Unpacking the Black Box: A Deconstruction of the Programming Approach and Physical Activity Interventions Implemented in the Kahnawake Schools Diabetes Prevention Project

Lucie Lévesque, PhD
Gisèle Guilbault, RN, MSc
Treena Delormier, MSc, Pdt
Louise Potvin, PhD

An ecological lens was used to deconstruct the programming approach and unpack physical activity interventions implemented through the Kahnawake Schools Diabetes Prevention Project. Despite a surge of interest in ecologically based health promotion programming, optimal combinations of interventions and programming approaches to promote community physical activity involvement have not been systematically studied. The authors obtained physical activity intervention descriptions through archive retrieval and face-to-face interviews with intervention staff. Programming approach, intervention targets, strategies for change, and delivery settings were assessed by applying the intervention analysis procedure to intervention descriptions. A complex intervention package was found containing a host of multitarget, multisetting intervention strategies designed and implemented through dynamic exchanges between a diversity of community partners. This study provides a first step toward better understanding community intervention packages and programming strategies for promoting physical activity involvement within a community setting.

Keywords: intervention analysis; implementation; physical activity; community based; ecological approach; health promotion.

Ecologically based community interventions that encompass a wide range of activities in a variety of settings offer a strong potential for promoting physical activity involvement in populations (Booth et al., 2001; King et al., 1995; Orleans, 2000; Powell, Kreuter, Stephens, Marti, & Heinemann, 1991; Sallis & Owen, 1997, 1999). Programs that integrate school-based and community-based interventions to promote healthy lifestyles can also benefit schools, community organizations, families, and students by optimizing community resources through cooperative programming (Killip, Lovick, Goldman, & Allenworth, 1987). Exchanges of community resources that tap into local educational, medical, social, and lay expertise to address a community health issue may take different forms (Killip et al., 1987). Be they formal or informal, unidirectional or multidirectional, collaborative partnerships between community entities are coherent with an ecological perspective that stipulates a multilevel, multidisciplinary approach to health promotion programming (Roussos & Fawcett, 2000). Optimal combinations of interventions and programming approaches that rely on an ecological approach to promoting physical activity opportunities within a community setting have not been systematically studied. In a first step toward this endeavor, the current study examined the physical activity interventions and the programming approaches implemented between 1996 and 1997 in the Kahnawake Schools Diabetes Prevention Project (KSDPP) through an ecological lens.

Authors’ Note: This research was funded by the National Health Research and Development Program from Health Canada (6605-4188-ND and 6605-4187-ND). Lucie Lévesque was funded by an MRC Fellowship (9804HSN-1018-57385) and Louise Potvin by an MRC Scientist Award (H3-17299-AP007270). We wish to thank Kahnawake Schools Diabetes Prevention Project Community Advisory Board members for their insightful comments in the preparation of this article. We are also grateful to Lucie Richard from the School of Nursing, Université de Montréal and Margaret Cargo, from the Department of Social and Preventive Medicine, Université de Montréal, for their review of this article. Correspondence concerning this article should be directed to Lucie Lévesque, School of Physical and Health Education, Queens University, Kingston (Ontario) Canada, K7L 3N6; e-mail: levesqul@post.queensu.ca.
BACKGROUND

An Ecological Approach to Promoting Health Behaviors

Health promoters are increasingly being encouraged to adopt an ecological approach to their intervention planning and implementation (Grzywacz & Fuqua, 2000). An ecological approach acknowledges the complexity of interrelations between humans, their health, and their environment and is characterized by a multidimensional, multilevel, interactional, and interdependent view of the etiology of community health (Green, Richard, & Potvin, 1996; Grzywacz & Fuqua, 2000, Stokols, 1992a, 1992b). Proponents of an ecological perspective contend that enduring improvements in health can be attained best through the implementation of multidisciplinary and multilevel interventions (Green & Kreuter, 1991; Stokols, Pelletier, & Fielding, 1996).

Given their comprehensive perspective, ecological models are very complex in theory and in practice (Green et al., 1996). In an effort to formulate useful working definitions of ecological concepts within the context of health promotion, conceptual models of the ecological approach have been proposed (Green & Kreuter, 1991; McLeroy, Bibeau, Steckler, & Glanz, 1988; Richard, Potvin, Kishchuk, Prlic, & Green, 1996; Simons-Morton, Simons-Morton, Parcel, & Bunker, 1988). These models present a practical framework for health promotion practitioners interested in ecological programming by providing detailed descriptions of program integration of ecological principles. The formulation presented by Richard and colleagues (1996) is of particular interest as it provides a well-organized integration of concepts underlying an ecological approach and an accompanying tool for intervention analysis.

