



Testing the theory of holism: A study of family systems and adolescent health

Valerie Michaelson^{a,b}, William Pickett^{a,*}, Nathan King^a, Colleen Davison^{a,c}

^a Department of Public Health Sciences, Queen's University, Canada

^b School of Religion, Queen's University, Canada

^c Department of Emergency Medicine, Queen's University, Canada

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ABSTRACT

Holism is an ancient theory that can be applied contemporarily to adolescent health and its determinants. This theory suggests that there is value in considering factors that influence health together as integrated wholes, in addition to consideration of individual components. Characteristics of families are fundamental determinants of health and provide opportunity for exploration of this theory. In a “proof-of-concept” analysis we therefore: (1) developed a multidimensional, composite (holistic) measure to be used to characterize family systems; and (2) related this measure and its individual components to adolescent health outcomes, in order to test the theory of holism. Cross-sectional analyses of survey reports from the 2014 Canadian Health Behaviour in School-aged Children study (weighted $n = 19,333$) were performed. Factor analysis was used to confirm the psychometric properties of the holistic measure to describe a family system (the “holistic measure”). Associations between this holistic measure, its individual components, and various indicators of health were examined descriptively and using binomial regression. The holistic measure (4 items, $\alpha = 0.62$; RMSEA = .04; SRMR = 0.01; AGFI = 0.99) included components describing family: material wealth, meal practices, neighbourhood social capital, and social connections. It was consistently associated with various health behaviours, and social and emotional health outcomes. In 22/24 comparisons, this holistic measure related to positive health outcomes more strongly than did its individual components; for negative health outcomes this occurred in 20/24 comparisons. Study findings suggest that it is possible to assess family systems holistically. Such systems are strongly associated with adolescent health outcomes, and there is etiological and theoretical value in considering family systems as integrated wholes.

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1. Introduction

Holism is a theoretical concept with ancient roots that has re-emerged during recent years (Smuts, 1926/1961). By definition, this theory suggests that *organic or unified ‘wholes’ have value and being which is inherently different from, and cannot be reduced to, the sum of their individual parts* (Christakis, 2012). This implies that complex systems cannot be fully understood by only understanding the individual components (Stempsey, 2001). While reductionist approaches have value, holism suggests that new properties emerge with the whole that are not present in the individual parts. This thinking is common to many longstanding philosophies related to ancient cultures (Svenson & Lafontaine, 1999; Strong, 2005), and it has the potential to provide new insights that can inform etiological and preventive research.

Family characteristics provide some of the most consistent influences on the health of young people. Families represent the first point of contact between children and the larger world. For most, they provide basic essentials of life and an environment that fosters early childhood development (Bronfenbrenner, 1986). Families offer early elements of community and provide formative influences on physical

development, cognition, knowledge, socialization, attitudes, behaviours, and beliefs. Families prepare children, or not, for the demands of wider social contexts and challenges in life. Aspects of family environments are modifiable as one strategic approach to prevention (Lewis et al., 1976), a fact recognized for decades in such initiatives as the “family movement” that, amongst other goals, attempted to foster positive life trajectories in children and adolescents (Bowen, 1966).

In a theoretical sense, families also provide an ideal context for exploring the theory of holism methodologically. All families are different, and each will have a number of individual components that come together in a unique system that can be measured in composite or holistically. Both the components and the resultant family systems will influence the health of young people; however, what remains unknown is whether family systems as viewed holistically will have influences on health that differ from those of their individual components. Many of the etiological studies in this field focus on the effects of individual dimensions of family behaviours or dynamics (Stadler et al., 2010; Wilkinson, 2004). In part this is for practical reasons: categorizing behaviours into individual parts allows for specific intervention, and most validated modes of measurement are also based on such a reductionist approach. However, holism suggests that there are

emergent properties that can be best understood by measuring the whole system.

In this study, we modeled the potential effects of family characteristics, both individually and collectively, on the health of young Canadians in order to: (1) develop a multidimensional, composite (holistic) measure to be used to characterize a family system; (2) relate this measure and its individual components to adolescent health outcomes, in order to test the theory of holism in a *proof-of-concept* analysis. Our primary intention was methodological, and was not to develop and promote a definitive model of what would be included in a holistic family system, but rather to explore this concept using available population health data. Our hope was that study findings would also provide practical insights for preventive research and associated etiological thinking.

