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The Ripple Effect: Youth Leadership Development and Influence on Environmental Engagement in the Community

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Running head: THE RIPPLE EFFECT

The Ripple Effect: Youth Leadership Development and Influence on Environmental Engagement
in the Community

by

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BSc Psychology, York University, 2013

THESIS

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Abstract

Youth leadership is a critical factor in creating momentum for a cultural shift in sustainability practices and can be fostered through youth leadership programs. While evidence exists showing youth environmental programs are able to promote program participant leadership, it is not yet known to what degree these participants are able to improve the environmental engagement of members of their social networks. This “ripple effect” is assessed in the current study through the context of the Make-A-Difference (MAD) Youth Sustainability Leadership Program in New Zealand. The program involves a 3-day social gathering (hui) and ongoing support for several following years. The ripple effect of environmental engagement is explored using a 4-phase mixed-methods design with 30 participants of the MAD program and 6 members of their social networks as participants. Results indicate that MAD participants undergo transformational changes during the MAD program, including developing an identity of a change agent and becoming a member of the MAD community. Together, these personal changes and the ongoing support from MAD program staff contribute to MAD participants’ ability to influence members of their social networks through a variety of approaches. These influences include increased environmental knowledge, personal practice changes, and environmental action participation as well as leadership.

Keywords: environmental action, youth leadership, youth, environmentalism, youth engagement

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The Ripple Effect: Young Leaders Motivating Environmental Action in the Community

Introduction

Human development is known to cause extensive damage to both earth's environmental eco-systems and human well-being (IPCC, 2014). This destruction may be the most significant threat to the health and future of younger generations, calling for a fundamental rethinking in our approach and a movement towards a culture of sustainability (Hegarty, Thomas, Kriewaldt, Holdsworth, & Bekessy, 2011; Riemer, Lynes & Hickman, 2013). In a culture of sustainability, people's individual and group choices favour minimal harm to the environment, viewing themselves as interdependent with nature, fellow humans, and future generations (Riemer et al., 2013). Youth leadership programs have been shown to successfully contribute to creating this culture (Hegarty et al., 2011; Riemer et al., 2016).

Programs that foster youth leadership are particularly important for bringing wider change. Leaders have reach, both in the number of individuals they can engage and in their range of influence, such as policy at the governmental level (Riemer et al., 2013). Young people are ideal candidates for leaders of change as they are undergoing identity development (Harré, Tepvac, & Bullen, 2009), remain open to new behaviours and ways of being, and are able to impact individuals in different groups and age ranges (Riemer & Dittmer, 2016). While youth may not be granted a high degree of social power, the connection of young leaders and their networks to circles of environmental action positions them to cause cultural shifts as their social status advances. Youth leadership programs are often developed with the intention that participants will go on to influence collective environmental action following the program (Riemer et al., 2013) and multiply its impact beyond the classroom (Ballantyne, Connell, & Fien, 1998). Despite this potential, the process and impact of the ripple effect of youth environmental

leadership programs has yet to be explored empirically. To address this gap, the current mixed-methods study explored how participants of a youth environmental leadership program called Make-A-Difference (MAD) are engaging others in environmental action and influencing their personal practices. The current study also explores how MAD may be facilitating this process of influence.

This introduction begins by situating the current project within theorized strategies of effectively addressing climate change through human action in the Environmental Action and Personal Practices section. This section explains that collective action that targets the culture of sustainability is needed to address environmental degradation and engaged citizens are in an effective place to influence this change. Youth leadership programs are often developed with the intention that participants will go on to cause collective environmental action following the program (Riemer et al., 2013), yet the process and impact of this ripple effect of youth environmental leadership programs has yet to be explored. Attributes of a leader, how youth programs contribute to this development, and the process and impact of leader influence on members of their social networks are examined in this introduction to address gaps in the field of environmental education in these areas.

Environmental Action and Personal Practices

Before exploring youth leadership, it is important to first discuss what types of behaviours and actions may contribute to shifts towards a culture of sustainability. Riemer and colleagues (2013) explain that cultural change can stem from engaged citizens who are defined as, "... members of a society who are aware of their rights and responsibilities in society and actively participate in shaping the system norms, resources, regulations and operations that comprise the foundation of their respective society" (p. 554). Environmental action by engaged

citizens can target these norms, resources, and regulations that make up system-level indicators of culture (e.g., a city's waste management policy) through activities carried out with the intention of effecting collective environmental actions and behaviours (Alisat & Riemer, 2015; Jensen & Schnack, 1997). These actions are shown to fall along a continuum from high-level political leadership to civic participation that may not require as much skill, experience, or confidence to enact (Alisat & Riemer, 2015). Political engagement may benefit not only the system and community, but is also theoretically and empirically supported as a process of healthy development that enables youth to conceptualize their identity in relationship to democratic practices and institutional contexts so they can, "... function intelligently and freely in a pluralistic society" (Youniss, 2009, p. 129). This insight into youth development suggests that engaging young leaders can contribute to their confidence in achieving a higher level of social power as they age, further illustrating the importance of directing this power towards environmental responsibility.

Influencing others to become engaged with environmental issues has been empirically shown to be distinct from personal practices, which are individual-level environmental behaviours, such as recycling or choosing to cycle instead of driving a car (Alisat & Riemer, 2015). Personal practices are less likely than environmental actions to be carried out with the intention of influencing environmental engagement at the societal level (Alisat & Riemer, 2015). Personal practices may, however, contribute to a shift in culture if they become common by influencing others indirectly, such as through role-modelling and normalizing certain behaviours (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). Changes to the personal practices of a large number of people can also affect government and industry decisions by demonstrating consumer propensity (Stern, 2000).

The current study explores how the environmental actions of participants of a leadership program influence the environmental engagement of members of their social networks. In this context, environmental engagement may include knowledge, attitudes, values, intentions, motivations, personal practices, and environmental actions. Although both personal practices and environmental actions are carried out with the intention of causing environmentally impactful change, the complex cause and effect relationship between human behaviours and their effect on environmental systems is often indirect or may not be significant (Stern, 2000). It is out of the scope of this study to calculate the actual environmental impact of participants' actions, so behaviours and actions addressed in this paper will refer to those carried out with the intention of having a positive impact on the environment.

Attributes of Leadership

Due to the complex nature of environmental issues being embedded across social, ecological, political, and cultural systems, environmental action-taking is multifaceted, difficult, and may involve standing up against the status quo. A foundation of strong leadership qualities is needed for youth to effectively undertake environmental actions while leading others. Over the course of several years and multiple projects, Hickman et al. (2016) developed a theory of youth engagement that informed the Youth Leading Environmental Change (YLEC) program implemented across six countries (Riemer et al., 2016). Riemer et al. (2016) and Hickman et al. (2016) propose that to be able to engage in environmental action, youth need: a) comprehension; b) motivation; c) confidence; and d) opportunities for engagement. Although it was not included as part of the model, Riemer and colleagues (2016) also show the importance of identifying as a change agent to engage in environmental action-taking.

Comprehension is about more than just providing people with knowledge. This concept refers to a deeper understanding of why we should care about environmental issues, which contributes to action, as those motivated by concerns for social justice and political change are more likely to engage in collective environmental action (Hickman et al., 2016). De Vreede and colleagues (2014) describe environmental comprehension as understanding the primary causes of climate change, potential solutions, and facts about environmental issues, and as having the ability to apply this knowledge in practice. Due to the complexity of environmental issues, Hegarty et al., (2011) adds that this knowledge should arise from different disciplines to gather a diverse worldview that facilitates solving complex issues.

