuals to "do their bit" for conservation, providing residents with a sense of personal agency in counteracting the negative effects of urbanization. Further research could illuminate how to maximize the contribution of private gardens to nature conservation, while simultaneously allowing these spaces to meet multiple human preferences and needs.

Given that the range of residents' interests and priorities may limit the space they reserve for native nature in their gardens, local authorities could focus on providing habitat for native species in public greenspaces while promoting wildlife gardening. Our results provide evidence that planting native species in public greenspaces can inspire gardening choices and provide a source of seeds and seedlings for residents' private gardens.

The tensions and value-action gaps in our study are in alignment with Blake's (1999) claim that environmental concern may be outweighed by other conflicting priorities. Human actions and decisions are not the result of a simple, linear process of logical reasoning, but rather are shaped by many competing values, attitudes, emotions, and experiences. Ingold (1988, as cited in Johnston 2008:642) argues that,

...the immediacy of everyday life means that a great deal of human daily behaviour is necessarily intuitive and spontaneous: thought interrupts action, breaks it up into fragments; but by no means does it constantly direct action. The fact that we can think things out in advance does not imply that we always do.

The motivations that underlie certain actions or inactions are not always clear to ourselves, and it is characteristic of human beings to be inconsistent and unpredictable. Yet, in methods prescribed by a positivist approach, such as surveys or theme counting procedures, the objective is to reduce complexity and remove extraneous information by organizing people and their attitudes into pre-determined categories. Although such research does add to our knowledge, Billig (1996:211) contends that "there is no reason for supposing that we can conveniently slot all the messy particulars of the world into our general attitudinal categories. We might assume that no one is perfectly consistent." This means that there is a need for a broader range of methods beyond those that seek to count variables or themes. To better understand human behavior as it occurs in daily life, we need to explore the specific examples and nuances of what people do in particular places (Hodgetts and Stolte 2012). In this research, the IPA approach allowed us to examine in depth the value-action gap in individual cases as situated, partial, and contextualized phenomena.

As the notion of the Anthropocene suggests, humans have altered every ecosystem on the planet. The most serious consequences are seen in cities, where the loss of biodiversity threatens to further alienate humans from the natural world. The formidable global environmental issues of the 21st century have emerged from the disconnection of people and nature. Private gardens have great potential to increase the area available to native plants and animals, bringing these species back into cities and the daily lives and experiences of urban residents. Our qualitative IPA approach allowed us to uncover the multiple, at times conflicting values that people hold for their gardens, and provide management recommendations to address and reconcile these values with nature conservation.

Responses to this article can be read online at:
<https://www.ecologyandsociety.org/issues/responses.php/12515>

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Data Availability:

The data/code that support the findings of this study will be made openly available in Figshare if this study is accepted for publication.

