

Challenging families to live more sustainably : A multicase study in adopting eco-sustainable habits in the context of family

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Abstract: A case-study methodology was used to explore the processes of change as experienced by 18 New Brunswick (Canada) families attempting to lead a more eco-sustainable lifestyle as part of a 6 month long provincial initiative called the NB Family Eco-Challenge. Cross-case thematic analysis of findings revealed the emergence of certain conceptual themes related to families who successfully adopted collective environmental actions. For instance, we note the presence of certain applied competencies in these families, such as a capacity for planning, openness to change and collective efficacy. We also noted that families who succeeded in integrating collective environmental actions shared biospheric values and tended to maintain their chosen actions when part of a support network. Based on these findings, this article concludes by outlining the lessons learned in terms of their potential for a possible educational program for families looking to adopt a more eco-sustainable lifestyle.

Keywords: sustainability education; sustainable family living; environmental competencies; family action competence; environmental education

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INTRODUCTION

Climate change is one of the environmental problems currently posing the greatest risk to humanity (Haines, Kovats, Campbell-Lendum, and Corvalan, 2006). Some research reports that human beings are becoming increasingly conscious of their impact on the environment, and especially on the world's climate (EKOS, 2003), while other studies indicate that in general, people continue to engage in non-sustainable behaviour (Whitmarsh and O'Neill, 2011). Many researchers in environmental education (EE) believe that a well-intentioned individual can adopt more environmentally respectful behaviours, whether at school or in the community.

Recently, in Durban, South Africa, the world's nations met once again for the 17th Conference of the Parties (COP17) of the United Nations Framework Convention on Climate Change (UNFCCC). For the first time, an agreement in principle was signed by all polluting countries, including the United States, and rapidly industrializing countries, such as China. However, this agreement still includes greenhouse gas (GHG) reduction targets far into the future (2020) that are not based on concrete action in the short term. While waiting for a concerted national or international action plan, local action continues to represent, in our view, a significant context for change in the fight against climate change.

Although different levels of government, non-governmental agencies, and the world of business all need to help reduce GHG, which are responsible for climate change according to Haines, Kovats, Campbell-Lendum, and Corvalan (2006), we consider the family an environment for significant action within these socio-political and socio-economic systems. The family is a relevant study setting for EE, because homes and private properties are responsible for the most polluting and energy-intensive, as well as environmentally conscious lifestyles on a daily basis. A lot of research has been done on behavioural change and environmental behaviour. Nevertheless, a review of the literature conducted by Léger & Pruneau (forthcoming) revealed little research in which the family is considered a context for adopting environmental behaviours. While authors such as Payne (2010; 2005) in Australia and Gronhoj (2006) in Denmark have produced some work on environmental education in the context of families, our literature review pointed to a dearth of such studies in Canada.

With respect to the competencies underlying environmental action, our previous research (see Léger & Pruneau, 2011, 2012) indicates that the more competencies are developed and mastered within the family, the more successful the family will tend to be in adopting difficult environmentally sound habits. These results give us a new context, that of the family, for the work of Pruneau et al. (2006), who have listed some of the competencies shown by Canadian individuals engaged in adopting environmental actions. In fact, our previous work on the subject is in line with other researchers such as Pruneau et al. (2006) and shows that competencies play an important role in a family's ability to collectively adopt a more environmentally conscious lifestyle. In particular, the research indicates that the following competencies, among others, are involved in the processes of adopting environmental habits within the family, i.e., perseverance, cooperation, organizational skills, citizenship, self-sufficiency, and decision making. A family's collective environmental behaviour also seems to be related to the sharing of common biospheric values. The results of our previous research (see Léger & Pruneau, 2012) with four New Brunswick (Canada) families seem to confirm the statements of Kaiser and Wilson (2004),

among others, who believe that family values play an important role in the choice of acting environmentally or not.