In combination with environmental action-taking skills, comprehension can contribute to “action competence”, preparing youth to move against the status quo and change systems that govern environmental issues (Jensen & Schnack, 1997). To be able to challenge dominant and influential ways of thinking and acting towards the environment, youth must have training in politics and democracy and be, “... able, and willing, to be a qualified participant” in civic life (Jensen & Schnack, 1997, p. 473). This definition suggests youth must have a collection of personal experiences that enable them to act. Chawla and Cushing (2007) align with this definition as they defined competence in relation to self and collective efficacy (discussed below). Action competence has also been shown to contribute to influence at a relational level in studies examining children’s ability to influence their parents (Ballantyne et al., 1998; Ballantyne, Fien, & Packer, 2001b; Sutherland & Ham, 1992; Uzzell et al., 1994). Put in these terms, it is difficult to imagine being confident enough to attempt to change how others think about a topic while being illiterate about it or without any experience of having the competence to do so.

Self-efficacy is the general belief in one's ability to carry out complicated or difficult actions and that those actions will have an impact (Bandura, 1994; Lubell, 2002). Since environmental actions often require moving against the status quo, the ability to persevere is likely to be particularly important for environmental leaders to be able to influence others. Further, self-efficacy has been connected to the ability to overcome challenges by allowing individuals to set difficult goals and stay committed to accomplishing them (Bandura, 1994). Often reform efforts are difficult and seldom fully achieved, so this motivation to stick with the cause could have an important effect on change outcomes (Bandura, 1994). Bandura (1997) discusses how this same difficulty also often leads youth to engage in actions as a group, which contributes to the development of collective efficacy – that is, the belief that collective efforts to cause change will be effective (as cited in Chawla & Cushing, 2007). Together, self and collective efficacy contribute to strengthened confidence, which is important for young leaders to be able to take environmental action (Chawla & Cushing, 2007). At a relational level, when youth transmit a sense of confidence, others are more likely to trust their ideas about environmental issues (Volk & Cheak, 2003). For example, Zampa's (2013) study on intergenerational influence showed that children's confidence in their ability to influence others enabled them to use their environmental knowledge to convince their parents to adopt environmental beliefs and behaviours.

Environmental actions that move against social norms, however, are more than just a matter of knowing about environmental issues and believing in one's ability to cause change – they are dependant on our identity as a change agent, encompassing who we are and "... how we think of ourselves and our position in society" (Harré, 2011, p. 69). Harré and colleagues (2009) show how identity as a change agent is a composite of integrity (alignment of values), social

connections, and a sense of personal effectiveness, while this identity is affirmed through actions (Harré, 2011). These findings suggest a productive snowball effect when considered alongside evidence that identifying as a change agent enables youth to engage in environmental action influencing others (Riemer et al., 2016).

A snowball needs a push, which is suggested by studies showing that youth need opportunities to carry out environmental actions, such as connections with environmental agencies, group, clubs, or other individuals who leaders can ally with to cause change (Harré et al., 2009; Hickman et al., 2016). The importance of an initial push seems all the more evident with a variety of studies determining that involvement in these groups is more effective at facilitating action-taking and leadership development when group processes are collaborative and youth can meaningfully participate in decision-making processes (de Vreede et al., 2014; Hegarty et al., 2011; Jensen & Schnack, 1997; Uzzell et al., 1994; Riemer et al., 2013; Schusler, Krasny, Peters & Decker, 2009).

Fostering Youth Leadership

Youth environmental leadership programs hosted outside the formal education system are an effective way to foster the youth leadership attributes discussed previously (Riemer et al., 2013). In their youth engagement model, Riemer and colleagues (2013) propose that effective program activities be participatory, teach participants to impact change in the community context, and be based on best practices. Building on this model, Hickman and colleagues (2016) have shown the effectiveness of a set of active program ingredients that collectively promote four facilitating factors described in the leadership attributes section above, ultimately influencing environmental actions in youth. These ingredients include: 1) fostering system thinking; 2) encouraging personal reflection; 3) building action competence; and 4) providing a

role model. These leadership promotion factors differ from the leadership attributes themselves in that they are *processes* of leadership development that can be implemented in youth programs, whereas attributes are the participant outcomes.

Fostering system thinking can be understood as an ongoing process of critical consciousness development and increased environmental citizenship (Jensen & Schnack, 1997). Critical consciousness raising is essentially the process of developing the comprehension attribute – coming to a deep understanding of the political, social, economic, and cultural elements of one’s world to take action against oppressions revealed through that understanding (Freire, 1970). Engaging in environmental citizenship means building on environmental knowledge through motivation to take part in actions and decision-making that affect one’s individual and community well-being through democratic means (Jensen & Schnack, 1997; Short, 2010). To foster system-thinking, linking actions to their beneficial outcomes by providing programming focused on local problems was a specific programmatic factor shown to facilitate youth’s ability to influence others (Sutherland & Ham, 1992; Rickinson, 2001). Including a component of personal reflection in a program, where participants learn the connections of environmental issues with other social and political issues, is also shown to encourage a holistic understanding of environmental processes (Hickman et al., 2016).

Related to a holistic outlook, experiences in nature can influence the way one understands ecosystems – one’s relationship with nature (Chawla, 1998). Formative experiences in natural areas have a demonstrated influence on development as an environmental leader, as well as whether and how youth later engage in action-taking (Liddicoat & Krasny, 2013; Chawla, 1998). These formative experiences can be provided by youth environmental leadership programs (Blythe & Harré, 2012), where similarly to the attribute of action competence, the process of

classroom experience when combined with an outdoor component is shown by Ballantyne and colleagues (2001a) to enhance children's ability to influence their parents.

Youth environmental programs are also positioned to provide quality social support, which is another critical facilitator for fostering environmental action (Hickman et al., 2016; Riemer et al., 2013). Chawla and Cushing (2007) discuss the importance of role models for instilling action-taking confidence in youth by demonstrating environmental attitudes, knowledge, and strategies to them through instructive modelling and vicarious experiences. In an examination of past influences on current environmental action takers, Arnold, Cohen, and Warner (2009) add that leaders in environmental programs have been successful role models for these people by providing encouragement and resources to young program participants. The research discussed in this section suggests the experiences provided through youth environmental leadership programs may contribute to leadership development and help enable participants to influence the environmental engagement of members of their social networks.

The Ripple Effect

Given the critical importance of environmental program leaders as role models and gateways to formative experiences, it would be invaluable to understand the program processes that cause some participants to forward this influence to others. Much of the research on community influence by environmental program participants focuses on children influencing their parents or teachers, with very few studies looking at youth influence on their peers and community members (as explained in the literature review section of Istead, 2009). Within this relatively small body of literature, there are a number of noticeable observations.

Youth seem to influence their parents informally during one-on-one situations (Sutherland & Ham, 1992), while influence was increased when children appealed to the

interests of their parents and considered what might make the process enjoyable for them (Ballantyne et al., 1998; Rickinson, 2001; Uzzell et al., 1994; Zampas, 2013). Collaborative idea building to come up with environmental action strategies also facilitated influence (Zimmerman & McClain, 2014), along with conveying actionable strategies that can help contribute to environmental sustainability, such as personal lifestyle change that would positively impact the environment (Uzzell et al., 1994). Finally, expressing the urgency for human action to save the environment showed increased effects (Sutherland & Ham, 1992), while several studies confirm that children have greater influence when both they and their parents have greater knowledge and concern for the environment, compared to children and parents who have a lesser regard for environmental issues (Ballantyne et al., 1998; Ballantyne, Fien, & Packer, 2001a; Uzzell et al., 1994). Together, these studies suggest there are techniques that can facilitate parents learning about environmental issues and changing their personal practices through the influence of their children.

