

TITLE PAGE

TITLE

Leisure participation-preference congruence of children with cerebral palsy in Canada and Australia: A CAPE International Network descriptive study.

AUTHORS

Imms C^{1,2,7}, King G^{3,4}, Majnemer A⁵, Avery, L.³, Chiarello L⁶, Palisano R,⁶ Orlin M⁶, Law M⁷,

AFFILIATIONS

¹ Centre for Disability and Development Research, Australian Catholic University, ²Murdoch Childrens Research Institute, Melbourne, VIC, AU; ³Bloorview Research Institute, Toronto, ON, CA; ⁴Occupational Science and Occupational Therapy, University of Toronto; ⁵ School of Physical and Occupational Therapy, McGill University, Montreal, QC, CA; ⁶Department of Physical Therapy and Rehabilitation Sciences, Drexel University, Philadelphia, PA, USA; ⁷ McMaster University, CanChild Centre for Childhood Disability Research, ON, CA

WORD COUNT: 3502

CORRESPONDING AUTHOR

Professor Christine Imms

School of Allied Health, Australian Catholic University, 17 Young Street, Fitzroy, Melbourne, VIC, Australia; E: Christine.imms@acu.edu.au T: 61 3 99533404

KEY WORDS

Leisure, activity participation, cerebral palsy, child,

ABSTRACT

Background: Knowledge of whether children with cerebral palsy (CP) are doing preferred leisure activities has important implications for families and rehabilitation professionals. We examined (a) participation-preference congruence; (b) regional differences in participation-preference congruence; and (c) predictors of whether children were participating in preferred activities.

Methods: The sample (n=236) included 148 boys and 88 girls, 10 to 13 years, living in Victoria (n=110), Ontario (n=80) or Quebec (n=46); GMFCS Level 1: 99(41.9%); Level II/III: 89(37.7%); Level IV/V: 48(20.3%). Participants completed the Children's Assessment of Participation and Enjoyment and Preferences for Activity of Children. Regional comparisons were performed using one way ANOVAs and exploration of factors influencing participation-preference congruence using multiple linear regression.

Results: Proportion of children Doing Non-Preferred activities in each Activity Type was generally low (2-17%); with only one regional difference. Higher proportions were Not Doing Preferred Active Physical (range: 23.2%-29.1% across regions), Skill-based (range: 21.7%-27.9% across regions) and Social activities (range: 12.8%-14.5% across regions). GMFCS level was the most important predictor associated with Not Doing Preferred activities.

Interpretation: Children with CP did not always participate in preferred Active Physical and Skill-based activities. Understanding discrepancies between preferences and actual involvement may allow families and rehabilitation professionals to address participation barriers.

SHORT TITLE

Participation-preference congruence

WHAT THIS PAPER ADDS

- Few regional differences in participation-preference congruence were evident.
- More participation in Active Physical and Skill-based activities was desired
- Greatest participation-preference discrepancy occurred at GMFCS Levels IV/V.

Cerebral palsy (CP) is a disorder of movement and posture that commonly leads to secondary impairments and activity limitations¹. As a consequence, children with CP may experience restricted participation^{2,3} due to physical, social, and attitudinal barriers, and this may lead to feelings of isolation from their peers and communities⁴. Because CP is a lifelong condition, self-management, health promotion, and prevention of secondary disability are important foci of families as well as health and educational professionals.

The World Health Organization defines participation as “involvement in a life situation.”⁵ p. 9 Leisure participation, the focus of this paper, is defined as involvement in activities for rest, recreation, enjoyment, and social and community engagement, undertaken both with others and on one’s own.

Preference can be defined simply as a greater liking for one alternative over another⁶ or more theoretically (in the pediatric rehabilitation context) as the “subjective elements of how people explain their participation.”⁷, p. 361 Preferences are both personal and cultural and are moderated by objective opportunities to participate⁷. Understanding preferences for leisure participation of children with disabilities, and the extent to which they are able to participate in preferred leisure pursuits, is important because preference-based participation promotes learning, knowledge of self and a sense of mastery.⁸ Prior research has also demonstrated that preferences are an important predictor of participation in leisure.⁹⁻¹¹ As leisure participation is reported to provide fulfilment, friendship and a sense of belonging it is also an important avenue for development of self-determination¹².