Basically, an important question arises when we talk about adopting more environmentally conscious behaviours as a society: What makes one person or group able to change their habits to incorporate new environmental components daily, while others fail? In response to this general question, we can access the results of various major research projects on the subject, especially the work of Ajzen (1991) and Prochaska, DiClemente, and Norcross (1992) on behavioural change, Seidel (1992) and Cairns (2007) on cognitive challenges and physiological characteristics associated with change, and Hungerford and Volk (1990), Hwang, Kim, and Jeng (2000), and Hershfield et al. (2004) on factors underlying environmental behaviours. However, as mentioned previously, very little research exists on the problems of adopting environmental behaviours in the family context, especially in Canada. Finally, we believe that the data resulting from the interviews with the families participating in the NB Family Eco-Challenge, a provincial EE program designed to engage families in adopting a greener family lifestyle.

THEORETICAL PERSPECTIVE AND PURPOSE

This paper contributes to the growing body of research concerned with adopting eco-sustainable habits in light of increasingly serious environmental problems. The literature on public awareness of climate change points to general concern, yet there is a lack of meaningful societal engagement with the issue (Whitmarsh & O'Neill, 2011, p.3). For its part, environmental psychology literature reveals a number of factors involved in deciding to act more responsibly in regards to the environment (Hwang, Kim & Jeng, 2000). In addition, perceptions literature identifies important psychological and physiological barriers to change such as dissonance and denial (Seidel, 1998).

In the present study, we look to better comprehend the processes involved in collective environmental action in the context of family. We are curious as to the “key environmental competencies” (Morgensen & Schnack, 2010) demonstrated by family members, both individually and collectively, as they seek to act more sustainably. Less inclined to adopt a linear behaviorist view of environmental action, our views on engaging in eco-sustainable action are more in line with those of Jenson & Schnack (1997) in that education should strive to foster “action competence” instead of focusing on behavior modification, which are generally not grounded in intention. Though our previous work considered the processes behind adopting environmental behaviours in the context of family (Léger & Pruneau, 2011, 2012), looking at eco-sustainable living through the lens of psychological theories such as Ajzen’s (1991) Theory of Planned Behavior and Prochaska, DiClemente & Norcross’s (1992) Transtheoretical Model of change (TTM), further reflection along with results from our more recent work leads us to prefer the action competence perspective and, accordingly, opt for the term environmental action rather than environmental behaviour. As stated by Morgensen & Schnack (2010), “actions are a special kind of behaviour qualified by the intentions of the agent [...] conscious and purposive”.

Throughout the literature, in studies using qualitative inquiry methodology, researchers almost always collected their results by interviewing participants when new behaviors had turned into

habits. Few researchers have observed, over time, the experience of families who attempted to adopt new environmental habits. This kind of research is nevertheless, in our view, very important. For instance, a better understanding of how families integrate environmental habits such as climate change mitigation behaviors could lead to policies that are more effective in reducing our impact on the climate, especially from levels of government which are closer to the people (e.g. municipalities). A better understanding of how families and communities can change their GHG producing habits seems even more important today in light of a virtual political withdrawal from climate change mitigation policies on the part of Canadian political leaders. Indeed, Stoett (2009) points to a lack in federal leadership on this issue in Canada, citing the following cuts, all in the past six years: the much publicized One Tonne Challenge, 40 public information offices across the country, funding for scientific and research programs on climate change and the Home conservation rebate plan.

As previously indicated, few studies have considered the notion of action competence in the context of educating students AND their families on issues relating to the environment. Our research looks to pursue this very objective, with both educators and policy makers in mind, by reporting on the lessons learned in regards to the processes involved in adopting collective environmental actions in the context of family. We wonder: What key environmental competencies are present in families who are actively trying to adopt a more eco-sustainable lifestyle? What other processes might contribute to fostering action competence in the context of family? What role can environmental education (EE) play in developing action competence in students as well as in their families?

THE NB FAMILY ECO-CHALLENGE : AN EE INITIATIVE FOR CHANGE

Running from January to June 2012, the NB Family Eco-Challenge was initiated by the Canadian province of New Brunswick's Department of the Environment and Local Government. The EE program was designed to get families from around the province involved in a project to adopt collective actions designed to mitigate climate change. During the project, the Department worked with 28 families to increase their awareness of climate change, sharing relevant information on the topic through a series of internet webinars and telephone conferences. As such, the project looked to foster interconnectedness between participating families. The NB Family Eco-Challenge was specifically intended to make the public aware of climate change, through a graduated program that enabled families to reduce their ecological footprint, protect the environment, and save on the family budget. Activities focused on the themes of energy, transportation, waste, water, and adaptation to climate change.