The process of peer-to-peer influence is different from child-to-adult influence, as it involves a more balanced power dynamic due to shared characteristics between the influential child and their peer (de Vreede et al., 2014; Erickson, 2010). Peer influence is facilitated by trust, respect, rapport, and being seen as a role model, while sharing accurate information and the perception of life experience in the topic area help build this trust and rapport (Ford & Collier, 2006). As with literature about intergenerational influence, success in helping program participants develop the skills needed to influence peers relies on participatory and collaborative program teaching methods, which facilitate the development of personal skills (de Vreede et al., 2014; Erickson, 2010; Ford & Collier, 2006). Similar to children influencing their parents, peer-to-peer influence is facilitated by an informal and conversational approach to communicating

environmental messages (Ford & Collier, 2006; Erickson, 2010). All of these studies examine impact on environmental knowledge, attitudes, and personal behaviours. The question that remains is what degree of wider impact young leaders are having on others in their communities, not only in regard to knowledge, attitudes, and behaviours, but also environmental action and the factors that enable some of these leaders to cause these changes.

Research Questions and Context

The current study focused on one example of a youth leadership program, the MAD program, to examine how youth leaders influence their social networks and how this process may be supported by leadership programs. The MAD program, run out of the Auckland, New Zealand, has been running for roughly ten years and has seen ~540 participants (C. Jessep, personal communication, March 14, 2017). Many attributes of the MAD program make it an ideal setting to explore the ripple effect of leadership programs beyond the educational setting. High school students aged 15-18 from the Auckland region are first recruited to take part in MAD by staff from Auckland Council, who facilitate the MAD program. Auckland Council is a city council that provides governance and services in the Auckland region, and themselves have set a target for the city to reduce greenhouse gas emissions by 40% of 1990 levels by the year 2040 (Auckland Council, 2014). Students recruited to the MAD program are invited to apply through a written form and two students from each Auckland high-school are accepted, privileging demographically diverse participants who already have leadership qualities and/or an interest in environmental issues (C. Jessep and H. Childow, personal communication, March 9, 2016). Six previous program participants are also invited to return as mentors to help run the program.

Once accepted, MAD participants attend an intensive three-day program on a nature reserve outside Auckland, where they learn about and develop environmental actions plans. This portion of the program is referred to as a hui – the Māori word for social gathering, signifying the importance of community building and social connections forged during this portion of the program. Another component of MAD includes follow-up support after the hui for two or more years, where MAD coordinators share sustainability-related information with participants, maintain a social platform for participants to connect with one another through a Facebook group, and provide mentorship to participants by connecting them to experts for advice and funding opportunities. Other support includes networking opportunities every three months after the hui for students to come together and reflect on their action-taking challenges and successes.

As reported in Blythe and Harré's (2012) examination of MAD, the program inspired environmental action in its participants as a result of the following factors – MAD: a) takes place in a nature setting; b) provides role models; c) models eco-friendly living; d) empowers participants to develop their own strategies for action; e) supports participants in taking environmental action after the hui. The MAD program also increased participants' environmental knowledge, inspiration, self-confidence, social connections, resources and skills, connection to nature, and action and leadership in other areas of life (Blythe & Harré, 2012). As a result, the MAD program provides an ideal context to explore how young environmental leaders develop their skills and identity as leaders, and ultimately the ripple effect beyond youth environmental leadership programs.

Specifically, the research questions guiding this study are:

- 1) What is the *process* by which MAD participants influence members of their social networks to be more environmentally engaged, including the length of time this influence takes place;
- 2) What is the *impact* of MAD participants' influence on members of their social network in regard to their environmental engagement (i.e. the ripple effect); and
- 3) How did participation in the MAD program enable this process of influence between young participants of the MAD program and members of their social networks.

Methods

Design

The current project used a four-phase mixed-methods design. First, quantitative survey data were gathered to provide background information about the participants in the MAD program. This background information was then used for subsequent qualitative interviews with a subsample of the survey participants. The same sequence of survey and interview data was then also used for the ripple participants who were recruited by those MAD interview participants. Quantitative data facilitated participation as it required a smaller commitment from participants and enabled comparison to environmental action scores of other young leaders. While more time consuming for participants, qualitative interviews provided detail-rich contextual information to help fill in gaps about the process and impact of the ripple effect, as this topic was relatively unexplored in the literature. Qualitative interviews also allowed participants to provide information from their perspective and draw attention to things they found important. Used together, qualitative and quantitative data provided two sets of data about the same events, adding validity to each type of data collected (see Data Analysis Procedure sub-section for more information).

Phases One and Three gathered descriptive information about MAD participants and members of their social networks, respectively. Phases Two and Four consisted of in-depth interviews that provided primary data related to the research questions. All members of the 2016 MAD cohort (MADc) and previous cohorts that remain connected to MAD (MADal) were invited to take part in study Phase One (MADc and MADal are collectively referred to as *seed participants* or *seeds*). A total of 30 seeds took part in Phase One,¹ (19 female, 9 male, 2 unspecified) with the following ethnic distribution: Pacific Peoples (1), Pacific Peoples/Asian (1), Asian (3), Asian/European (2), European (16), New Zealander (2), South African/European (1), Pākehā (2), and unspecified (2). This distribution is similar to the ethnic composition in Auckland,² and ranged between 16-25 years of age. All seeds who participated in Phase One were invited to take part in Phase Two (8 seeds participated in Phase Two). During the interview, seeds were invited to recruit five members of their social network 16 years or older³ (these participants are referred to as *ripple participants* or *ripples*) to take part in the online ripple questionnaire for Phase Three of the study. The current study employed several techniques to facilitate ripple recruitment, such as by providing seeds with an email template, poster, and techniques for recruitment, providing a donation to MAD as compensation for ripples, and designing the study to collect an online survey that enabled ripples to share their contact information with researchers if they wanted to take part in the study.

¹ In Phase One, 29 seeds completed the survey and one seed responded only to the EAS scale. Data for the participant with partial responses was included in the study for that measure.

² The 2013 census data indicates that Auckland has an ethnic composition of 59.3% European, 10.7% Māori, 14.6% Pacific Peoples, 23.1% Asian, 1.9% Middle Eastern, Latin American, and African, and 1.2% other (Statistics New Zealand, 2013).

³ Only participants aged 16 and older were included in the study as participants aged under 16 years require informed consent from a parent or guardian to participate in the study. Obtaining consent from participants' parents was not feasible for the current study given the time and resource constraints of conducting a Masters thesis abroad. Not including participants under 16 years, however, has several limitations. Less MAD participants could take part in the study, as many participants of the MAD cohort that ran during the time of the study were under 16 years. Further, the process of leadership development and ripple effect may look different for younger youth. The current study could not capture these differences.

Six ripples completed the survey in Phase Three (2 male, 3 female, 1 not specified). Of these six participants, four identified as European, one as Asian, and one not specified. All six ripples who completed the Phase Three survey were invited to take part in an interview for Phase Four (4 ripples participated in Phase Four, see Table 1). Recruiting ripple participants was a challenge in the current study due to the reliance on seed participants to recruit members of their social networks. Lack of buy-in and geographical and conceptual distance from the researchers may have also contributed to the lower ripple participation rate, even though multiple reminders had been sent to the seeds by the program coordinator. This recruitment issue is not uncommon, as previous attempts by our research team to recruit ripple participants for other studies were met with similar challenges.

Table 1

Ripple Participant Characteristics

Ripple Participant Pseudonym	Seed-pair Pseudonym	Relationship to Seed	Completed Interview
Henry	Mark	Partner	Yes
Linda	Mark	Parent	No
Samuel	William	Friend	Yes
Katie	William	Friend	Yes
Megan	Cherol	Friend	No
John	Marie	Not specified	Yes

One ripple (Samuel) attended MAD with the seed that recruited him (William), and completed the ripple survey and interview. During his interview, Samuel was asked to specify whether and how William contributed to his environmental engagement, given their mutual experience and his high level of environmental engagement outside of William's influence. During analysis, Samuel was coded as a seed with respect to his influence on others, and coded as a ripple when he referred to influence William added, apart from MAD and other influences on his engagement. In other words, Samuel was analyzed as a seed and ripple, and is included in the seed interview data results, ripple survey results, and insights into some measures on ripple

interview data (e.g., specific seed influences on ripples) but not others (e.g., impact on ripple action-taking) because this could not be adequately assessed, given Samuel’s participation in MAD.