Few studies have investigated whether children with CP take part in their preferred leisure activities. Bult and colleagues¹³ found that children with disabilities participated in fewer recreation and leisure activities than children with typical development; however, both groups were not doing activities for which they expressed high preferences. The highest discrepancy scores, for both groups, were observed in the Active Physical and Skill-based activity types of the Children’s Assessment of Participation and Enjoyment (CAPE) and Preferences for Activity of Children (PAC). Discrepancies varied by age and gender for children without impairment but not for those with disabilities. Bult et al.¹³ also found that children with disabilities had lower preferences for Active Physical and Social activities compared to children without disability. This may reflect that people devalue what they are not good at,¹⁴ but remains an important finding as past participation experiences predict future preferences and motivations.^{8, 15}

The purpose of this study was to explore participation-preference congruence for children with CP living in three different regions: Ontario and Quebec (Canada) and Victoria (Australia). Our aim was to determine the extent to which these children do what they like, and like what they do, and to examine regional differences to determine whether varying community or cultural differences are apparent. Regional differences between Ontario, Quebec and Victoria were explored as homogeneity could not be assumed between regions in terms of recreational, health and educational services, because each are funded provincially in Canada, and both nationally and locally in Australia. The potential variation based on funding sources, language and cultural differences between Ontario and Quebec may influence service availability and/or opportunities and thus outcomes. In addition to investigating regional differences, we explored the influence of available child and family variables on whether children were participating in their preferred activities.

METHODS

Design

Secondary data analyses using de-identified data aggregated from three descriptive studies was undertaken to meet the study aims. Our research questions were:

1. To what extent are children taking part in their most preferred activities?
2. To what extent are children taking part in their least preferred activities?
3. Is there evidence of regional difference in participation-preference congruence?
4. To what extent are child and family variables associated with participation-preference congruence scores?

Ethics

Each study that contributed data to this study had ethical approval for the conduct of the original study, including meeting the requirements related to consent, as well as for the conduct of the currently reported study (see Acknowledgements for details). As this study involved secondary data analyses, obtaining consent from the participants was not possible, therefore, only de-identified data were aggregated.

Participants

The combined dataset contained information from 236 children with CP aged 10-13 years from Victoria, Australia (n=110), Ontario, Canada (n=80) and Quebec, Canada (n=46). Eligible participants had completed both the *Children's Assessment of Participation and Enjoyment* (CAPE) and the *Preferences for Activity of Children* (PAC)¹⁶ (see Table 1). Recruitment procedures and eligibility for each study have been previously reported.³ Only children aged 10-13 years were included in this CAPE International Network study, as there were no Victorian children outside this age-range. No children from the US study sites were included as PAC data were not collected.

Measures

The CAPE and PAC are questionnaires, designed for children aged 6-21 years, asking about the activities undertaken over the previous 4 months. For each of 55 included activities, participants are asked if they do the activity (yes/no: measuring Diversity or range of activities done); the frequency of participation; where and with whom the activity is undertaken; and extent of enjoyment of the activity. For this study, only Diversity scores were used in the calculation of the participation-preference congruence scores. The PAC measures Preference by asking how much the child would like to do each of the 55 activities, given a choice: "If you could do anything in the world, would you like to be doing...." PAC scores range from 1 = I would not like to do at all; to 3 = I would really like to do.

In addition to CAPE and PAC scores, common variables in the datasets included child age, gender, Gross Motor Function Classification System (GMFCS) level¹⁷, family income, parental education and number of parents/caregivers. As previously described,³ for the Ontario dataset, which did not collect the GMFCS levels, a valid proxy variable was created based on items from the Activities Scale for Kids¹⁸. Family income and education was measured using five categories (based on annual household income and highest household educational attainment) corresponding to the Australian Economic Resources and Education and Occupation Indices¹⁹. In

this study two child (GMFCS and gender) and two family (income and parental education) variables were assessed for their influence on the participation-preference congruence scores. These variables were chosen because they were available in the combined data set and have previously been shown to be important predictors of participation²⁰.

Analyses

Descriptive statistics were computed for CAPE diversity scores and PAC scores for each of the five Activity Types. *Not doing preferred activities* was defined as items in which the CAPE Diversity score = 0 (did not do the activity) and the PAC Preference score = 3 (would really like to do the activity). *Doing Non Preferred activities* was defined as items in which the CAPE Diversity score = 1 (did do the activity) and the PAC Preference score = 1 (would not like to do at all). For each participant, the proportion of CAPE items that met the criteria *Not Doing Preferred Activities* and *Doing Non Preferred Activities* were computed for each Activity Type. A proportion of 0 indicates that there are no activities in the Activity Type that the child would like to do (PAC score 3) but is participating in them all; indicating *total congruence between participation and preference*. A proportion of 1 indicates that the child is not participating in any of the activities in the Activity Type but would like to do them all; indicating *total incongruence between participation and preference*.