Throughout the project, specialists from provincial organisations such as the Department of Environment and Local Government, the Canadian Standards Association, and Efficiency New Brunswick shared practical tips and useful advice with participating families. From a government standpoint, the challenge provided the perfect opportunity to encourage New Brunswick families to take action to reduce their GHG emissions and adapt to climate change. It was a tangible way to respond to the public awareness and education objectives of the provincial Climate Change Action Plan 2007-2012, i.e. "The Province recognizes that public awareness and

education initiatives are essential in engaging people in making choices that both reduce greenhouse gas emissions and respect the challenges of a changing environment.”

From an educational standpoint, the NB Family Eco-Challenge taps into the potential of families to act as an effective milieu of change. In fact, the project puts into practice some of the research conclusions found in EE studies by authors such as leading researcher Philip Payne, who finds that families can be highly influential in educating members on environmental issues, as well as « powerful shaper[s] » in regards to beliefs, knowledge and everyday actions (2010, p.224). For his part, Miller (1998) also found that people with whom we live can greatly influence our personal decisions when it comes to environmental action, or inaction. In this regard, the Eco-Challenge program therefore contributed in developing and maintaining environmentally sustainable practices in the context of family. The following table briefly outlines the three principle educational interventions undertaken with participating families during the program :

Table 1 : Educational interventions

INTERVENTION	FREQUENCY	DESCRIPTION
Information bulletins	6	Monthly tips on actions relating to each of the 4 themes.
Information webinars	2	Forums where experts would share more detailed info.
Telephone conferences	2	Forums where families could share their experiences.

Finally, throughout the NB Family Eco-Challenge program, participating families were asked to record certain data such as monthly energy consumption figures, water consumption amounts as well as travel specific information. These quantitative data were nevertheless not part of the present study in their original form. Instead, the present study focused on the holistic family change experience as documented through subsequent qualitative interviews. That being said, some families did make reference to their recorded quantitative data in describing their collective change experience.

METHOD

Our research was a multiple case study (Creswell, 2007) in which we interviewed 18 families from across New Brunswick, following their participation in the six month long Family Eco-Challenge initiative. We also considered data from journals collected from 8 of these family. In those cases, the collected journal served to enhance and deepen the interview conversations. The methodological approach guiding the present study was rooted in the qualitative research paradigm. As such, a qualitative approach was applied to all aspects of the research design: inquiry, data collection and thematic data analysis. Hence, the present article used discourse from interviewed families to interpret the complexity of the problem, which we consider to be the lack of public action in light of impending global climate change. Our study was of an exploratory nature in that it examined the adoption of environmental actions in a relatively new context, that of the family.

During analysis, we attempted to inductively establish patterns or conceptual themes in order to ultimately better understand environmental collective action in families. We chose to focus on

qualitative data collected through interviews and subsequently conducted a cross-case thematic analysis of these transcribed data, as viewed by Paillé & Mucchielli (2008). The interviews themselves were semi-directed and involved a series of questions dealing with several aspects of the process of adopting greener family habits, designed in relation to our *a priori* theoretical considerations. The interview transcriptions were divided into subject fields, which were initially coded using NVivo qualitative analysis software, and then organized into qualitative statements to bring out a series of major themes, described in the upcoming Results section.

The 28 families participating in the 2012 Family Eco-Challenge project were from around the province. For the purpose of this report, we contacted all 28 families initially involved in the project, and 18 agreed to share their experience. The map below shows the geographical distribution of all families in the Eco-Challenge (see green dots) and that of the 18 families that agreed to share their experience during the interviews this past summer (see red circles – the larger the circle, the more interviews held in the region in question). As shown, the data collected are representative of all areas of the province taking part in the 2012 Family Eco-Challenge. Table 2 on the following page shows some demographic characteristics of the 18 families we met (note that all the names in this report are pseudonyms).