Another approach to collecting information in the current study was communication with MAD staff at Auckland Council throughout the research process, from study design through report-writing. While information from this exchange was not included as an official form of data, it was critical for understanding the nature of the program and the context for participants’ actions. MAD staff also provided input into all components of the study design, provided survey administration support, and gave feedback on study findings to ensure interpretations were relevant to the MAD context.

Data Collection Methods

Emphasis was placed on qualitative methods as the primary source of data, which will be explained in the next section. Quantitative data was the secondary form of data in the current study. The seed questionnaire in Phase One consisted of an adapted version of the Environmental Action Scale (EAS), which measures “level of engagement in civic actions designed to have a collective impact on environmental issues” (Alisat & Riemer, 2016, p. 13). The EAS questions assessed participatory actions (e.g., “I talked with others about environmental issues”) and leadership actions (e.g., “I organized an environmental protest/rally”), with participatory actions requiring a lower degree of leadership ability than leadership actions, which are more political in nature (Alisat & Riemer, 2015). Additional questions in the seed questionnaire assessed seed participant influence over others – both in terms of depth and breadth, strategies used to influence others, and demographics. The questionnaire in Phase One served as a secondary form

of data collection measure to gather initial information that could be expanded upon during seed interviews in Phase Two.

Phase Two seed interviews served as a primary form of data collection to measure the first, second, and third research questions by asking about influential experiences in MAD and whether participants were using skills, experiences, and identity development gained in MAD to impact others. Phase Two interviews with seeds also asked whether and how seeds were reaching out to members of their social networks and the impact seeds believe they had on the environmental engagement of members of their social networks. The ripple questionnaire in Phase Three was a secondary form of data collection to gather initial data on ripples that could be expanded on in Phase Four ripple interviews. The Phase Three questionnaire assessed ripple participants' knowledge and engagement with environmental issues (sustainability in general, waste management, sustainable transport, water and energy conservation, conscious consumerism, climate change, resource depletion, sustainable food, marine conservation). Further, the relationship to the seed participant that recruited each ripple was explored; whether this person impacted their engagement with environmental issues (knowledge, environmental practices, engagement with environmental issues, and/or environmental actions), and if so, why this person had an influence on them. Interview questions with ripple participants in Phase Four were a primary form of data collection that addressed all research questions of the study. Specifically, Phase Four interviews explored ripple participant environmental engagement, relationship to their seed participant counterpart, and whether this seed participant influenced their knowledge, attitudes, behaviours, actions or any other aspect of their environmental engagement. Ripple interview questions also asked what methods the seed used to influence the ripple participant, including whether the seed shared their experience in MAD.

Data Analysis Procedure

Seed and ripple questionnaire data were primarily used as background information to build upon during the interview phases. Descriptive analyses of the seed and ripple questionnaire data were also conducted to gather a general understanding of participants' engagement with environmental issues, participants' actions, and the ways participants were engaging others.

Interview data were transcribed and read over several times while memo-writing to gather context and understanding about the interviews as a whole. Next, the transcripts of seeds and ripples were coded with NVivo software into named segments of data using an inductive approach, as far as this was possible given my existing background knowledge, interest, and investment in the research topic. This coding approach was used first in an attempt to give participants a voice and allow the data to speak for itself, rather than looking for evidence of a perceived thesis or hypothesis (Charmaz, 2006). One of the project supervisors, Dr. Riemer, reviewed the codes after the third interview and a codebook was created to code the rest of the interviews. After inductive coding, the codes were reviewed and collated, then re-coded using a deductive approach that searched for themes related to the research questions and relevant literature. Codes were checked in relation to the full dataset and collated a second time, and then drawn out into a mind map that represented the processes and outcomes. An action-impact table was constructed to align influential actions with their respective outcomes and explore causality, while a themes table was created to cluster common processes and outcomes under common themes following Braun and Clark's (2006) suggested process. An iterative process of theme creation by checking back with the codes, code queries, mind map, action-impact table, and literature was used to arrive at a near-final set of interview themes. Near the end of analysis,

themes were reviewed by MAD coordinators and the project supervisors before settling on the results.

Efforts were made to ensure ethical and methodological rigour in the current study. All elements of the research design were integrated with feedback from project supervisors and MAD program staff before being finalized, helping to ensure the fairness and ethical capacity of the research methods (Padgett, 2012) and enable the results to be meaningful for curriculum development of MAD and similar programs. A continuous dialogue was maintained with the MAD community partners and project supervisors throughout the research process to help ensure validity of the results. Ethical concerns were also assessed by the Research Ethics Board of Wilfrid Laurier University, who approved the study (REB#4999).

With respect to construct validity, the EAS used in Phase One was created using a rigorous development and refinement process by Alisat and Riemer (2015) and was shown to have strong reliability and validity in assessing environmental action-taking by individuals 16-62 years old across six countries. Additional items added to the EAS and all items in the ripple questionnaire were reviewed by project supervisors, who have expertise researching youth environmental action-taking. As is customary in mixed-methods research, triangulation between qualitative and quantitative data was conducted by comparing qualitative and quantitative findings to reduce the bias of each single method of data collection (Bowker, 2001; Yin, 2009). For example, the impact that seeds had on ripples was compared between interview and questionnaire data, and reported alongside one another in the results section. Convergence signifies validity of each separate data collection method (Bowker, 2001).

To control for the interviewer's effect on interviewees' reactions and answers, efforts were made by the interviewer to remain open and neutral throughout the data collection process

(Padgett, 2012). Dr. Riemer, the supervisor for the current study, reviewed and provided feedback on the first interview transcript for potential biasing questions revealed during the interview process.

Results

The first results section describes seeds' environmental engagement in civic actions based on results from the seed survey to contextualize seeds' leadership development, actions, and impact on ripples presented in later sections. The second section explores MAD's role in facilitating action by examining leadership development of participants, both in and outside the MAD program. The third section presents the processes seeds used to influence others and the final section explores the ripple effect on close members of seeds' social networks. All participants were given pseudonyms to maintain anonymity.

Seeds' Environmental Action Profile

Overall, seeds were engaging in a high level of environmental action⁴, with a total mean score on the EAS of $M = 2.14$ for the group ($SD = 0.35$), where $N = 30$. In comparison, the mean EAS score for known environmentalists⁵ was 2.07 ($SD = 0.74$) (Alisat & Riemer, 2015). Using a dependent group t-test, EAS participatory actions were compared to leadership actions. Participatory actions occurred significantly more frequently ($M = 2.5$, $SD = 0.36$) than leadership actions ($M = 1.84$, $SD = 0.39$), $t(29) = 13.22$, $p < .001$. The number of people reached through these initiatives varied. Three seeds reported reaching between 1-10 people, eight reported reaching between 11-50 people, four reported reaching between 51-100 people, seven reached

⁴ Interviewed seeds were not statistically different from the sample of 30 surveyed seeds in regard to the key demographic variables that were assessed as part of this study.

⁵ The comparison sample consisted of 205 undergraduate university students (age ranged between 16-68 years, mean age = 18.88 years, $SD = 3.34$), and 161 adults from a crowdsourcing internet marketplace for work (age ranged between 18-68 years, mean age of 33.49 years, $SD = 11.02$) (Alisat & Riemer, 2015).

101-500 people, two reached between 501-1000 people, and five reached more than 1000 people. It can thus be inferred that between 4960-21330 people were potentially influenced by the 29 seed participants who responded to this question. The next section explores how seeds developed their leadership skills for this influence.