Adopting a systemic view of health promotion programs (Miller, 1978), which considers health promotion programs as part of one’s environment, Richard and colleagues (1996) proposed that it is important to consider the settings in which interventions are implemented and the targets designated for change to fully understand the ecological character of a health promotion program. In this view, an ecological program is one that integrates multistack and multisetting interventions. Briefly, according to Richard and colleagues’ (1996) formulation, the setting of a given intervention is defined as the social system in which persons designated for change are reached. Health promotion programs may be located in any one of the following settings: organizations, communities, societies, or supranational systems. Targets are defined as those persons or entities designated for change. These include individuals, small groups of persons/social networks, organizations, communities, and political systems (McLeroy et al., 1988). The intervention strategy represents the specific sequencing of one or more targets joined either in a direct transformation relationship or in a networking relationship (cf. American Journal of Health Promotion 1996, 10, 318-328 for a detailed description of the model).

 Collaborative partnerships, defined as people and organizations from numerous sectors working together toward a common goal, are an example of a prevalent networking strategy in community health promotion (Roussos & Fawcett, 2000). When the common goal is to improve health-related conditions and outcomes in a given community, these partnerships often involve community members and/or others who share a common experience related to the health goal (e.g., preventing diabetes). Such partnerships may take various shapes and occur during diverse phases of programming (i.e., planning or implementation). Partnerships can take the form of community coalitions (Rowe, 1997), interagency alliances (Bloxham, 1996; Polivka, Dresbach, Heimlich, & Elliott, 2001), and more informal grassroots cooperatives and advocacy groups (Kass & Freudenberg, 1997) that include aspects of both or either top-down (i.e., professional-led social planning) and bottom-up (i.e., grassroots community driven) strategies (Fawcett, Paine-Andrews, Francisco, & Vliet, 1993; Green & Kreuter, 1991; Kreuter, 1992). With an emphasis on multisectoral collaboration, environmental change, and community-wide improvement, collaborative partnerships to enhance the health and well-being of an entire population are highly compatible with an ecological approach.

Despite an increase in interest for ecologically based intervention programming to promoting physical activity involvement, community intervention packages have not been systematically studied, and effective programming strategies for promoting physical activity involvement within a community setting remain unknown (Booth et al., 2001; Sallis & Owen, 1999). The principal aims of the current study were (a) to deconstruct the programming approach (i.e., identify players involved in planning and implementation) and (b) to unpack the physical activity interventions implemented in 1996 and 1997 in the KSDPP.

The Authors

Lucie Lévesque, PhD, is an assistant professor at the School of Physical and Health Education at Queen’s University, Kingston, Ontario, Canada.

Gisèle Guillault, RN, MSc, is a program coordinator for health promotion in education in the Lanaudière region in Quebec, Canada.

Treena Delormier, MSc, PDT, is a PhD candidate in health promotion at the Department of Social and Preventive Medicine at Université de Montréal in Quebec, Canada.

Louise Potvin, PhD, is a full professor at the Department of Social and Preventive Medicine at Université de Montréal, Montréal in Quebec, Canada.
Methods

Context

Kahnawake is a Kanien’kehá:ka (Mohawk) community of 7,200 people, located approximately 15 miles south of Montreal, Canada. The KSDPP is a current ongoing community-based participatory project to prevent type II diabetes. The KSDPP intervention started in 1994 through an alliance between the Kahnawake community and university researchers. KSDPP’s aims are to change the physical environment and social norms of the schools and community by promoting healthy eating and regular physical activity involvement among children, parents, teachers, and community members. As described elsewhere (Macaulay et al., 1997, 1998) the KSDPP intervention model combines elements from the Ottawa Charter for Health Promotion (World Health Organization, 1986), social learning theory (Bandura, 1986), and the PRECEDE-PROCEED model (Green & Kreuter, 1991) and incorporates traditional learning styles of Aboriginal children. This model is consistent with the ecological principle of using multilevel intervention strategies that target individual behavior, school curricula and policies, and family and community involvement in different settings within the community.

Data Collection

We chose to examine physical activity interventions implemented between September 1996 and June 1997, Year 3 of the KSDPP, because the intervention team had by then an established core of intervention activities and experience in implementing these within the Kahnawake community context. We then conducted an exhaustive inventory of all available documents (e.g., activity logs, research reports, meeting minutes, community newspaper, etc.) pertaining to physical activity intervention activities implemented during this period. This inventory served to establish a partially comprehensive chronologically ordered set of physical activity intervention descriptions. To complete intervention descriptions, semistructured interviews were conducted with the main KSDPP intervention worker and the KSDPP evaluation coordinator. The data collection yielded a total of 55 intervention activity descriptions.