LITERATURE CITED

- Aronson, M. F., F. A. La Sorte, C. H. Nilon, M. Katti, M. A. Goddard, C. A. Lepczyk, P. S. Warren, N. S. G. Williams, S. Cilliers, B. Clarkson, C. Dobbs, R. Dolan, M. Hedblom, S. Klotz, J. Louwe Kooijmans, I. Kühn, I. MacGregor-Fors, M. McDonnell, U. Mörtberg, P. Pyšek, S. Siebert, J. Sushinsky, P. Werner, and M. Winter. 2014. A global analysis of the impacts of urbanization on bird and plant diversity reveals key anthropogenic drivers. *Proceedings of the Royal Society B: Biological Sciences* 281(1780):20133330. <https://doi.org/10.1098/rspb.2013.3330>
- Baker, C., J. Wuest, and P. N. Stern. 1992. Method slurring: the grounded theory/phenomenology example. *Journal of Advanced Nursing* 17(11):1355-1360. <https://doi.org/10.1111/j.1365-2648.1992.tb01859.x>
- Belaire, J. A., L. M. Westphal, C. J. Whelan, and E. S. Minor. 2015. Urban residents' perceptions of birds in the neighborhood: biodiversity, cultural ecosystem services, and disservices. *Condor* 117(2):192-202. <https://doi.org/10.1650/condor-14-128.1>
- Billig, M. 1996. *Arguing and thinking: a rhetorical approach to social psychology*. Cambridge University Press, Cambridge, UK.
- Blake, J. 1999. Overcoming the 'value-action gap' in environmental policy: tensions between national policy and local experience. *Local Environment* 4(3):257-278. <https://doi.org/10.1080/13549839908725599>
- Carpiano, R. M. 2009. Come take a walk with me: the "go-along" interview as a novel method for studying the implications of place for health and well-being. *Health & Place* 15(1):263-272. <https://doi.org/10.1016/j.healthplace.2008.05.003>
- Chawla, L. 1998. Significant life experiences revisited: a review of research on sources of environmental sensitivity. *Journal of Environmental Education* 29(3):11-21. <https://doi.org/10.1080/00958969809599114>
- Clarkson, B. D., C. Bryan, and F. Clarkson. 2012. Reconstructing Hamilton's Indigenous ecosystems: the Waiwhakareke Natural Heritage Park. *City Green* 4:60-67. [online] URL: https://www.nparks.gov.sg/-/media/cuge/ebook/citygreen/cg4/cg4_05.pdf?la=en&hash=C6F14C0677E1C3E596BB2538D06C183DF4B0C87B
- Clarkson, B. D., C. L. Kirby, and K. J. Wallace. 2018. Restoration targets for biodiversity depleted environments in New Zealand. Environmental Research Institute, The University of Waikato, Hamilton, New Zealand. [online] URL: <https://www.biodiversitynz.org/uploads/1/0/7/9/1/07923093/clarkson-bruce-restoration-targets-for-biodiversity-depleted-environments-2018.pdf>
- Clarkson, B. D., and J. C. McQueen. 2004. Ecological restoration in Hamilton City, North Island, New Zealand. *Proceedings of the 16th International Conference, Society for Ecological Restoration*, Victoria, British Columbia, Canada. [online] URL: <https://researchcommons.waikato.ac.nz/handle/10289/8099>
- Clarkson, B. D., P. M. Wehi, and L. K. Brabyn. 2007. Bringing back nature into cities: urban land environments, indigenous cover and urban restoration. Research Report 52. Centre for Biodiversity and Ecology Research, University of Waikato, Hamilton, New Zealand. [online] URL: https://www.waikato.ac.nz/_data/assets/pdf_file/0010/471997/CBER_52.pdf
- Coleman, E. J., and B. D. Clarkson. 2010. Cities biodiversity index for Hamilton city, New Zealand: 2010. Centre for Biodiversity and Ecology Research, University of Waikato, Hamilton, New Zealand.
- Cornes, T. S., R. E. Thomson, and B. D. Clarkson. 2012. Key ecological sites of Hamilton City. Centre for Biodiversity and Ecology Research, University of Waikato, Hamilton, New Zealand.
- Cox, D. T., and K. J. Gaston. 2015. Likeability of garden birds: importance of species knowledge and richness in connecting people to nature. *PLoS ONE* 10(11):e0141505. <https://doi.org/10.1371/journal.pone.0141505>
- Curtin, S. 2009. Wildlife tourism: the intangible, psychological benefits of human-wildlife encounters. *Current Issues in Tourism* 12(5-6):451-474. <https://doi.org/10.1080/13683500903042857>
- Doody, B. J., J. J. Sullivan, C. D. Meurk, G. H. Stewart, and H. C. Perkins. 2010. Urban realities: the contribution of residential gardens to the conservation of urban forest remnants. *Biodiversity and Conservation* 19(5):1385-1400. <https://doi.org/10.1007/s10531-009-9768-2>
- Dunn, R. R., M. C. Gavin, M. C. Sanchez, and J. N. Solomon. 2006. The pigeon paradox: dependence of global conservation on urban nature. *Conservation Biology* 20(6):1814-1816. <https://doi.org/10.1111/j.1523-1739.2006.00533.x>
- Feagan, R., and M. Ripmeester. 2001. Reading private green space: competing geographic identities at the level of the lawn. *Philosophy & Geography* 4(1):79-95. <https://doi.org/10.1080/10903770124446>
- Freeman, C., K. J. Dickinson, S. Porter, and Y. van Heezik. 2012. "My garden is an expression of me": exploring householders' relationships with their gardens. *Journal of Environmental Psychology* 32(2):135-143. <https://doi.org/10.1016/j.jenvp.2012.01.005>
- Goddard, M. A., A. J. Dougill, and T. G. Benton. 2010. Scaling up from gardens: biodiversity conservation in urban environments. *Trends in Ecology & Evolution* 25(2):90-98. <https://doi.org/10.1016/j.tree.2009.07.016>
- Hamilton City Council. 2007. Gully reserves management plan. Hamilton City Council, Hamilton, New Zealand. [online] URL: <https://www.hamilton.govt.nz/our-city/parks/parksandgardens/Documents/Gully%20Reserves%202007.pdf>
- Head, L. M., and P. Muir. 2005. Living with trees: perspectives from the suburbs. Pages 85-94 in M. Calver, H. Bigler-Cole, G. Bolton, A. Gaynor, P. Horwitz, J. Mills, and G. Wardell-Johnson,