Leadership Development

During the interviews, seeds described the importance of MAD's support structure for their leadership development. This was the case both during the hui (short-term support), in the years following the hui (long-term ongoing support), and through the MAD community that spanned across both short-term and long-term components of MAD. Support structure external to the MAD program, including personal networks and institutions and organizations, also contributed to seeds' leadership development. MAD's support structure contributed to seeds' development of an identity of a change agent and increased action-taking following the program (see Table 2 for an overview).

Table 2

Theme Structure for Leadership Development

Major Theme	Sub-Theme	Aspect of the Sub-Theme	Number of Seeds by Sub-Theme
Leadership Development	MAD's support structure	Action competence	4 seeds and Samuel
		Long-term ongoing support	6 seeds
		MAD community	8 seeds
	Support structure external to MAD	Personal networks	2 seeds and Samuel
		Institutions and organizations	6 seeds
	MAD's impact on participants	Development of identity as a change agent	6 seeds and Samuel
Increased action-taking		8 seeds and Samuel	

One seed, Emma, stood out among other seeds as having a strong understanding of MAD and years of action-taking experience, perhaps due to her four-time experience as a MAD leader, whereas the other participants had only been a MAD leader once (Amanda, Tina, Mark, and Marie), or not at all (Julie, Cherol, and William). William, another seed who described having

years of experience engaging in environmental actions, had been to two MAD hui as a participant, while the other seeds had only been to one.

MAD's support structure.

Action competence.

MAD's program structure was linked to several key change processes that built on leadership qualities seeds had before attending the MAD hui. During the program, MAD taught core action skills and how to plan initiatives through "*small action groups. They try to get you thinking of ways to just teach people and to engage people*" (Samuel). Actions to impact the collective level were also taught during the hui, as exemplified in one seed interview: "... [MAD] provided space to learn... *campaigning techniques, how to get people on board with what you want to achieve, how to sway your school (because obviously it was high school students...), how to facilitate discussions*" (Emma). Several seeds described MAD as providing them with new environmental knowledge through presentations by experts in the field and environmental videos shown during the hui, while one seed described this as reinforcing past environmental knowledge. Regarding the content presented, Amanda was impressed by a speaker who explained different sides to an environmental issue: "*I remember that talk stuck out to me because it was really balanced... I've always been interested in complex systems.*" Amanda's description suggests some environmental issues presented during the hui incorporated elements of system-thinking, although other seeds did not describe presentations at the hui so this cannot be verified.

Long-term ongoing support.

During the interviews, several seeds described MAD's long-term ongoing support, which enabled them to network, plan, and problem-solve with other MAD participants, while providing

resources and opportunities for involvement, “... *they actually still support you outside camp so its like a journey type of thing*” (Tina). For example, Marie described an opportunity for growth through returning to MAD as a peer leader: “*I really wanted to experience the leadership and... get to know all the people that are in charge of it and see how I can grow through that because is quite a good opportunity.*” Perhaps partially due to MAD’s ongoing support, almost all seeds stayed connected with other MAD participants after the hui: “*after 6 years, 7 years... we have a MADal hui in February and I basically plan my visits... based on when the hui is*” (Amanda).

MAD community.

This ongoing connection with the MAD community that first formed during the hui was a common theme across all seed interviews. All seeds described the hui as immersion into a community of “like-minded” people: “*I think the biggest one that has still stuck with me is very much the culture of MAD... it’s just something special about the way people treat each other and people work together at MAD*” (Amanda). According to seeds, membership in the MAD community increased their collective efficacy by providing a sense of belonging, opportunity, friendship, and support from a group of active and engaged individuals. One seed’s experience of the MAD community is illustrated in the following quote,

“I think what really struck me was that... I was not alone... there’s this community of people... This is exactly what I needed to feel as though my contributions could matter... as though I was part of this growing, nurturing community” (Emma).

After the hui, several seeds described planning, problem-solving, and taking action with other MAD participants, suggesting the MAD community itself contributed to seeds’ action-taking.

Support structure external to MAD.

One unexpected theme, unprompted by interview questions, was seeds' support structure external to MAD that facilitated leadership development and action-taking, including personal networks and institutions and organizations. Possibly due in part to seeds' high-school age when they took part in the program, many of these facilitating factors were embedded in the school context, such as enviro groups⁶, although families as well as other institutional and organizational contexts were also mentioned as helpful.

Personal networks.

Marie highlighted friends as having influenced her early engagement, and Emma described her parents early and profound impact on her environmental engagement. Other supportive individuals mentioned in seed interviews included teachers and other enviro group members: “... *one of our teachers... is really involved... she's at most of our [enviro group] meetings, she's helping us organize...*” (Henry).

Institutions and organizations.

Institutions and organizations that seeds were a part of both facilitated action-taking and were avenues through which seeds took action. For example, high school provided much needed support and structure for William but so did an environmental organization after graduating from high school:

“... through school you've got all the channels ... you can talk to and all the stuff is there to help you do all the environmental action you want to. And you... leave school and you move up in a world and there's none of that. So, for me the Ambassador program [at] Sustainable Coastlines is facilitating my environmental nature” (William).

⁶ Participants described how most high schools, referred to as “colleges” in New Zealand, have a school enviro group through which members plan and implement sustainability projects in their school.

Three other participants also mentioned joining the ambassador program at Sustainable Coastlines, which supported them in developing their own action projects that “... *centre around what Sustainable Coastlines do*” (Tina). For example, seeds discussed creating and facilitating talks at beach clean-ups and at local primary and high schools, volunteering at tree-planting events, and creating a film with Sustainable Coastlines⁷.

MAD’s impact on participants.

Development of identity as a change agent.

As described by MAD program staff, seeds were environmentally engaged before the program, but nonetheless reported during the interviews that the three-day hui changed the way they see themselves and spurred their memberships as “MADsters”. This development of an identity as a change agent encompassed changes in attitudes, values, and a sense of self in relation to environmental issues. For example, one seed described MAD’s impact on her views: “... [MAD] took me from, “*oh this is something I can do...*” to *actually care about it and actually do something about it*” (Amanda). Seed self-identification as change agents was often described in relation to action-taking, as they built a belief in their own competence to carry out actions and their ability to influence others. One participant remarked that, “... [MAD] teaches you how to interact with different people... you felt confident to approach people. And...[MAD] makes you... aware of your leadership qualities and then you can examine it yourself like *different areas you need to work on*” (Tina).

⁷ Sustainable Coastlines is a New Zealand charity located in Auckland that conducts conservation projects related to coastlines and waterways. Some of their programs include clean-ups of coastal areas, providing education, public awareness campaigns, and riparian planting (Sustainable Coastlines, n.d.).

Increased action-taking.

These personal changes and the experience of MAD, as expressed by seeds', affected seeds' increased action-taking. For example, one participant started an enviro group in his school after the MAD program, "... *that was certainly inspired by MAD*". He stated, "*I'd never heard of a school enviro group until I went... so the idea was generated by MAD, but it was outside of MAD. I wanted the initiative*" (Mark). William, Samuel, and Julie mentioned implementing actions planned during the hui afterwards in their high school, such as approaching administration to change school practices and running a campaign to raise awareness about environmental issues. Social skills learned in the program were also described by Tina and Cherol as facilitating their ability to take environmental action.

Seeds' Actions to Influence Others' Environmental Engagement

Seeds described influencing members of their social networks in two distinct ways – either through actions intended to reach many people (50-5000 people), or actions aimed at less than 50 people (see Table 3).