Coding and Analysis

We used an analytical procedure, hereafter referred to as the intervention analysis procedure (IAP), to unpack from each KSDPP intervention activity description the intervention setting, target(s), strategy(ies) and programming approach.1 The IAP is a systematic tool useful for describing the degree of integration of the ecological perspective in health promotion programs. It presents a protocol for coding intervention descriptions based on Richard and colleagues’s (1996) operationalization of concepts first put forth by McLeroy et al. (1988) and by Simons-Morton et al. (1988). The IAP was derived through numerous iterations of the steps necessary to extract all the components of a health promotion program from archival data (Lévesque, Richard, Duplantie, et al., 2000). The procedure provides operational definitions and specifies coding criteria for identifying the intervention setting, target(s), strategy(ies) and programming approach from each intervention activity description. For example, the intervention setting is defined as the social system(s) in which persons/entities designated for change are reached. Drawing on Miller’s (1978) hierarchical organization of living systems, four types of settings are possible according to this scheme: organization (ORG), defined as entities characterized by a formal hierarchy (e.g., schools); community (COM), defined as persons and/or organizations within a designated geographical area (e.g., neighborhoods); society (SOC) defined as larger systems that exert control over those located in their constituencies (e.g., states); and supranational (SUPRA) defined as the association of two or more societies (e.g., the United Nations). Targets refer to those persons or entities designated for health behavior change. Five types of targets are identified: individuals (IND), interpersonal environment (INT, e.g., friends, colleagues); organizations (ORG; e.g., school and/or school personnel, worksite and/or worksite employer); community (COM; e.g., members of a geographical grouping); and political entities (POL; politicians or policies).2 When an intervention strategy includes more than one target, a distinction is made between the proximal target(s) (i.e., intermediate entity[ies] designated for change), and the ultimate target that represents those persons who are the raison d’être of the intervention programming (i.e., those ultimately designated for change). Only one ultimate target is sought by all KSDPP interventions: the schoolchildren. Intervention strategies represent the specific sequencing of one or more targets that reflects the relationship or type of exchange that occurs between the intervention program and its targets. Two types of exchange are possible: in a direct transformation relationship resources and/or information (i.e., training, lobbying, environmental change) are directly transferred from the program team to the intended target. For example, a “get your family active” workshop offered by KSDPP for parents of schoolchildren would represent a direct transfer of skills and knowledge from KSDPP staff to parents who would use their new skills and knowledge to help their children be more physically active. This transfer of resources contrasts with a networking relationship that involves the linking of at least two targets by the program team. An example of this would be when KSDPP brings together organizations in a new collaboration (e.g., a coalition) to create a resource (e.g., build a community bike path) to benefit the ultimate target (i.e., schoolchildren in the community). Thus, the particular disposition of targets and the type of exchange between them defines the intervention...
strategy. Table 1 presents a nonexhaustive list of examples of intervention strategies involving the five targets of the model. The programming approach refers to the persons or entities involved in the planning and/or implementation of intervention activities (e.g., partnership between two organizations).

> RESULTS

Application of the analytical procedure to each of the 55 intervention activity descriptions yielded 47 interventions. Eight of the intervention activity descriptions were either incomplete, and thus precluded coding, or contained redundant information. Table 2 shows that, overall, 76.6% of interventions occurred in a community setting. Programming approaches for these interventions were split between KSDPP acting independently (i.e., 47.2% of interventions), and collaborative partnerships between KSDPP and other community entities (i.e., 52.8% of interventions). Of the 23.4% of interventions implemented in an organizational setting (i.e., schools), KSDPP most often acted independently, implementing 72.7% of interventions. All (i.e., 100%) interventions resulting from a KSDPP→Partner collaboration, and 80% of interventions resulting from a Partner→KSDPP collaboration were used to intervene in a community setting. Of the 25 interventions implemented by KSDPP alone, 68% took place in a community setting. Regardless of setting, KSDPP implemented most of the interventions independently (i.e., 53.2% of interventions). Of the 46.8% of interventions implemented through collaboration, 68.2% were the result of KSDPP teaming up with an existing activity (e.g., annual community walk) whereas the remaining 31.8% were the result of KSDPP seeking a partner.