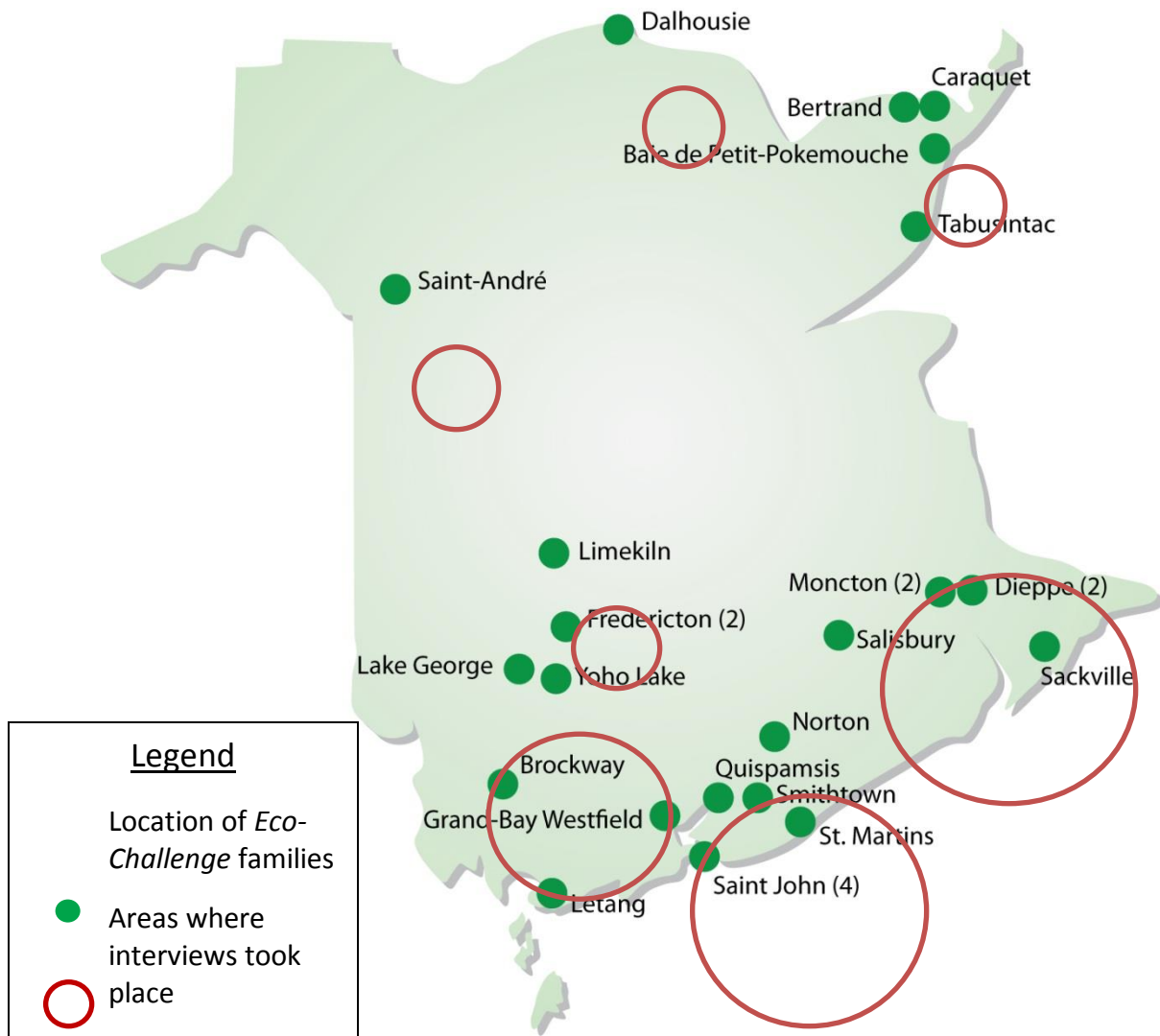


Table 2: Demographic characteristics of the 18 participating families

Name of participating family	Composition of family	Area of the province	Number of families / area
Bradley	Couple with three adult children	South	7
MacDonald	Young couple with a baby		
McKinley	Elderly couple with no children at home		
Caissie	Mother with two young children		
Mills	Couple with three young children		
Brown	Couple with no children at home		
No children	Elderly couple with no children at home		
Cormier	Young couple with two young children	Southeast	4
LaPierre	Young couple with three young children		
McCain	Young couple with three young children		
Lynch	Couple with three teenagers		
Lang	Couple with no children at home	Southwest	2
No children	Young couple with two young children		
Black	Couple with two young children	Central	2
Trites	Young couple with two young children		
Nadeau	Couple with two young children	Northeast	2
Gould	Young couple with two young children		
Landry	Couple with two young children	Northwest	1