Proportions of children in each region with participation incongruence – that is Not Doing Preferred, and Doing Non Preferred were calculated for each activity in CAPE's five Activity Types: Recreational, Active-Physical, Social, Self-Improvement and Skill-Based. Regional comparisons of incongruence were undertaken using analysis of variance (ANOVA). The role of child and family characteristics as determinants of a child-specific measure of participation-preference congruence were examined for the whole sample, using Activity Type congruence scores. Four predictors were considered: parental education, family income, GMFCS level and gender. As this was an exploratory study, all available variables were considered, none were specifically identified as potential confounders. Initially the effect of each predictor on the activity-preference congruence score was investigated (univariate analyses). Using a Bonferroni correction to account for multiple tests (5 Activity Types x 4 predictors) and with a global Type-I error rate of 5%, p -values < 0.0025 were used to identify differences in participation-preference congruence among groups. The interaction plots, along with the univariate analyses, guided the regression analyses that aimed to build models to determine whether, and how, the predictors affected participation-preference congruence. The most important predictor from the univariate analysis was the starting point and other predictors were added to the regression model if they were statistically significant (that is, p -value < 0.0025).

RESULTS

Not doing preferred activities

Figure 1, panel A displays the individual CAPE/PAC items grouped according to Activity Type and presents the proportions of children that were *not doing preferred activities*. These data show high variation with up to 50% of the participants indicating they were not doing Active Physical, Skill-based and Social activities they would prefer to be doing, and up to 25% of participants not doing Self-improvement activities they preferred. Fewest discrepancies were observed in the Recreational Activity Type.

The pattern of responses across the regions was very similar: there was no evidence of a difference between the regions in the proportion of children indicating they were not doing activities for which they had a high preference (all $p > .05$). However, in each region, high proportions of children indicated that they were not doing Active Physical (Victoria: 29.1%; Ontario: 28.5%; Quebec: 23.2%), Skill-based (Victoria: 23.4%; Ontario: 27.9%; Quebec: 21.7%) and Social (Victoria: 14.5%; Ontario: 12.9%; Quebec: 12.8%) activities they would prefer to be doing (see Supplementary Figure 1).

Doing non preferred activities

The data displayed in Figure 1, panel B demonstrate that relatively few (0 to 12%) children were doing non-preferred Recreational, Active Physical, Social and Skill-based activities. In contrast, up to 58% were doing Self-improvement activities they did not prefer. The overall pattern of responses was similar in each region with low proportions of children doing non-preferred Recreational, Active-Physical, Social and Skill-based activities (see Supplementary Figure 2). There was evidence that a higher proportion of Ontario children take part in Self-improvement activities they do not prefer (Victoria: 10.7%; Ontario: 16.7%; Quebec: 10.7%; $p = .006$). For the most part, the activities within this Activity Type demonstrating greatest regional variation were homework and chores.

[insert Figure 1 about here]

Characteristics associated with not doing preferred activities

Models of predictors for *not doing preferred* activities were developed using regression for each Activity Type (see Table 2). For Self-improvement activities, there was no evidence that the included independent variables were predictors of participation-preference congruence. For Recreational activities the most important predictor was GMFCS Level [$F_{(2, 233)} = 20.0, p \leq 0.001$, adjusted $R^2 = 0.139$], with those in GMFCS Level IV/V identifying a higher proportion of preferred activities they were not doing (11.7%) in comparison to those in GMFCS Level I (5.1%). GMFCS Level was also a significant predictor of participation-preference congruence in Active Physical activities, [$F_{(2, 233)} = 3.61, p = 0.029$, adjusted $R^2 = 0.03$]: those in GMFCS Levels IV/V had a higher proportion of activities they preferred that they were not participating in (33.8%) than those in the reference group: Level I (24.5%).