The analysis also enabled us to pinpoint the breadth and variability of intervention strategies implemented. Table 3 shows that at least 10 different types of intervention strategies for promoting physical activity were inventoried overall. Interpersonal environments emerged as the most frequent proximal target (i.e., 46.8%) of interventions, whereas 17% and 9% of intervention activities directly targeted individuals and organizations, respectively. Of all the interventions directed at interpersonal environments, results show that 54.5% were implemented by KSDPP independently, 36.4% were implemented by a collaborative partnership in which KSDPP was invited to join the efforts of another community entity, and 9.1% were implemented by a collaborative partnership with another community entity, initiated by KSDPP. Of all interventions directly targeting individuals, results show that 50% were implemented by KSDPP independently, 37.5% were implemented by a collaborative partnership in which KSDPP was invited to join the efforts of another community entity, and 12.5% were initiated by KSDPP in a collaborative partnership with another community entity. An examination of the transformation relationships (i.e., type of exchange of resources and or information) shows that, overall, a direct transfer of resources to the intended target was sought through 78.7% of interventions. Of these, interpersonal environments were targeted 59.5% of the time. Of the 21.3% interventions that aimed to network two or more targets, 50% of these aimed to link organizations together and 40% aimed to link Kahnawake with another community. When considering the programming approach, results show that when KSDPP acted alone to plan and implement physical activity interventions, proximal intervention targets were 48% interpersonal environments, 16% individuals, and 12% organizations. Collaborative partnerships in which organizations sought the involvement of KSDPP most often targeted the interpersonal environment (53.3% of interventions), and individuals (20% of interventions). When KSDPP partnered with other community entities, 28.6% of interventions were aimed at the interpersonal environment. 28.6% of interventions aimed to network organizations, and 14.3% targeted individuals.

> DISCUSSION

Optimal combinations of interventions and programming approaches that rely on an ecological approach to promoting physical activity opportunities within a community setting have not been systematically studied. In a first step toward this endeavor, the principal aim of the current study was to examine through an ecological lens the physical activity interventions and programming approaches implemented between 1996 and 1997 in the KSDPP.

Deconstructing the Programming Approach

Overall, our findings reveal that the majority of KSDPP-sponsored physical activity interventions were implemented in a community setting. At first glance, these results may appear surprising given that the KSDPP is, by appellation and by origin, a school-based program. However, this finding reflects the theoretical and cultural underpinnings (Delormier et al., 2003) of the KSDPP model of an integrated ecological approach to diabetes prevention. This model recognizes that the adoption of health-promoting behaviors can be enhanced if consistent messages are provided in multiple settings (e.g., school, home, community) through multiple sources (e.g., teachers, parents, media) that learning is not limited to the classroom, and that schools do not operate in isolation from the community but rather offer support to and are supported by the community (Killip et al., 1987). That schools are high-lighted in the KSDPP project name is not a contradiction but rather a testimony to the KSDPP commitment to facilitating the adoption of health-enhancing behaviors in Kahnawake schoolchildren. Moreover, all interventions occurring in an organizational setting took place in the schools where KSDPP mostly intervened alone. It

Lévesque et al. / PROGRAMMING APPROACHES AND INTERVENTIONS 67
should be noted, however, that teachers were very much involved in supporting KSDPP intervention activities. Teacher involvement is evidenced by strategies that identify them as an intermediate target whereby efforts were made to enhance their physical activity so that they might serve as role models for their students. This finding also suggests that the principles of an ecological approach were respected.

We found that just more than one half of the interventions carried out in a community setting were planned and implemented in collaboration with other community entities. Although exchanges between KSDPP and a same partner might recur, our findings indicate that partnerships were usually organized around a specific intervention, were mostly informal, minimally structured, and of limited duration. By coming together under the umbrella of a same community event, partners created opportunities to optimize community resources. For example, partners could each benefit from the same media advertising for an event, both gaining visibility. This repeated informal networking allows partners to share responsibilities and support each other’s efforts. Most important, such exchanges are seed and fruit of broad community engagement whereby conditions are created that, in Roussos & Fawcett’s (2000) view, contribute to promoting and sustaining healthy behaviors in all Kahnawake community members.

More interesting, we found that more than two thirds of collaborations occurred in response to invitations received by KSDPP from other community entities. This proportion is likely to increase as KSDPP continues to expand and gain recognition as a community institution in Kahnawake (Potvin, Cargo, McComber, Delormier, & Macaulay, 2003). KSDPP’s visibility in and acceptance by the community suggests that it is perceived as an accessible community resource for health promotion.