2. Methods

2.1. Study populations and procedures

Health Behaviour in School-aged Children (HBSC), a cross-national study affiliated with the World Health Organization, aims to increase understanding of health and its determinants in populations of young people (Currie et al., 2011; Freeman et al., 2011). It involves written health surveys conducted with students in classroom settings with a focus on the early adolescent years. Nationally in Canada, Cycle 7 of the HBSC was conducted in 2013–14. The Canadian sample was stratified by province/territory, type of school board (public vs. separate), urban-rural geographic status, school population size, and language of instruction (French or English) with standardized population weights generated to ensure representativeness. Inclusion criteria for the current analysis were: (1) participation in the 2013–14 survey; (2) valid responses to all core HBSC items required for the present analysis. Children from private schools, home school situations, First Nation or Inuit reserves, street youth not in school, incarcerated youth, and youth not providing informed consent (explicit or implicit, as per local school board customs) were excluded.

2.2. Measures

2.2.1. Family systems

We developed our holistic measure to describe a family system for our “*proof-of-concept*” analysis. This was guided in part by socio-ecological theory as it relates to adolescent development. According to this theory first espoused by Urie Bronfenbrenner (Bronfenbrenner, 1986; Bronfenbrenner & Morris 1998), in addition to factors that are associated with the individual (e.g., personal demographics, health status, etc.), adolescent development is impacted by contextual factors in five nested environmental systems: the microsystem (family, peers, school, neighbourhood, church, etc.); mesosystem (relationships between microsystems); exosystem (environmental factors that originate beyond the immediate realm of the individual); macrosystem (cultural attitudes and ideologies), and the chronosystem (socio-historical conditions or patterns of events and transitions over a life course). Therefore, adolescents exist within the family microsystem that is in turn embedded in these other layers of influence. In order to be considered for inclusion in our holistic measure, the indicators considered had to belong to at least one of these nested social systems.

The measures were also required to be continuous or semi-continuous variables, which limited our list to 11 available HBSC items (Table 1). Here we describe in detail the origins and psychometric properties for the four items and scales that were ultimately included in the holistic measure (Fig. 1); the remaining items listed in Table 1 are described elsewhere (Freeman et al., 2011). The four domains that were included are: frequency of family meals, a family support scale, a neighbourhood social capital scale, and an indicator of relative material wealth.

Frequency of family meals (an activity within the microsystem ring of the socio-ecological model), a standard indicator of parenting and associated family practices that constitute one component of a family system, was indicated via a combined measure ($\alpha = 0.59$) consisting of responses to two items: (1) “how often do you have breakfast together with your mother or father (or other adult family member)”; (2) “how often do you have an evening meal together with your mother or father (or other adult family member)” (6 response options: “never” through “every day”) (Elgar et al., 2012).

The family support scale (also activities within the microsystem) ($\alpha = 0.90$), a standard indicator of social climate within families, consisted of the summed responses to four items: (1) “my family really

Table 1
Derivation of a holistic measure to describe family systems according to the theory of holism. Results reflect the findings of an exploratory then confirmatory factor analysis conducted with split half samples. Analysis limited to variables available in the 2014 Canadian Health Behaviour in School-aged Children Study.

Measure or scale			Factor loadings ^a	
	Available in HBSC	Included in composite scale	Split Sample 1 Exploratory (n = 9666)	Split sample 2 Confirmatory (n = 9667)
Relative material wealth scale	X	X	0.41	0.40
Frequency of breakfast consumption ^c	X	...	–	–
Frequency of family meals (breakfast and dinners)	X	X	0.50	0.49
Number of people in primary home ^c	X	–	–	–
Relative family wealth (FAS) ^c	X	–	–	–
Ease of communication within family ^c	X	–	–	–
Family support scale	X	X	0.75	0.76
Frequency of screen time on weekdays ^d	X	–	–	–
Social capital in family neighbourhood social capital	X	X	0.49	0.51
Parental trust and communication scale ^c	X	–	–	–
Home climate scale ^c	X	–	–	–
Eigenvalues ^a			2.16	2.24
Cronbach's Alpha (Standardized) ^a			0.61	0.62
Confirmatory Factor Analysis ^b : RMSEA			–	0.04 (0.02, 0.06)
Confirmatory Factor Analysis ^b : SRMR			–	0.01
Confirmatory Factor Analysis ^b : AGFI			–	0.99

^a Exploratory factor analysis using maximum likelihood estimation.

^b Eliminated from holistic measure due to high correlation with similar paired item that was included.

^c Eliminated from holistic measure due to low factor loadings (<0.30).

^d Confirmatory factor analysis using maximum likelihood estimation.

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