The model for Social participation-preference congruence indicated that GMFCS and income were important: children in GMFCS Levels IV/V had poorer participation-preference congruence than children in GMFCS Level I [$F_{(2, 233)} = 5.7, p = 0.004$, adjusted $R^2 = 0.038$]. Although not an important predictor alone, the interaction between having very low income and GMFCS Level was significant, indicating that children in GMFCS Level IV/V in families with low income (<\$15,000) participated on average in 17.2% fewer social activities that they would prefer, relative to those with higher family income [adjusted $R^2 = 0.048, p = 0.006$].

The model for participation-preference congruence in Skill-based activities found that both females and those in GMFCS Level IV/V were doing fewer skill-based activities than they would like to [$F_{(3, 232)} = 6.1, p = 0.001$, adjusted $R^2 = 0.061$]. In percentage terms, females were doing 26.8% fewer preferred activities, compared to males who were doing 17.2% fewer preferred, and those in GMFCS Level IV/V were doing 27.2% fewer preferred activities compared to those in Level I who were doing 17.2% fewer.

DISCUSSION

This study's exploration of participation-preference congruence in children with CP across three regions demonstrated more similarities than differences. In particular, a relatively high proportion of children with CP were not doing their preferred activities, and this was especially true for Active-Physical, Skill-based and Social activities. There was no evidence of regional variations, suggesting this is a consistent experience that may be indicative of barriers to participation in each region. Bult et al.¹³ also found high proportions of children with and without CP were not taking part in preferred activities. Direct comparisons with their data are complicated by differing methods of determining participation-preference congruence. Despite this, similar patterns were found with higher proportions of discrepancy found in Active-Physical, Skill-based and Social activities than in Recreational and Self-improvement. Bult et al. also demonstrated that, although children with CP participated at a different level than those without CP, they had similar preferences and there was little evidence of differences in their discrepancy scores. This finding suggests that the experience of barriers to desired participation is a common experience for all children, perhaps related to family-level values, activity preferences and parenting styles. Despite the similar discrepancy scores, the overall lower level of participation of children with impairments heightens the importance of the issue for them.

The lack of differences between regions suggests that either these Western, high-income regions were not sufficiently different from each other to influence children's participation-preference congruence. This finding also suggests that other variables, such as those related to the close environment – that is the context (people, place, objects, activity, time)²¹ in which the participation takes place, or within-person variables such as self-determination, are more important. These contextual and personal factors are likely to contribute to the high variance seen in the congruence scores (see Table 1) and would benefit from further research.

Regional variations were found in participation-preference congruence related to children doing non-preferred activities. In particular, variation in incongruence was evident with higher proportions of children in Ontario undertaking Self-improvement activities they did not prefer, in comparison to the other regions. The Ontario data also demonstrated higher preferences and higher participation diversity in Self-improvement, suggesting increased access to Self-improvement activities, which in turn may reflect variations between the regions in parent values, school structures and programs, or social expectations.

Severity of activity limitations as represented by three groups of GMFCS levels (I, II/III and IV/V) was an important predictor in each Activity Type, except Self-improvement activities. The finding of no influential variables in Self-improvement activities may be due to the restricted range of scores, in that few children identified they wanted to do more of these activities, which in itself may reflect the age group of the children and/or that these activities may be managed by parental values and expectations. For all the other Activity Types, children who were classified at GMFCS Level IV/V indicated a higher proportion of activities in which they were not participating but would like to, than children in Level II/III or I. This finding is likely reflective of the barriers imposed by increased limitations experienced by these children, that might influence physical, cognitive and communicative skills. This finding reinforces the need for improved mechanisms that support access and engagement in a variety of activities across the activity types for children of all abilities as an important goal of all health and human services.

The finding that both GMFCS level and low family income influenced social participation-preference congruence is an important indicator of the compounding effect of multiple disadvantages. Families with few resources have expressed increased difficulty with family

social participation.²² These families' perspectives and experiences highlight the importance of flexible supports that enable the whole family where there are children with complex impairments. Under-resourced families in which there is a child with complex or severe disability are frequently excluded or missing from research. Further research is recommended to investigate how to best support positive outcomes in this group.

Gender effects were only evident in relation to Skill-based participation-preference congruence, where girls were found to participate in fewer of their preferred activities. This finding might be influenced by the higher preference for this type of activity by girls²³ who perhaps then experience similar levels of opportunity as boys. Engagement in preferred activities where there are opportunities for skill development is likely to be important to the development of self-efficacy.⁸ Thus, families and health professionals may need to seek ways to assist girls to bridge this gap between preferences and participation, and potentially to assist boys to establish stronger preferences for Skill-Based activities.