As for the interview grid used to collect the data, it contained a total of nine questions, divided into two sections: 1) five general questions on the overall impression of the Family Eco-Challenge and 2) four more specific questions about the process of adapting climate change mitigation behaviour within the family. The interviews lasted between 30 and 45 minutes and were conducted, whenever possible, as group interviews with all members of each family present. The following questions were asked:

A. General questions about overall impression

- 1) Describe your experience with the 2012 Family Eco-Challenge project.
- 2) What did you like about your participation in the Eco-Challenge?
- 3) What problems did you encounter as a family in your participation in the project?
- 4) How did you overcome these difficulties? Can you provide examples?
- 5) How could we improve the Eco-Challenge project?

B. Questions on adopting mitigating behaviours

- 1) Describe your family's experience of change as it tried to adopt mitigating behaviours during the project.

- 2) In your opinion, what were the main factors that influenced the experience of change in your family? What contexts or conditions contributed to your adoption of new environmental behaviours?
- 3) What are the main values expressed by the members of your family? Are they common to all family members?
- 4) How do you think new green behaviours can be instilled in a family? Does it take certain competencies? If so, what are they?

RESULTS & DATA ANALYSIS

The themes developed in the following category subsections emerged from the qualitative data gathered from the interviews we conducted at the end of the NB Family Eco-Challenge program. As previously mentioned, these interviews represent the experience of 18 of the 28 families involved in the Eco-Challenge who agreed to share their experience as participants in a project to change family habits.

THEMATIC CATEGORY 1: Motivations for participating in the Family Eco-Challenge

When questioned about the Eco-Challenge, the 18 participating families gave reasons why they were initially interested in the project to adopt climate change mitigating actions. Looking at the data in Table 3, we can see that the families questioned are interested in the Eco-Challenge for reasons that are connected to 1) their values (which seem more altruistic and earth-friendly than selfish) and 2) their desire to pass on green habits to their children to make sure they will inherit a healthy planet. It is also interesting to note that many families want to share their knowledge with others to help mitigate climate change. Saving money and wanting to know more about the environment are two other sources of motivation for the Eco-Challenge that were mentioned, but they seem to be less influential than the two main themes that emerged.

Table 3: Motivations expressed by families for participating in the Eco-Challenge

Themes (motivations)	# of families / 18 that mentioned these themes	Excerpts from data supporting the theme
Leave a healthy planet for our children	5	- <i>It is important to leave a healthy planet as a legacy for our children.</i> - <i>We must respect Mother Nature and the planet for future generations.</i>
Instill earth-friendly habits in our children	8	- <i>It's up to us to set an example for our children, to instill good habits in them.</i> - <i>I want to show my children that it is important to act responsibly.</i>
Economize by saving money on electricity	4	- <i>I want to reduce my electricity costs.</i> - <i>I want to save the planet of course, but I also want to save money!</i>

Acquire more ecological knowledge	4	- We want to know more about living environmentally. - I want to learn how to reduce my ecological footprint and have a healthier lifestyle.
Act on my environmental values	8	- We are trying to live our environmental values better and to respect nature. - We want to create a culture of respect for the planet in our family.
Be a leader in my community	6	- I want to be a leader in my community by sharing what I know how to do. - We want to share what we are doing with other families.

THEMATIC CATEGORY 2: Concrete actions taken by families during the Eco-Challenge

All 18 families interviewed said they had incorporated a minimum of green actions into their daily routine. Table 4 shows all of the actions attempted, the number of families that attempted the said actions, and the degree of resilience associated with each one.