Table 3

Theme Structure for Seeds' Actions to Influence Others' Environmental Engagement

Major Theme	Sub-Theme	Aspect of the Sub-Theme	Number of Seeds by Sub-Theme
Seeds' Actions to Influence Others' Environmental Engagement	Collective actions	Engaging and appealing to decision makers	5 seeds and Samuel
		Educational initiatives	8 seeds and Samuel
		Founding and leading groups, clubs, and organizations	Founding – 3 seeds Leading – 8 seeds and Samuel
	Relational actions	Collaboration and inclusion	8 seeds and Samuel
		Mentorship and role-modelling	Mentoring – 5 seeds and Samuel Role model – 2 seeds
		Providing information	6 seeds and Samuel
		Recruitment	4 seeds

In most cases the impact of actions aimed at the collective level were not measured, which may be in part due to the difficulty of measuring uptake of large-scale initiatives. One

seed participant discussed this issue in relation to his film-making as both a disadvantage and advantage:

“One video view, you have no idea how much that person has engaged with your message, which is kind of frustrating. On the other hand, it does mean it’s easier to get your message out to an awful lot of people” (William).

When impact of these types of actions was measured, participants looked for changes in school waste management (e.g., through waste audits) and the number of new members joining an environmental group, club, or organization. For example, one participant reported: *“to reignite the [recycling] campaign... we released the video and we added stickers onto the lids of the bins... And we found it dropped from 50% non-recyclable to about 30-40%” (Samuel).* Changes at the relational level in others’ knowledge, attitudes, personal practices, and environmental actions were conveyed to seeds through conversations and not measured in a formalized way. Based on interview data, both actions aimed at the collective and relational level were shown to influence environmental knowledge and personal practices but only relational actions were described as contributing to environmental action by members of seeds' social networks.

Actions to impact the collective level.

Seeds actions that aimed to impact the collective level included engaging and appealing to decision makers, educational initiatives, and founding and leading groups, clubs, and organizations. Collective environmental actions carried out by seeds, as described across all seed and ripple interviews, primarily targeted change related to environmental issues in their school, community, and international spheres.

Engaging and appealing to decision makers.

One of the principal ways seeds influenced collective impact was by engaging and appealing to decision makers to change practices or policy related to sustainability (six seeds, including Samuel, discussed taking this action). Specific actions mentioned in the interviews included writing proposals, calling for and facilitating meetings with decision makers, and bringing a list of proposed changes to school administrators⁸. These actions were associated by seeds with changes in institutional practices or policy that contributed to changes in the personal practices of many individuals. Changes in policy were often contingent upon support from school administration through approval and funding for initiatives. This was exemplified by one participant who,

“... went about ensuring that happened... and facilitated a meeting where we set plans... about reducing waste... We eventually ended up... applying for a waste minimization fund of \$55,000 and got that, and implemented this... large scale waste minimization project, which saw an 80% reduction in our waste at school going to landfills” (Emma).

Educational initiatives.

The most prevalent actions, mentioned by all seeds, involved taking part in and leading initiatives to educate large numbers of individuals through planned, methodological outreach. Examples of these educational initiatives included presentations to large groups, such as through school assemblies and circulating content on social media. One participant created an educational video to decrease littering habits of students at his school. The video *“... was set up much like an informative video ... And then I finished it by attempting to link it back to the person...”* (William). William described evoking viewers' empathy by drawing from images and

⁸ EAS questions were not similar enough to warrant comparison.

information about an environmental issue relevant to New Zealand and Auckland specifically. He also connected this local issue to tangible actions viewers could take to address it. When asked about students' response to the video, William answered: *"Mainly people were saying... 'Oh, wow! I didn't realize that that happens.' Because the main thing was showing people that seeing garbage on the ground looks bad."* Another approach used by four seeds and Samuel included collecting data about the school and targeting specific groups of students based on the results. Seeds noted during interviews that educational initiatives influenced others' environmental awareness and knowledge, personal connection to the issue, and personal practices.

Engaging in educational initiatives was further supported by the quantitative survey data. Twenty seeds indicated that they frequently organized a community/school event that focused on environmental awareness (8 sometimes, 2 never), while 24 seeds frequently participated in these same type of events (5 sometimes, 1 never). Further, 22 seeds frequently promoted environmental issues and sustainability within their school, organization, or workplace (7 sometimes, 1 never).

Founding and leading groups, clubs, and organizations.

Seed interview data indicated that seeds' actions to influence collectives were often enacted through groups, clubs, and organizations, such as *"[founding] a civic education organization that goes into high schools to up-skill students on the issues"* (Emma). Emma, Amanda, and Mark reported founding their own sustainability organizations, described by Mark's ripple participant Henry: *"... [Mark]'s just brought together this big community of 20 or so people... working to make a difference... with our local government... we're getting things done."* During interviews, all seeds indicated they had led a group, club, or organization by

planning and implementing events. In a few instances, these actions were shown to increase others' confidence as well as the participatory and leadership actions of others who took part in the initiatives (as mentioned previously, not all impacts on others were measured). These results did not fully align with the seed survey data. Twenty-five seeds indicated they had started an environmental club or group (5 never), and 20 seeds frequently organized a community or school event (8 sometimes, 2 never).

Actions to impact the relational level.

Actions at the relational level included mentorship and role-modelling, providing information, and recruitment. Through these various actions to influence close members of their social networks, seeds often employed practices of collaboration and inclusion.

Collaboration and inclusion.

All participants described seeds employing processes of collaboration and inclusion when influencing close members of their social networks, ranging from carrying out actions as a collective, through involving and inviting others to take part in initiatives, to assigning important leadership roles on projects (mentioned by both Samuel and Henry of their respective seeds William and Mark). This direct involvement in the process of leadership increased Samuel's confidence in action-taking, described in the quote below:

“we’ve also done a lot of movies to promote sustainability and that’s not something I would have done myself. I used to be quite shy so just acting in general wouldn’t have been something I really wanted to do. But with his help we’ve been able to make a lot of movies and some of them have had impacts on our community” (Samuel).

Mentorship and role-modelling.

During interviews, both seeds and ripples described seeds (Amanda, Mark, William, Marie, Samuel, and Tina) mentoring members of their social networks by communicating, problem solving, and supporting action-taking. Tina recognized the resource intensity for MAD program staff to provide follow-up support and volunteered to provide ongoing mentorship to young MADsters by connecting them to resources as well as learning and action opportunities. Interestingly, in the ripple survey only two ripples reported being influenced by seeds as models of environmental behaviour and actively encouraging changes in environmental practices. A full range of changes in members of seeds' social networks were associated with mentorship and role-modelling actions, including increased environmental knowledge, attitudes, and motivation to engage in personal practices and environmental actions.

William and Mark described acting as role models and other seeds may have also been role models without having been told so or identifying as one. William described his experience of acting as a role model:

“I’ll lead them by example...So at school I was notorious for walking and if I see garbage picking it up... people noticed and either thought, “Oh wow he’s weird” or they thought it was kind of cool. And then if people asked about stuff or it came up in conversation then I would jump in and say, “Hey this is the deal” (William).

Providing information.

The interviews confirmed that six of the eight seeds and Samuel were influencing understanding of environmental issues by providing related information, such as by “... *telling me to recycle the proper way... how to do it efficiently. So that kind of made me wonder, ‘I should do that as well’*” (John). Seeds were sharing things on social media, through group

discussions, and in one-on-one conversations, as conveyed during interviews, and “talking with others” to influence their environmental engagement (28 frequently, 2 sometimes), as conveyed in seed surveys. In the survey, four ripples indicated that seeds discussed environmental issues with them, three were provided information and resources, and four were shared media about environmental issues. Both ripple and seed interview data suggests that these actions can produce changes in comprehension and personal practices.

Recruitment.

Interviews indicated that members of seeds’ social networks were recruited into environmental initiatives or groups (i.e. encouraged or invited to join) by four seeds. Recruitment was described by participants as leading to membership in a group and impacted between 1-50 new members. Other than MAD, seeds were involved in groups such as enviro groups, local environmental organizations, and Sustainable Coastlines. Recruitment was demonstrated by Emma, who described the process of influencing her “*brother, who was not interested at all, then I went and brought him on board with this waste campaign at school and now he’s clearly involved at university.*” Samuel was also influenced by William to join Sustainable Coastlines, which he continued to be involved with even after leaving high school:

“... he kind of just approached me at the start of the year and he was like, “... They’re looking for ambassadors to help spread the message around...” So I kind of just went along to that. And ya, it’s just gotten me hooked to that place now” (Samuel).