Addressing participation restrictions is a major focus of rehabilitation. In particular, rehabilitation efforts should support children to find and access positive activity niches – the patterns of activities they wish to pursue and in which they can develop competency and friendships, find support and meaning, and develop knowledge of self and a sense of mastery. Niches²⁴ are conceptually similar to social contexts²¹ and refer to the experienced setting in a larger environment in which people, places, activities and objects come together in time²¹. These contexts can be experienced as positive, negative or neutral, and thus play a role in the development of preferences. In addition, not all contexts or niches are available to all children: some are culturally specific and others are more or less open depending on characteristics of the child as well as characteristics of the context and wider environment²⁴. Contexts for children with impairments might also include the presence of adults, such as aides or assistants, which may in turn influence the participation experience. Further research on participation contexts is necessary as it is highly likely that changing any one aspect (that is, the people, place, activity, objects, time in which participation occurs²¹) may impact the participation experience and outcome.

The transactional relationships between preferences, participation, competence, and self-concepts including self-efficacy and self-determination²⁵, place considerable importance on the need for greater understanding of where, and how, to intervene to promote optimal participation experiences and outcomes, particularly for those children with significant impairments. This might involve seeking alternate activities that match the overall preferences of the individual, if specific activities cannot be undertaken. Improved understanding of participation-preference congruence for children with and without disability will assist our understanding of potential barriers as mediating or moderating variables which may vary between these populations.¹³

Study limitations and future directions

Although the inclusion of a narrow age range of children (those aged 10-13 years) allowed a detailed analysis of one age group, it is also a limitation. The experiences of younger and older children may differ; research that examines participation-preference congruence in a broader age range is warranted. Further research should also capture a broader range of potential influential factors on participation-preference congruence to address the following questions: What is the relative contribution of the children's perspective compared with their family's perspective? How do other variables, such as the context in which the activities occur, influence congruence

between interests and participation? How do preferences co-vary with participation opportunities? How do past experiences and present affordances of contexts/niches affect preferences? Of particular interest is the role of high participation-preference congruence in contributing to the development of core outcomes such as autonomy and self-regulation.

Design limitations include the cross-sectional nature of data, the use of truncated GMFCS classifications and unequal distribution of children in the GMFCS Levels among the regions, and secondary data that precluded collection of important independent variables. The primary studies were conducted prior to the development of a classification of functional communication, and so these data are not available. In addition, findings may not be generalizable to low resource areas. Despite these identified limitations, the strengths of this paper include the relatively large sample that provided the opportunity to consider the participation-preference congruence of children with CP in three regions of two countries. Longitudinal datasets that are sufficiently large to enable person-based analytical approaches will provide more robust estimates of participation outcomes and influences. This more sophisticated approach to addressing participation issues²⁶ is likely to contribute important knowledge to contemporary models of human development.^{27, 28}

CONCLUSION

This study found relatively high levels of congruence between what children with CP want to do outside mandated school and what they actually do: in particular, they were typically not doing activities for which they indicated no particular preference. There were however, some discrepancies as well as evidence that the children with the most severe mobility limitations experienced the greatest discrepancy between their personal preferences for participation and their actual participation. Given that participation should not be predicated on activity competence, this suggests the presence of barriers to participation in each of the geographic regions studied.

ACKNOWLEDGEMENTS

The CAPE Network is comprised of teams of researchers who have used the *Children's Assessment of Participation and Enjoyment (CAPE)* to examine the participation of children with cerebral palsy in Australia, Canada, and the United States. CAPE International Collaborative Network acknowledges investigators and funding sources of the original research projects included in this study:

King G, Law M., Rosenbaum P., Kertoy M., King S., Tremblay P., & Young N. *A longitudinal study of predictors of the recreational and leisure participation of children with physical disabilities.*

Imms C., Reilly S., Carlin J. & Dodd K. *Diversity of participation of children with cerebral palsy: The middle years.*

Majnemer A., Shevell M., Law M., Rosenbaum P. *Determinants of life quality in children with cerebral palsy.*

Majnemer A., Shevell M., Lach L., Law M., Schmitz N. *Determinants of quality of life and participation in leisure activities in adolescents with cerebral palsy.*

Ethical approval was obtained for each original study, and for the currently reported study, from the following Human Research Ethics Committees.