Although the families interviewed adopted various climate change mitigating behaviours and other green actions, we note that many of the environmental behaviours could be considered fairly easy (for example, recycling, turning out the lights when leaving a room, taking shorter showers, and so forth). For more difficult actions such as composting, gardening, and carpooling, most of the families that tried them admitted that they couldn't maintain them. Finally, it is important to note that several of the 15 families consulted said that they were already engaging in green actions every day. We therefore believe that the sampling of families that asked to take part in the 2012 Family Eco-Challenge, beyond its restricted number, is not necessarily representative of a typical New Brunswick family.

Table 4: Categories of behaviours attempted and associated success rates

Categories of behaviours attempted	# of families /18 that attempted the action	Degree of resilience: # of families that successfully maintained the action
Recycling (implementation of a comprehensive system)	14	High (12/14)
Water conservation		

(using less water in the shower; ... for washing; ... for doing dishes)	12	High (9/12)
Saving electricity (turning out lights; using electric power bars)	10	High (7/10)
Composting (using an outdoor composter) (1 family even tried vermicomposting)	5	Average (3/5)
Gardening (planting and maintaining a vegetable garden; canning for the winter)	4	Low (2/4)
Limiting the use of the car (avoid having the engine idling in the winter; carpooling; planning outings)	9	Very low (2/9)

THEMATIC CATEGORY 3: Challenges in adopting a greener family lifestyle

With respect to the question referring to the major challenges encountered when attempting the chosen earth-friendly behaviours, two main themes emerged from the family interview data:

3.1) Changing comfortable habits

Of all the families interviewed, 12/18 said they found it hard to do without some comfortable habits, such as taking long hot showers and having the car idling on winter mornings and using the drive-through. Following are some excerpts from interview data:

“After a long day, a nice hot shower helps me relax... and I like to stay in there for a long time.”

“It’s easier to get your coffee at the drive-through, especially in the winter when it’s cold out. The car is so warm and I don’t want to get out!”

“I can’t get used to scraping my car windshield in the morning. I prefer to let the car warm up to melt the frost... it’s so much easier.”

3.2) Lack of time

The other main theme identified by the families as a challenge was the lack of time because of busy schedules. Most of the participating families had young children, and their lifestyle made it hard for them to plan, organize, and even perform the tasks involved in the behaviours they had chosen. The following are excerpts from the supporting data.

“Sometimes it’s hard to find the time to do as we would like. We do a lot of driving to take the children to their various activities. We’d like to carpool, but it takes time to plan.”

“I’d really like to compost in my back yard but who has the time?”

THEMATIC CATEGORY 4: Environmental competencies that support greener habits

In studying the data from all 18 participating families, we observed the following environmental competencies: desire to acquire environmental knowledge, cooperation, organizational skills, green citizenship, planning, and open-mindedness. We noticed that the families that already had sustainable lifestyles and those that managed to incorporate new earth-friendly behaviours into their daily routine were already using several of those competencies. We also noticed that the ability to plan (and organize), the desire to acquire new environmental knowledge (linked to open-mindedness), and green citizenship were the most commonly occurring key environmental competencies. We think that the competencies observed constitute an important factor in the process of incorporating sustainable lifestyles into families and other contexts of change. Table 5 shows the competencies found in our analysis, supported by excerpts from interviews.

Table 5: Environmental competencies put into practice by the families

Environmental competencies (emergent themes)	# of families /18 per competency observed	Excerpt from data supporting the theme
Desire for environmental knowledge	12	<ul style="list-style-type: none"> - <i>We already knew a lot about the environment, but we'd still like to find out more... to make better choices.</i> - <i>We should look to older people ... they could teach us a thing or two about earth-friendly behaviour!</i>
Planning	10	<ul style="list-style-type: none"> - <i>If we took the time to plan... we'd make fewer trips in the car.</i> - <i>We could incorporate greener behaviour into our routines if we would take the time to plan.</i>
Green citizenship	8	<ul style="list-style-type: none"> - <i>We must become more involved in local politics in order to push for change for the good of the planet.</i> - <i>It's everyone's responsibility to try to behave in an environmentally respectful manner.</i>
Organizational skills	7	<ul style="list-style-type: none"> - <i>Recycling is easy for us. Everything is well organized... each type of container has its place... it's effortless!</i> - <i>Planning is one thing, but knowing how to be organized means that the plan will work better.</i>
Open-mindedness	6	<ul style="list-style-type: none"> - <i>Vermicomposting, for me, worked very well... and the children loved it!</i>