Ripple survey data neither supports nor contradicts recruitment findings. Two ripples indicated that seeds invited them to join an existing group, club, or organization and two ripples also said seeds taught them how to start an environmental club or group. Seed survey data supported the interview findings with 20 seeds indicating they invited others to join an existing group, club, or

organization, and seven responding they taught others how to start an environmental club or group.

This section presented seeds’ environmental actions and their respective impacts on members of seeds’ social networks. The next section will describe the ripple effect, including which participants were influenced and how.

Impact on Ripple

The interview data indicated there was a ripple effect on members of seeds’ social networks that included increased environmental knowledge and attitudes, personal practices, changes in the self, membership in groups, and increased environmental action-taking (see Table 4).

Table 4

Theme Structure for Impact on Ripple

Major Theme	Sub-Theme	Number of Ripples by Sub-Theme
Impact on Ripple	Ripples’ knowledge, attitudes, and personal practices	Attitudes – 4 ripples Knowledge – 2 ripples Personal Practices – 3 ripples
	Ripples’ membership	Membership – 3 ripples
	Ripples’ identity as a change agent	Identity – 3 ripples
	Ripples’ environmental actions	Environmental actions – 4 ripples

Ripples’ knowledge, attitudes, and personal practices.

Seed and ripple interviews confirmed that seeds influenced all ripples’ attitudes, and both Katie and Henry described changes in their environmental knowledge as a result of seed influence: “... *I wouldn’t say I wasn’t aware of it previously, but he made me stop ignoring it and make me think more deeply about... the consequences of my actions*” (Henry). Interviews also suggest that seeds increased ripples’ personal practices, including the personal practices of Katie, John, Henry, and other members of seeds’ social networks, exemplified by the following

quote: "I remember one person told me... *"I saw some garbage on the ground and thought [about information William presented] ... so I picked it up and put it on the bin"*" (William). In the survey, three ripples also said that seeds impacted their environmental knowledge and personal practices and four ripples reported becoming more environmentally engaged as a result of seeds. Likewise, 20 seeds reported they increased another's engagement with environmental issues through their influence.

Ripples' membership.

Ripple participants described experiencing changes in their group membership as a result of seed influence. Membership in a group or club (e.g., enviro groups, Sustainable Coastlines) increased the environmental actions of many members of seeds' social networks, including Henry, Samuel, and John. For Henry and Samuel, who had more of a leadership role in their respective groups, membership provided an avenue for problem solving, support, and idea generation exemplified by the following quote:

"[enviro groups] in our area we... discuss things that we're doing and things that we want to do but need help with and we just try to find people who share the same interest as us and can help us. In those groups, for example, our turn all the lights off campaign it spread to another college" (Samuel).

Ripples' identity as a change agent.

Henry, Katie, and Samuel described how seed influence resulted in transformations in how they personally relate to environmental issues, including feeling more deeply connected to these issues and reflecting on how their own actions contribute to change processes. This change resembles seeds' development of an identity as a change agent, although ripple transformations

were not likely caused solely by seed influence. John, Samuel, and Henry described how seeds increased their confidence to enact environmental action, exemplified in the following quote.

“She helps me out a lot, she cheers me up and helps me be a better person. She’s actually changed my attitude a lot. I used to be a shy person that used to only say hello now and then. But thanks to her I have become more confident” (John).

Ripples’ environmental actions.

During the interviews, all ripples discussed how seeds’ influence contributed to their environmental action-taking. While Samuel and Henry described actions that would be considered “leadership actions” according to the EAS (e.g., organizing events to raise awareness, teaching other youth to become leaders), Katie and John discussed engaging in more participatory environmental actions by influencing others to change their personal practices or take part in nature conservation events: “... *friends, family... I try to involve them as much as I can*” (Katie). Ripple surveys suggest that not all ripples increased environmental action-taking as a result of seed influence (2 ripples claimed seeds influenced their action-taking). Also, only about half of seeds (17) reported influencing another person’s environmental actions.

Based on the interview data, ripples’ actions are likely influencing the personal practices, and in some cases, the environmental actions of others. For example, Henry may be influencing other enviro group members’ environmental actions by taking on a, “... *leadership role within the environmental group. I do some organizing of things, I talk to people about, you know, getting visits from professionals and all that sort of stuff.*”

Results Summary

In summary, MAD influenced seeds through short-term programming that developed action competence, long-term follow up that provided support for ongoing action-taking, and a

community of like-minded young activists. As a result, seeds described experiencing membership in a community, development of an identity as a change agent, and increased action-taking. This process of leadership development was facilitated by seeds' social relationships and supportive institutional structures. Following MAD, seeds impacted collective-level engagement with environmental issues by appealing to decision makers, implementing educational initiatives, and founding as well as leading collectives. At a relational level, seeds influenced close members of their social networks through mentorship and role-modelling, providing information, and recruitment – all with a focus on collaborative processes. These actions influenced ripples by increasing their membership in clubs, groups, and organizations, fostering their identity as change agents, increasing personal practices, and increasing environmental action-taking.

Discussion

This research provides evidence that young leaders can increase the environmental engagement of others, including environmental knowledge and attitudes, personal practices (e.g., recycling), and participation as well as leadership actions. The results suggest that a strong leadership foundation can significantly contribute to affecting change in others, including inspiring their identities as change agents and their opportunities to enact change. Effective youth environmental leadership programs, such as MAD, are well positioned to foster this leadership transformation.

Based on the study findings, two predominant processes can be understood to contribute to how youth influence others and how youth programs can facilitate this influence. MAD facilitates community impact through the actions of its participants by: a) fostering leaders who have the personal attributes and opportunities to enact change, and b) acting as a model for its participants who parallel attributes of the program to influence others, effectively extending the

reach of MAD beyond the program. These two processes contextualize and situate the impact that participants have on others, as the impact itself is a process of action-taking. To show how MAD enables change through seeds, this discussion is structured by the path seeds take, beginning with MAD and its influence on seeds in *The MAD Program* section, moving to the ways seeds use these changes to take action, and then to the resulting impact on others in the *Actions to Influence Others* section.

The MAD Program

Consistent with existing research about youth environmental leadership programs (Chawla & Cushing, 2007; Hickman et al., 2016; Jensen & Schnack, 1997; Riemer et al., 2016), the ability of seeds to take environmental action and influence others is a factor of their action competence fostered during the program. This was found to be the case for action-taking skills, however, not all seeds described increasing their environmental knowledge during the program. This divergent finding may be a result of the seeds' level of environmental knowledge before the program, allowing MAD to build on their engagement through development in other areas. The program may have enhanced the existing knowledge of seeds that, while requisite for influencing others, was not a significant factor that increased the breadth or depth of influence that seeds had on others' environmental engagement, perhaps allowing other critical factors to be more easily isolated. It was clear, for example, that MAD did contribute to participants' development of an identity as a change agent, which was significant to their level of influence and has also been shown in previous studies to enable leaders to take environmental actions (Chawla & Cushing, 2007; Harré et al., 2009; Riemer et al., 2013).

During MAD, participants came to view themselves as part of a collective and developed friendships with others who shared an interest in action-taking, consistent with literature

identifying this as a facilitator for environmental action-taking (Arnold et al., 2009; de Vreede et al., 2014). Participants described initially developing their MADster identity and forming important friendships during the hui and later maintaining these attributes through ongoing involvement in the program. If seeds had only participated in the initial program, this membership may have faded. In comparison, participants of another study that lacked ongoing support experienced a decline in action-taking six months after the program, except in one participating country where continuous support was provided (Riemer et al., 2016).