Study	HREC committee	Ethics ID number
Imms et al. Australia	Royal Children's Hospital Human Research Ethics Committee & La Trobe University Human Ethics Committee	HREC 25096 HEC 05-153
King et al. Canada	McMaster University's Research Ethics Board	03-078 & 99-105
Majnemer et al. Canada	The Montreal Children's Hospital Institutional Review Board: School age participants Adolescent participants Centre de recherche interdisciplinaire en réadaptation du Montréal métropolitain	MCH-002-07 PED-05-083 CRIR-415- 0209

Funds in support of the currently reported project were provided by investigators from various sources including: Royalties received from sales of the CAPE/PAC; Canada Research Chair funds from the Canadian Institutes of Health Research in support of the Canada Research Chair in Optimal Care for Children with Disabilities held by Gillian King. The funding bodies had no role in the conduct of the study, interpretation or reporting of results.

REFERENCES

1. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M. A report: The definition and classification of cerebral palsy April 2006. *Dev Med Child Neurol.* 2007;49(Supp 109):8-14.
2. Shields N, Synnot A, Kearns C. The extent, context and experience of participation in out-of-school activities among children with disability. *Res Dev Disabil.* 2015;47:165-74.
3. King G, Imms C, Palisano R, Majnemer A, Chiarello L, Orlin M, et al. Geographical patterns in the recreation and leisure participation of children and youth with cerebral palsy: a CAPE international collaborative network study. *Dev Neurorehabil.* 2013;16(3):196-206.
4. Baker K, Donnelly M. Social experiences of children with disability and the influence of environment: A framework for intervention. *Disabil Soc.* 2001;16(1):71-85.
5. WHO. International classification of functioning, disability and health: children and youth version: ICF-CY. Geneva: World Health Organisation; 2007. 349 p.
6. Oxford English Dictionary. Online: Oxford University Press; 2015. Oxford English Dictionary.
7. Skille E, Osteras J. What does sport mean to you? Fun and other preferences for adolescents' sport participation. *Critical Public Health.* 2011;21(3):359-72.
8. Bandura A. Perceived self-efficacy in cognitive development and functioning. *Educ Psychol.* 1993;28(2):17-148.
9. Shikako-Thomas K, Majnemer A, Law M, Lach L. Determinants of participation in leisure activities in children and youth with cerebral palsy: systematic review. *Phys Occup Ther Pediatr.* 2008;28(2):155-69.
10. King GA, Law M, Petrenchik T, Hurley P. Psychosocial determinants of out of school activity participation for children with and without physical disabilities. *Phys Occup Ther Pediatr.* 2013;33(4):384-404.
11. Imms C, Reilly S, Carlin J, Dodd KJ. Characteristics influencing participation of Australian children with cerebral palsy. *Disabil Rehabil.* 2009;31(26):2204-15.
12. Powrie B, Kolehmainen N, Turpin M, Ziviani J, Copley J. The meaning of leisure for children and young people with physical disabilities: a systematic evidence synthesis. *Dev Med Child Neurol.* 2015.
13. Bult MK, Verschuren O, Lindeman E, Jongmans MJ, Ketelaar M. Do children participate in the activities they prefer? A comparison of children and youth with and without physical disabilities. *Clin Rehabil.* 2014;28(4):388-96.
14. Specht JA, King G, Francis PV. A preliminary study of strategies for maintaining self-esteem in adolescents with physical disabilities. *Canadian Journal of Occupational Therapy.* 1998;11(3):109-16.
15. Anderson DH, Fulton DC. Experience preferences as mediators of the wildlife related recreation participation: Place attachment relationship. *Human Dimensions of Wildlife.* 2009;13(2):73-88.
16. King GA, Law M, King S, Hurley P, Rosenbaum PL, Hanna S, et al. Children's Assessment of Participation and Enjoyment and Preferences for Activities of Kids. San Antonio, Texas: PsychCorp; 2004. 117 p.