Cooperation	6	<ul style="list-style-type: none"> - <i>Participating in this project was a wonderful opportunity for us to share and learn with other families interested in changing... we would have liked to do more with them.</i> - <i>We help each other in our family by reminding one another to act for the environment.</i>
Simplicity of lifestyle	5	<ul style="list-style-type: none"> - <i>We can have fun as a family without consuming.</i> - <i>Keeping things simple brings us closer to the environment.</i>
Adaptability	3	<ul style="list-style-type: none"> - <i>The climate is changing... we have to adapt!</i>
Systemic thinking	3	<ul style="list-style-type: none"> - <i>When we have a better understanding of how nature works, we can plan our actions better and have a positive impact.</i>

THEMATIC CATEGORY 5: Biospheric values associated with adopting greener habits

During the interviews, we asked the families two general questions about the process of change they experienced during the Eco-Challenge project. One of the conceptual constructs brought out by the analysis of these questions is related to the importance of common values. In fact, we noticed that the families that seemed to be the most successful in adopting new green behaviours shared biospheric values, i.e. altruistic and green. Table 6 shows the values found in our analysis.

Table 6: Values of families that successfully adopted green actions

Values (themes that emerged)	# of families /18 per value observed	Excerpts from data supporting the theme
Respect others and the environment	12	<ul style="list-style-type: none"> - <i>We live our lives respecting others. It's a value we want to give our children.</i> - <i>Respecting others is one thing but we must also respect nature and act in such a way as not to pollute.</i>
Think about future generations	12	<ul style="list-style-type: none"> - <i>When you've had children, it's as though everything has changed. You make better choices to leave them a healthy planet.</i>
Appreciate nature	10	<ul style="list-style-type: none"> - <i>It was important for us to settle in a natural environment far away from the pollution and noise of the city.</i>

Living as a family	10	- <i>The family is very important to us... spending as much time as possible together.</i>
Healthy living	8	- <i>We value our health and we live healthily in our choice of foods and cleaning products, for example.</i>

THEMATIC CATEGORY 6: Incentives that motivated change initially

Finally, a few families said that incentives played an important role in their decision to pursue some more complex green actions, such as acquiring a heat pump or the installation of more energy-efficient windows. These families specified that receiving an immediate return on their investment motivated them to consider such actions. The following excerpt illustrates that point.

“For young families starting out, with student loans and other things, it is hard to find the cash to renovate in order to save energy [windows, insulation, heat pump...]. Maybe if the government would rethink the compensation formula for such projects, there would be a way of implementing them without having to spend a lot of money in advance that many people simply don’t have.”

Others brought up the fact that they are more motivated to change when they see savings related to their green actions, even if the savings are relatively small (for example, money saved on gas when the car is used less; money saved on the electricity bill by reducing hot water consumption in the house). The following two excerpts serve to illustrate that particular point.

“Saving energy is not as hard as we thought... and the money saved motivates us to keep up our conservation activities.”

CONCLUSION AND RECOMMENDATIONS

To begin, we want to emphasize the importance of government initiatives such as the Family Eco-Challenge. As discussed in the section on theoretical considerations, several studies show that people want to act more sustainably (Whitmarsh and O’Neill, 2011). Our own research (see Léger & Pruneau, 2011, 2012) shows that the family is a relatively new and fertile context for change in the field of sustainable development education, especially in Canada. We believe that governments at all levels would be advised to target the family context more in developing climate change education programs in the future, and that this would be a practical way of promoting green action on a community basis.

As indicated by our results in this study, participating families raised two main challenges related to their experience of adopting new green behaviours. First, it seems hard to change comfortable habits to more sustainable and often less practical actions. For example, many people choose to idle their car on winter mornings instead of scraping the frost off their windshield before starting the car. That observation was mentioned by other authors in the scientific literature, such as Maiteny (2002).