### Unpacking Interventions

The most noteworthy result of the intervention analysis is that a total of 10 different strategies were used to implement 47 interventions. An oft-cited criticism of health promotion implementation has been the tendency for professionals to target intrapersonal determinants of health rather than unhealthy aspects of per-
Further examination of the intervention strategies implemented through KSDPP reveals that interpersonal environments were most frequently targeted for change. Interventions sought to encourage family and parents of schoolchildren to make changes in their home environments, and family and personal practices. This evidence is highly compatible with an ecological approach that strives to reach beyond the individual to create an environment supportive of sustained health behavior change (Stokols, 1996).

Finally, most inventoried interventions were characterized by a direct transformation relationship. Attempts to network individuals and/or organizations were limited. A possible explanation for this finding may be the important number of collaborative partnerships established for KSDPP program implementation. Preliminary work has outlined a program intervention cycle in which the involvement of many individuals and groups from various sectors in the community occurs in a phase preceding intervention implementation (Delormier et al., 2003). The dynamic exchanges occurring in the planning of interventions provides evidence of community networking and are indicative of the “ecologicalness” of KSDPP programming.

CONCLUSION

Although some interesting observations were generated by the current study, some cautions should be taken for generalizing our findings. First, as an Aboriginal community, Kahnawake is typically close knit, and its culture of sharing responsibilities is germane to the development of a strong collaborative network. On the other hand, Kahnawake distinguishes itself from other eastern Canadian Aboriginal communities by its proximity to a neighboring metropolis replete with resources. For example, people from Kahnawake have access to several colleges and universities, and although this may be an asset from an intervention and a research perspective, it also translates into limited representativeness for generalizing research results to other Canadian Aboriginal communities. In addition, finally, we acknowledge that the analytical procedure for assessing the integration of the ecological approach in health promotion programming is a complex instrument that requires some training to use. However, intervention packages are rarely simple, and a less sophisticated tool to capture the complexity of a multilayered health promotion program has yet to be developed. Furthermore, we recognize that our analysis reflects a linear construction of KSDPP programming. More research is needed to expand the IAP’s usefulness in exploring the reciprocity between program outputs (i.e., what is delivered by the health promotion team) and the transformation of program resources by the social system that interacts with these resources. How intervention activities are received, transformed, and then fed back into the program affects the development of future intervention planning and implementation. Current work on the IAP seeks to map this reciprocity.

IMPLICATIONS AND RECOMMENDATIONS

Along with recent published work that has featured our intervention analysis procedure (Gauvin, Lévesque, & Richard, 2001; Lévesque, Richard, Duplantie, et al., 2000; Lévesque, Richard, & Potvin, 2000; Richard, Gauvin, Potvin, Denis, & Kishchuk, 2002), the current
study provides a first step toward responding to the need to better understand community intervention packages and programming strategies for promoting physical activity involvement within a community setting. These findings highlight the usefulness of the analytical procedure for unpacking interventions and deconstructing the programming approach of a health promotion package along ecological dimensions. Given that the analytical procedure is applied at the activity level, it allows us to identify where (i.e., setting), for whom (i.e., target), by whom (i.e., programming approach), and how (i.e., intervention strategy) an intervention activity is delivered.

This information could potentially be linked with intervention effects through the bridge of formative evaluation on complementary features of activity implementation not captured by the IAP. Multilevel information collected on individual participation rates and profiles (e.g., number of activities attended), activity content (e.g., activity reinforces behavior change, teaches skills, changes physical environment), community-level adoption (e.g., number of organizations involved), and implementation quality (e.g., extent to which activities were implemented as planned) could be used to establish individuals’ level of exposure to and participation in the overall program of activities. The degree of individual-level exposure could subsequently be compared to selected outcome indicators (e.g., individual knowledge, skills, behavior). Unpacking the program with the IAP thus has the potential to determine which type of intervention strategies are most effective for a given target group in a specific setting. This type of information can be advantageous for program planners striving to integrate an ecological approach into their programming by mapping the multiple targets and settings for intervention activities and by outlining different forms of collaborative partnerships conducive to community-wide implementation. Future work needs to focus on making the links between intervention analysis and intervention effectiveness as measured by community-wide behavior change and population-level health outcomes.

NOTES

1. The IAP was developed through a collaboration between the coauthors of Lévesque, Richard, Duplantie, et al. (2000) including Lucie Richard, who, with her colleagues (1996) first articulated a way to assess the integration of the ecological approach within health promotion programs. The IAP is currently being used by researchers from the Groupe de Recherche Interdisciplinaire en Santé from the Université de Montréal, Canada, and can be obtained from the first author.

2. Political Players/Systems (POL) is used in compliance with IAP terminology but is not a preferred term by some KSDPP members.

REFERENCES