17. Palisano RJ, Rosenbaum P, Walter S, Russel D, Wood E, Galuppi B. Development and reliability of a system to classify gross motor function in children with cerebral palsy. *Dev Med Child Neurol.* 1997;39(4):214-23.
18. Young NL, Williams JI, Yoshida KK, Wright GG. Measurement properties of the Activity Scales for Kids. *J Clin Epidemiol.* 2000;53:125-37.
19. Australian Bureau of Statistics. SEIFA 2001 Canberra: Australian Bureau of Statistics; 2001 [cited 2007 January 23rd 2007]. Available from: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/2033.0.55.0012001?OpenDocument>
20. King GA, Law M, Hanna S, King S, Hurley P, Rosenbaum PL, et al. Predictors of the leisure and recreation participation of children with physical disabilities: A structural equation modeling analysis. *Child Health Care.* 2006;35(3):209-34.
21. Batorowicz B, King G, Mishra L, Missiuna C. An integrated model of social environment and social context for pediatric rehabilitation. *Disabil Rehabil.* 2015:1-12.
22. Davey H, Imms C, Fossey E. "Our child's significant disability shapes our lives": experiences of family social participation. *Disabil Rehabil.* 2015:1-8.
23. King GA, Law M, Hurley P, Petrenchik T, Schwellnus H. A Developmental Comparison of the Out-of-School Recreation and Leisure Activity Participation of Boys and Girls with and without Physical Disabilities. *International Journal of Disability, Development and Education.* 2010;57(1):77-107.
24. Wachs TD. Necessary but not sufficient: The respective roles of single and multiple influences on individual development. Washington, DC: American Psychological Association; 2000.
25. Imms C, Adair B, Keen D, Ullenhag A, Rosenbaum P, Granlund M. 'Participation': A systematic review of language, definitions and constructs used in intervention research with children with disabilities. *Dev Med Child Neurol.* 2015.
26. Ployhart RE, Vandenberg RJ. Longitudinal research: The theory, design and analysis of change. *Journal of Management.* 2010;36(1):94-120.
27. Halfon N, Hochstein M. Life course development: An integrated framework for developing health, policy, and research. *Milbank Q.* 2002;80(3):433-79.
28. Lerner RM. Concepts and theories of human development. 3rd ed. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers; 2013.

FIGURE LEGENDS

Figure 1. *Incongruence scores displayed as proportion of children Not Doing Preferred activities (Panel A) and Doing Non Preferred activities (Panel B) in each Activity Type.*

This scatter plot displays the incongruence scores for individual items on the Y axis grouped according to the five Activity Types. The X axis shows the proportion of children Not Doing Preferred activities. Each site is identified as follows: Victoria (V); Ontario (O); Quebec (Qc). Each row of responses represents an item in each Activity Type.

Supplementary Figure 1. *Regional differences in proportions Not Doing Preferred activities by Activity Type.* The polar graph axes display each of the five Activity Types. Each bar of the graph equates to an increase in proportion of 10%. The three regions are plotted in different colours.

Supplementary Figure 2. *Regional differences in proportion of Doing Non Preferred activities by Activity Type.* The polar graph axes display each of the five Activity Types. Each bar of the graph equates to an increase in proportion of 5%. The three regions are plotted in different colours.