- editors. Sixth National conference of the Australian Forest History Society Inc. Millpress Science, Augusta, Western Australia, Australia.
- Hodgetts, D., and O. Stolte. 2012. Case-based research in community and social psychology: introduction to the special issue. *Journal of Community & Applied Social Psychology* 22 (5):379-389. <https://doi.org/10.1002/casp.2124>
- Hodgetts, D., O. Stolte, P. King, and S. Groot. 2019. Reproducing the general through the local: lessons from poverty research. Pages 157-174 in C. Højholt and E. Schraube, editors. *Subjectivity and knowledge: generalization in the psychological study of everyday life*. Springer, Cham, Switzerland. https://doi.org/10.1007/978-3-030-29977-4_9
- Hope, D., C. Gries, W. Zhu, W. F. Fagan, C. L. Redman, N. B. Grimm, A. L. Nelson, C. Martin, and A. Kinzig. 2003. Socioeconomics drive urban plant diversity. *Proceedings of the National Academy of Sciences of the USA* 100(15):8788-8792. <https://doi.org/10.1073/pnas.1537557100>
- Ives, C. D., P. E. Lentini, C. G. Threlfall, K. Ikin, D. F. Shanahan, G. E. Garrard, S. A. Bekessy, R. A. Fuller, L. Mumaw, L. Rayner, R. Rowe, L. E. Valentine, and D. Kendal. 2016. Cities are hotspots for threatened species. *Global Ecology and Biogeography* 25 (1):117-126. <https://doi.org/10.1111/geb.12404>
- Jay, M., and O. Stolte. 2011. A human ecology of urban ravine restoration: a New Zealand example. *Urban Habitats* 6:1541-7115. [online] URL: http://64.130.7.170/v06n01/urbanravine_full.html
- Johnston, C. 2008. Beyond the clearing: towards a dwelt animal geography. *Progress in Human Geography* 32(5):633-649. <https://doi.org/10.1177/0309132508089825>
- Keniger, L. E., K. J. Gaston, K. N. Irvine, and R. A. Fuller. 2013. What are the benefits of interacting with nature? *International Journal of Environmental Research and Public Health* 10 (3):913-935. <https://doi.org/10.3390/ijerph10030913>
- Kiesling, F. M., and C. M. Manning. 2010. How green is your thumb? Environmental gardening identity and ecological gardening practices. *Journal of Environmental Psychology* 30 (3):315-327. <https://doi.org/10.1016/j.jenvp.2010.02.004>
- King, C. M. 2005. *The handbook of New Zealand mammals*. Oxford University Press, Oxford, UK.
- Kollmuss, A., and J. Agyeman. 2002. Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8 (3):239-260. <https://doi.org/10.1080/13504620220145401>
- Larson, K. L., D. Casagrande, S. L. Harlan, and S. T. Yabiku. 2009. Residents' yard choices and rationales in a desert city: social priorities, ecological impacts, and decision tradeoffs. *Environmental Management* 44(5):921. <https://doi.org/10.1007/s00267-009-9353-1>
- Lerman, S. B., and P. S. Warren. 2011. The conservation value of residential yards: linking birds and people. *Ecological Applications* 21(4):1327-1339. <https://doi.org/10.1890/10-0423.1>