The second challenge was the lack of time they had to incorporate new green actions. Blake (1999) raised this same constraint in his explanatory model of moving from intention to environmental action. However, just like Kollmuss and Agyeman (2002), we find that Blake does not take certain psychological factors into account that could explain what "lack of time" means, especially the pressure associated with an often busy family life. Furthermore, with respect to the ability to overcome such constraints, we believe it would be better to try to develop "action competence" (Jenson and Schnack, 1997) within the family that aspires to a more sustainable lifestyle, rather than a linear causality approach between the intention to change and concrete action (see Ajzen, 1991). Finally, with regard to challenges related to behavioural change in a family context, we make the following two recommendations:

Recommendations related to the challenges of changing:

- 1) Before attempting more difficult sustainable actions such as composting, a family should try integrating easier actions like recycling or water conservation, in order to increase the chances of these new actions becoming collective habits and therefore set the stage for a progressively *greener* family lifestyle.
- 2) Conduct further scientific research on the development of action competence in the context of family in order to better understand the constraints involved in adopting environmental actions as a family.

Beyond the challenges raised by families, we also noted that the families interviewed showed various environmental competencies identified in the scientific writings. Notably, we observed a desire to acquire environmental knowledge (Hungerford and Volk, 1991) and cooperation between family members, organizational skills, and green citizenship (Pruneau et al., 2006; Léger & Pruneau, 2011, 2012). In addition to these competencies, the participating families also demonstrated planning and open-mindedness, two conceptual constructs cited in the most recent scientific writings. Finally, the following themes that emerged were also noted: systemic thinking, adaptability, and simplicity of lifestyle. We suggest that these last three constructs represent new key competencies to environmental action that would merit further study.

In short, we believe that practicing competencies such as those mentioned in this report contribute to what Prochaska et al. (1992) call the "maintenance stage" of a new behaviour attempted. Above all, as mentioned previously, we adhere to the vision of Jenson and Schnack (1997), who advocate the development of an action competence related to environmental behaviour. We believe that the incorporation of key competencies, such as the ones we observed in the Eco-Challenge families, leads to the development of a collective action competence in the family context. Lastly, with respect to environmental competency, we make the following four recommendations:

Recommendations related to action competence:

- 1) Promote the development of key environmental competencies in a family seeking to adopt sustainable lifestyles in order to cultivate a collective action competence.

- 2) Develop initiatives similar to the Family Eco-Challenge but focused on the incorporation of key organizational environmental competencies such as planning, organizational skills, and systemic thinking.
- 3) Develop and implement initiatives for the promotion of green citizenship, focusing on collective biospheric values within the family, through community education initiatives based on the Wenger's (1998) principles of community of practice.
- 4) Conduct further research on the role of key environmental competencies in developing a collective family action competence in order to better understand the process of adopting environmental behaviours in a family context.

Final conclusions: Lessons learned

In light of our findings, we believe that families looking to adopt a more eco-sustainable lifestyle may have better success if they foster common biospheric values, develop key competencies in the face of challenges such as time constraints, and form support networks with other families also looking to change. Finally, from an EE standpoint, we believe that an educational program which considers these very points and aims to bring school and family together could foster collective action competence at the family level and, ultimately, environmental action at the community level. We conclude the present article by offering four practical suggestions for building such a program:

- 1) begin by allowing participants (students and their families) to express their values and establish realistic personal and collective goals;
- 2) promote the school as a meeting place, allowing families to interact with each other in the context of an on-site school project where children could take on a leadership role in applying classroom knowledge;
- 3) foresee opportunities for vicarious learning (Bandura, 1969) by allowing families to meet with families already living eco-sustainably, thus encouraging the development of certain competencies such as openness to change, perseverance, self-efficacy and the ability to plan;
- 4) incorporate opportunities for families to gather, whether through organized meetings (e.g. a climate action club...) or via social networking sites, thus facilitating the sharing of knowledge, success strategies and acquired key competencies associated with action competence, ultimately contributing to active *Communities of practice* (Wenger, 1998).

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