Table 1. Participant characteristics

	Victoria (n = 110)	Ontario (n = 80)	Quebec (n = 46)	Total (n = 236)
Sex:				
Male	64 (58.2%)	55 (68.8%)	29 (63.0%)	148 (62.7%)
Female	46 (41.8%)	25 (31.2%)	17 (37.0%)	88 (37.3%)
GMFCS:				
Level I	26 (23.6%)	43 (53.8%)	30 (65.2%)	99 (41.9%)
Level II/III	52 (47.3%)	28 (35.0%)	9 (19.6%)	89 (37.7%)
Level IV/V	32 (29.1%)	9 (11.2%)	7 (15.2%)	48 (20.3%)
Family income: ^a				
<\$15,000	12 (11.0%)	2 (2.6%)	6 (13.6%)	20 (8.7%)
15,000-44,000	42 (38.5%)	33 (42.9%)	21 (47.7%)	96 (41.7%)
45,000-59,000	24 (22.0%)	17 (22.1%)	7 (15.9%)	48 (20.9%)
60,000-74,000	26 (23.9%)	8 (10.4%)	10 (22.7%)	44 (19.1%)
75,000-99,000	5 (4.6%)	17 (22.1%)	0 (0.0%)	22 (9.6%)
Parental education: ^b				
Less than high school	11 (10.1%)	3 (3.8%)	2 (4.4%)	16 (6.9%)
Completed high school	51 (46.8%)	19 (24.1%)	14 (31.1%)	84 (36.1%)
Completed college / Some Univ.	27 (24.8%)	34 (43.0%)	13 (28.9%)	74 (31.8%)
Completed university	15 (13.8%)	23 (29.1%)	12 (26.7%)	50 (21.5%)
Graduate degree	5 (4.6%)	0 (0.0%)	4 (8.9%)	9 (3.9%)
Mean CAPE diversity scores ^c				
Recreational (range 0-12)	7.9 (2.4)	9.7 (1.7)	8.2 (2.2)	
Active Physical (range 0-13)	2.4 (1.5)	3.8 (1.6)	3.3 (1.6)	
Social (range 0-10)	6.6 (1.5)	7.1 (1.6)	6.6 (1.5)	
Skill-based (range 0-10)	2.2 (1.4)	2.2 (1.4)	2.2 (1.4)	
Self-improvement (range 0-10)	4.7 (2.2)	6.5 (1.8)	5.6 (2.1)	
Mean PAC scores (range 1-3) ^c				
Recreational	2.3 (0.4)	2.4 (0.3)	2.3 (0.4)	
Active Physical	2.2 (0.4)	2.4 (0.4)	2.2 (0.5)	
Social	2.6 (0.4)	2.7 (0.3)	2.6 (0.4)	
Skill-based	2.1 (0.5)	2.1 (0.5)	2.0 (0.5)	
Self-improvement	1.9 (0.5)	2.1 (0.5)	2.0 (0.6)	
Mean participation-preference congruence scores (range 0-1) ^c				
Recreational	0.10 (0.13)	0.07 (0.10)	0.09 (0.09)	
Active Physical	0.29 (0.21)	0.28 (0.19)	0.23 (0.20)	
Social	0.15 (0.14)	0.13 (0.14)	0.13 (0.13)	
Skill-based	0.23 (0.22)	0.28 (0.23)	0.22 (0.20)	
Self-improvement	0.08 (0.13)	0.10 (0.13)	0.08 (0.14)	

Note: GMFCS = Gross Motor Function Classification System; CAPE = Children's Assessment of Participation and Enjoyment; PAC = Preferences for Activities of Children; Family income and education was measured using five categories (based on annual household income and highest household educational attainment) corresponding to the Australian Economic Resources and Education and Occupation Indices; ^a n = 230; ^b n = 233; ^c All participants provided sufficient data to calculate domain scores for each Activity Type according to the CAPE/PAC manual (i.e., $\geq 80\%$ of data available).

Table 2. Characteristics that predict whether children are doing their preferred activities

	Unstandardised Estimate	Standard error	<i>t</i> value	Pr(> <i>t</i>)	aR ² (p)
Recreational					
Intercept	0.051	0.011	4.831	0.000	
GMFCS II/III	0.029	0.015	1.889	0.060	
GMFCS IV/V	0.117	0.019	6.293	0.000	
					0.139 (<i>p</i> ≤0.001)
Active Physical					
Intercept	0.245	0.020	12.294	0.000	
GMFCS II/III	0.036	0.029	1.253	0.212	
GMFCS IV/V	0.093	0.035	2.679	0.008	
					0.03 (<i>p</i> =0.029)
Social					
Intercept	0.122	0.014	8.665	0.000	
GMFCS II/III	0.003	0.020	0.158	0.875	
GMFCS IV/V	0.059	0.024	2.424	0.016	
Low income	-0.021	0.042	-0.506	0.613	
GMFCS II/III/Low income	-0.015	0.074	-0.206	0.837	
GMFCS IV/V/Low income	0.173	0.081	2.130	0.034	
					0.048 (<i>p</i> =0.006)
Skill-based					
Intercept	0.172	0.024	7.174	0.000	
Female	0.096	0.029	3.362	0.001	
GMFCS II/III	0.049	0.031	1.573	0.117	
GMFCS IV/V	0.100	0.037	2.657	0.008	
					0.061 (<i>p</i> =0.061)

Note: GMFCS = Gross Motor Function Classification System; Dependent variable is the participation-preference congruence score which ranges from 0 to 1, where 0 indicates there are no activities in the Activity Type that the child would like to do, but isn't; and 1 indicates that the child isn't participating in any of the activities and would like to do them all. aR² = adjusted R²; no data presented for Self-improvement activities as no independent variables demonstrated significant univariate relationships with the outcome. Regression models including variables with missing data (n=3 parental education; n = 6 parental income) were removed from analyses including those variables. Only variables with statistically significant effects are reported (*that is, p-value* < 0.0025).