- Lewis, O., R. Home, and T. Kizos. 2018. Digging for the roots of urban gardening behaviours. *Urban Forestry & Urban Greening* 34:105-113. <https://doi.org/10.1016/j.ufug.2018.06.012>
- Lindemann-Matthies, P., and T. Marty. 2013. Does ecological gardening increase species richness and aesthetic quality of a garden? *Biological Conservation* 159:37-44. <https://doi.org/10.1016/j.biocon.2012.12.011>
- Loder, A. 2014. 'There's a meadow outside my workplace': a phenomenological exploration of aesthetics and green roofs in Chicago and Toronto. *Landscape and Urban Planning* 126:94-106. <https://doi.org/10.1016/j.landurbplan.2014.01.008>
- Longhurst, R. 2006. Plots, plants and paradoxes: contemporary domestic gardens in Aotearoa/New Zealand. *Social & Cultural Geography* 7(4):581-593. <https://doi.org/10.1080/14649360600825729>
- Loram, A., J. Tratalos, P. H. Warren, and K. J. Gaston. 2007. Urban domestic gardens (X): the extent and structure of the resource in five major cities. *Landscape Ecology* 22(4):601-615. <https://doi.org/10.1007/s10980-006-9051-9>
- Mathieu, R., C. Freeman, and J. Aryal. 2007. Mapping private gardens in urban areas using object-oriented techniques and very high-resolution satellite imagery. *Landscape and Urban Planning* 81(3):179-192. <https://doi.org/10.1016/j.landurbplan.2006.11.009>
- McKinney, M. L. 2006. Urbanization as a major cause of biotic homogenization. *Biological Conservation* 127(3):247-260. <https://doi.org/10.1016/j.biocon.2005.09.005>
- Merriam-Webster. 2021. Dichotomy. Merriam-Webster.com Dictionary. [online] URL: <https://www.merriam-webster.com/dictionary/dichotomy>
- Miller, J. R. 2005. Biodiversity conservation and the extinction of experience. *Trends in Ecology & Evolution* 20(8):430-434. <https://doi.org/10.1016/j.tree.2005.05.013>
- Mumaw, L. M., C. Maller, and S. Bekessy. 2017. Strengthening wellbeing in urban communities through wildlife gardening. *Cities and the Environment (CATE)* 10(1):6.
- Nassauer, J. I. 1995a. Culture and changing landscape structure. *Landscape Ecology* 10(4):229-237. <https://doi.org/10.1007/bf00129257>
- Nassauer, J. I. 1995b. Messy ecosystems, orderly frames. *Landscape Journal* 14(2):161-170. <https://doi.org/10.3368/lj.14.2.161>
- Pickett, S. T., M. L. Cadenasso, J. M. Grove, C. G. Boone, P. M. Groffman, E. Irwin, S. S. Kaushalf, V. Marshall, B. P. McGrath, C. H. Nilon, R. V. Pouyat, K. Szlavetz, A. Troy, and P. Warren. 2011. Urban ecological systems: scientific foundations and a decade of progress. *Journal of Environmental Management* 92 (3):331-362. <https://doi.org/10.1016/j.jenvman.2010.08.022>
- Pietkiewicz, I., and J. A. Smith. 2014. A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological Journal* 20(1):7-14.
- Pyle, R. M. 1993. *The thunder tree: lessons from an urban wildland*. Houghton Mifflin, Boston, Massachusetts, USA.