The development of youth into leaders can be understood as a process of mastery, building confidence, and satisfaction with action-taking through gradual learning and a sense of accomplishment from having successfully influenced others (Chawla & Cushing, 2007; Riemer et al., 2013; Stern, Powell & Hill, 2013). This stepwise process of growth and development supports the idea that individual level and participatory actions, rather than leadership actions, are stepping stones that require follow up to beget more influential environmental actions.

Actions to Influence Others

Most seed actions took place in a high school setting that provided a support network and a sphere to enact change on, such as school policy or other students' personal practices. Outside this action-enabling atmosphere, youth often experience a drop in their action-taking unless involved in an environmental group, club, or organization (Wicks, 2017). This finding by Wicks (2017), along with the current finding of the role of community in enabling change, suggests the importance of belonging, collective efficacy, and inclusion as key facilitators to change making at an individual level, and the collective nature of environmental change work at a relational and community level.

MAD enabled seeds to influence others by serving as a framework that seeds unknowingly paralleled in their actions to influence others, acting as role models and mentors, recruiters for groups and initiatives, and leaders that provided roles for others in change making. Participants' parallel process of MAD is most clearly identified in seeds' role-modelling action – they were mentored during their first hui and then became mentors to students in their schools as well as sometimes returning to MAD as leaders the following year.

Similarly, just as MAD recruits MADsters, seeds invite others to join groups (e.g., new MAD participants, enviro group members, and Sustainable Coastline ambassadors). The current study shows that recruitment is often the first step in fostering another leader, as it increases membership and gives ripples the opportunity to carry out action. While membership itself may not influence others, it is a strong enough predictor of action-taking that it has been equated with environmental action in other studies (Alisat & Riemer, 2015; Chawla, 1998). Membership in environmentally-focused groups may also play a role in sustaining action where otherwise it may have dropped off (Wicks, 2017), perhaps due to friendships causing the action-taking experience to be more meaningful and provide affirmation (Arnold et al., 2009).

Just as MAD provides leadership opportunities (e.g., as a MAD leader), seeds provide opportunities for others to get involved, such as through enviro group projects, stream clean-ups, leading meetings, and organizing campaigns. The finding that most seeds were directly leading environmental groups was surprising because leading and involving others is resource intensive and requires a large time investment (Kløckner, 2015), so may require a higher level of motivation. This investment burden may be lessened by the way seeds lead initiatives using collaborative and participatory processes, which facilitates skill development among those they are influencing and distributes the work load. Actions that involve collaboration are important

for leadership development, as they build *collective competence* to enact democracy and enable young people to gain autonomy, sense of self-worth, respect for the perspectives of others, and negotiation skills (Chawla & Cushing, 2007).

The second way MAD enabled community change through the actions of seeds was by up skilling and providing experience for participants of the program, similar to processes identified by other research on youth environmental action-taking (de Vreede et al., 2014; Riemer et al., 2016). These skills were used to enact collective and political-level environmental actions, such as carrying out educational initiatives and engaging stakeholders to influence the environmental knowledge and practices of the student body at participants' respective high schools. The latter was a surprising finding as changing institutional policy and practices can be difficult, especially for youth, and success requires high leadership capacity and determination, suggesting seeds are highly engaged.

Implications

This study contributes to the body of literature on youth environmental leadership programs, and environmental education more broadly, as it is perhaps the only study assessing the ripple effect beyond youth environmental program participants. The lack of research on this topic is not surprising as there were methodological challenges to sampling members of seeds' social networks, both in the current study, and in other studies conducted by our research team.

MAD's impact on participants and the ripple effect beyond the program has implications for organizations interested in changing environmental behaviours at a collective, provincial, and national level. Funding a youth environmental leadership program that also provides ongoing support and opportunity for involvement after the program may be less resource intensive than alternative behaviour change initiatives, while also likely having a higher impact. Marketing

campaigns, for example, can be very costly and may have little impact on people's behaviour, as shown by the evaluation of Canada's One Tonne Challenge that cost \$37 million over a three-year period from 2003-06 (Environment Canada, 2006). This evaluation suggests education campaigns can increase awareness, understanding, and support for an environmental initiative, but that a more comprehensive approach is required to change behaviour with the same resource input (Environment Canada, 2008). Training a group of young leaders and providing ongoing support in the way that MAD provides, on the other hand, has a two-fold impact on the environmental engagement of participants of the program and the members of their social networks they influence.

One likely success factor of MAD was admitting participants who were already engaged with and knowledgeable about environmental issues – a graduated approach that other programs might consider to inspire continued growth. Programs should also aim to promote continuing involvement after the initial program by providing ongoing support and opportunities to return as a leader in following years. Both the initial program and follow-up support should promote collective efficacy, a sense of belonging, and continued engagement in action-taking through participatory programming that promotes friendship between participants. Based on the study findings, it is recommended that returning leaders or peer program coordinators be taught leadership skills including how to: a) act as a mentor and role model; b) collaborate and share decision-making power; c) recruit individuals into groups and initiatives; d) foster comprehension about environmental issues; and e) run initiatives that involve others.

Limitations and Future Research

There are several limitations to the current study as well as areas to expand in future research. Seeds likely represent the most motivated MAD participants, as they were more likely

to participate in the study, skewing the results towards more ambitious findings. Survey data was further limited in that pre-program data could not be collected to compare to post-program results. Pre- and post-program data would have helped discern whether changes in participants resulted from the program. Also, both surveys and interviews relied on participant self-report about their environmental actions, which may have been exaggerated if participants felt they were not taking enough environmental action. Collecting different types of data (quantitative and qualitative) from two groups of individuals (seeds and ripples) helped minimize exaggerated self-reports of environmental actions by providing multiple data points for each finding.

There were also limitations regarding the diversity of the sample, which lacked adequate representation from Māori and Pacific Peoples, who represent an important portion of Auckland and New Zealand demographics (New Zealand, 2013) but might also provide insight about Indigenous populations in other locations where these results might be applied. Environmental engagement and leadership actions may look different for individuals from these groups compared to the Western ideologies of action and change informing participants who mostly identified as European ethnicity. The research and supervisory team was also comprised of all white Canadian and New Zealand researchers.

The present study was also limited by low ripple participation rate, perhaps due to a lack of buy-in or geographical and social distance from the research. Future research may take a more direct role with participants by organizing an event and training about recruitment for seeds. Alternatively, data could be collected from online social networks such as Facebook, or by working with estimates given by seeds. One ripple participant was found mid-interview to have participated in the MAD program previously but was not excluded due to their clear indication of having been influenced by their seed and the primary importance of this influence process in the

study. Efforts were made to be critical of whether the seed could reasonably have influenced their environmental action-taking in the ways described during the interview.

More research is needed looking at the ripple effect in countries with similar and different cultures to see whether these results are specific to New Zealand and similar cultures, or more universal. Future research and program administration could explore indicators for early, mid, and long-term leadership development and the impacts of leader influence, including specific environmental impact (e.g., carbon emissions equivalent calculation). Forthcoming research in the field of youth leadership program development could use a longitudinal design to explore the graduated approach to leadership development over the course of several years.

Conclusion

This study shows the potential power of youth and youth leadership programs in furthering the sustainability agenda. Youth are important catalysts in creating the cultural shifts needed for a sustainable future. Not only in the current study, but in cities across the world, youth have made important contributions to sustainability in their communities. In Curitiba, Brazil, for example, a government education initiative that taught school-aged children to recycle resulted in a 70% recycling rate in the city (considered to be among the highest in the world), due to children passing on the message to their parents (Rabinovitch, 1992). To become these ambassadors for change, youth need an avenue to learn about environmental issues and develop as change agents. Effective youth environmental leadership programs, such as MAD, can provide such opportunity, an itinerary for a journey of friendship, engagement, and change making that promotes positive youth development and carries on into adulthood.

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