Pyle, R. M. 2003. Nature matrix: reconnecting people and nature. *Oryx* 37(02):206-214. <https://doi.org/10.1017/S0030605303000383>

Schleiermacher, F. 1998. Hermeneutics and criticism and other writings. A. Bowie, editor. Cambridge University Press, Cambridge, UK. <https://doi.org/10.1017/cbo9780511814945>

Schraube, E., and C. Højholt. 2019. Introduction: subjectivity and knowledge: the formation of situated generalization in psychological research. Pages 1-19 in C. Højholt and E. Schraube, editors. *Subjectivity and knowledge: generalization in the psychological study of everyday life*. Springer, New York, New York, USA. https://doi.org/10.1007/978-3-030-29977-4_1

Selge, S., A. Fischer, and R. van der Wal. 2011. Public and professional views on invasive non-native species-a qualitative social scientific investigation. *Biological Conservation* 144 (12):3089-3097. <https://doi.org/10.1016/j.biocon.2011.09.014>

Smith, J. A. 2004. Reflecting on the development of interpretative phenomenological analysis and its contribution to qualitative research in psychology. *Qualitative Research in Psychology* 1 (1):39-54.

Smith, J. A., P. Flowers, and M. Larkin. 2009. *Interpretative phenomenological analysis: theory, method and research*. SAGE, London, UK.

Smith, J. A., and M. Osborn. 2003. Interpretative phenomenological analysis. Pages 53-80 in J. A. Smith, editor. *Qualitative psychology: a practical guide to methods*. SAGE, London, UK.

Sprague, J., and M. K. Zimmerman. 1993. Overcoming dualisms: a feminist agenda for sociological methodology. Pages 255-280 in P. England. *Theory on gender: feminism on theory*. Walter de Gruyter, Hawthorne, New York, USA.

Statistics New Zealand. 2018. Hamilton City. Statistics New Zealand, Wellington, New Zealand. [online] URL: <https://www.stats.govt.nz/tools/2018-census-place-summaries/hamilton-city>

The World Bank. 2018. Urban population (% of total population). The World Bank, Washington, D.C., USA. [online] URL: <https://data.worldbank.org/indicator/sp.urb.totl.in.zs>

United Nations. 2018. *World urbanization prospects: the 2018 revision, Online Edition*. United Nations, New York, New York, USA. [online] URL: <https://esa.un.org/unpd/wup/Publications>
<https://doi.org/10.18356/527e5125-en>

van Heezik, Y., K. J. M. Dickinson, and C. Freeman. 2012. Closing the gap: communicating to change gardening practices in support of native biodiversity in urban private gardens. *Ecology and Society* 17(1):34. <https://doi.org/10.5751/ES-04712-170134>

Van Manen, M. 1984. *Doing phenomenological research and writing: an introduction*. Monograph No. 7. University of Alberta, Edmonton, Alberta, Canada.

Walrond, C. 2008. Acclimatisation - early acclimitisation societies. *Te Ara - the Encyclopedia of New Zealand*, Wellington, New Zealand. [online] URL: <https://teara.govt.nz/en/acclimatisation/page-2>

Warnock, M. 1987. *Memory*. Faber, London, UK.

Appendix 1. Participant Code Names

Table A1.1 Code names, type of park visited, ethnicity, gender and age range of each participant.

Code Name	Type of park visited	Ethnicity	Gender	Age range
Fingal	Restoration volunteer	Pākehā	Male	60+
Artair	Restoration volunteer	Pākehā	Male	60+
Leathan	Restoration volunteer	Pākehā	Female	60+
Kaelin	Restoration volunteer	Pākehā	Female	40-59
Keira	Restoration volunteer	Pākehā	Female	40-59
Aindrea	Restoration volunteer	Pākehā	Male	40-59
Deoiridh	Restoration volunteer	Pākehā	Female	60+
Seonaid	Native park visitor	Pākehā	Female	40-59
Siobhan	Native park visitor	Pākehā	Female	20-39
Cian	Native park visitor	Pākehā	Female	60+
Lasair	Native park visitor	Pākehā	Female	20-39
Ngaio	Native park visitor	Māori	Female	20-39
Balfour	Native park visitor	Pākehā	Male	60+
Breena	Native park visitor	Pākehā	Female	40-59
Caitrin	Non-native park visitor	Pākehā	Female	60+
Awhina	Non-native park visitor	Māori	Female	20-39
Inoke	Non-native park visitor	Fijian	Male	20-39
Laren	Non-native park visitor	Pākehā	Female	40-59
Taan	Non-native park visitor	Indian	Female	40-59
Marama	Non-native park visitor	Māori	Female	40-59
Kendall	Non-native park visitor	Pākehā	Female	60+

Appendix 2. Nature in City Parks and Gardens: Interview Outline

Introduction

Introduce yourself to participants, inform them of the general goals of the study. Tell them to feel free to ask questions and to view the interview as an informal discussion.

Volunteer involvement (for restoration volunteers)

- When did you start volunteering at____? How did you come to get involved in restoration at _____?
- What do you do as a volunteer?
- How often do you work at the restored site?
- What does being a volunteer mean to you? Why do you volunteer?
- Do you spend time at the site only as a volunteer or do you come here to walk/relax/play a sport etc.?
- Are there any other things related to volunteering and restoration that we haven't discussed yet that you would like to talk about?

Tour of park

- How often do you come to this park?
- What do you do here/ why do you come here?
 - > *If dog walker*: do you prefer/tend to keep your dog on or off-leash? Why?
- Do you know what plants have been planted here? Which plants are your favourite?
- What animals have you seen at the site?
- *If interviewee uses site on daily/frequent basis*: are there certain animals you see every time you come here? Are there animals you know you will encounter at certain spots? Have you noticed changes in animal use of these spots over time/as seasons change?
- Do you think [*discussed animal*] belongs here? Are there animals you would like to see here/see more of? See less of/get rid of?
- How important is it to you to see animals here?
- Do you think urban restored sites/parks like this one should be refuges for animals? Which animals?
- Which part of the park is your favourite? What aspects of the park do you most appreciate?
- Do you feel safe here? Would you allow your children to play here?
- Are there any things about this space that we haven't discussed yet that you'd like to mention?

Tour of garden

- Are you a gardener? Do you enjoy spending time in your garden? What do you like to do in your garden?
- Why do you like gardening?
- What have you planted in your garden?
- *For volunteers:* do you think your involvement as a restoration volunteer has influenced your choice of what to plant?
- What animals do you see in your garden? (*similar questions to animals in parks*)
- Do you think about animals when you decide what to plant in your garden? (or what influences your choice of what to plant? Have you ever been inspired/gotten ideas from what grows in your park?)
- Do you have any pets/livestock? Are you ever concerned about the impact they might have on the wildlife in your garden? Is there anything you do to reduce the impact of your pets on native (*or desirable?*) plants/animals? (e.g. bells on cats/cat curfews/supervise dogs/fence out livestock)
- Do you feed any wildlife/stray animals? (e.g. stray cats/hedgehogs/birds)
- Are there any things about this space that we haven't discussed yet that you'd like to mention?

Closing the interview

Summarise the main points from the discussion and encourage further input from the participant.

- Is there anything that you would like to add or thought should have been discussed?
- Do you have any further questions concerning this study?

Thank the interviewee and remind them that they can request a review of the results of the study once it is complete. Remind the interviewee that they can contact the researcher anytime if they have questions or want an update about the research progress.