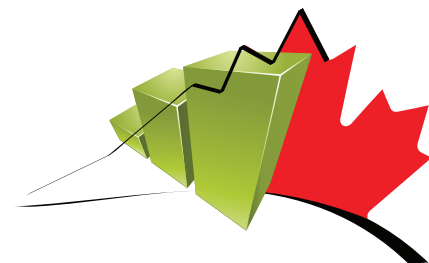


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A profile of children with affirmative responses to the 2016 census questions on difficulties with activities of daily living



by Thomas Charters, Christoph Schimmele and Rubab Arim

Release date: March 23, 2022

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DOI: <https://doi.org/10.25318/36280001202200300006-eng>

Abstract

This study presented a sociodemographic profile of children aged 0 to 14 years with affirmative responses by parents to the questions on the 2016 Census long-form questionnaire about difficulties with activities of daily living. The filter questions, derived from the Disability Screening Questions, were designed to identify persons who are likely to have a disability, for an adult population aged 15 years and older. Therefore, relatively little is known about their suitability for a child population. About 13.5% of children were identified as having one or more affirmative responses to the filter questions. The sociodemographic associations between the presence of any affirmative responses, and child and family characteristics were largely in line with findings from previous research on child disability, although some unexpected findings were noted. Given that these filter questions were repeated on the 2021 Census long-form questionnaire, future research is required to further assess their suitability for generating an appropriate sampling frame for prospective child disability surveys.

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Introduction

Since 1986, Statistics Canada has used filter questions on the Census of Population to generate sampling frames for postcensal surveys on disability. These questions are designed to reduce the sampling frames to persons who are most likely to have a disability. Without this census information, a survey on disability would require a very large random sample of the general population to appropriately cover the target population with different types of disabilities and their geographic and sociodemographic distribution (Statistics Canada, 2002).

A new set of filter questions was introduced on the 2016 Census long-form questionnaire, and the same question set was on that of 2021. These filter questions were derived from the Disability Screening Questions (DSQ), a survey measure of disability that was developed for an adult population aged 15 years and older. The DSQ were based on a social model of disability¹ and improved the coverage of a wider range of disability types (Furrie, 2018; Grondin, 2016). The DSQ filter questions identify persons who were reported to have difficulties² doing certain activities (activity limitations), and are therefore considered to have a greater likelihood of having a disability. While previous research has shown that the filter questions for the 2016 Census improved coverage of persons with disabilities in the adult population (Cloutier et al., 2018), relatively little is known about their suitability for a child population.

The current study presented a sociodemographic profile of children aged 0 to 14 years with affirmative responses to the DSQ filter questions on the 2016 Census. Specifically, the study examined the distributions of activity limitations by children's age, sex and family socioeconomic characteristics. The consistency of this profile with well-established patterns of child disability from the existing literature is discussed. Recommendations are also made to further assess the suitability of the DSQ filter questions for generating an appropriate sampling frame for prospective child disability surveys.

Data and methods

Data source: The 2016 Census

The target population of the 2016 Census long-form questionnaire included the Canadian population residing in private dwellings,³ and the questionnaire was completed by a random selection of 25% of Canadian households. Census data on private dwellings were collected primarily (99%) from an adult member of the household, who responded to a self-administered questionnaire on behalf of all occupants (Statistics Canada, 2018a). There were complete responses to the DSQ filter questions for almost 1,500,000 children aged 0 to 14 (i.e., less than 1% of children had missing data). The overall response rate for the 2016 Census long-form questionnaire was 96.9% (Statistics Canada, 2018b).

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1. The social model of disability recognizes that barriers in the social environment need to be eliminated to provide everyone with an equal chance for full participation in society (Furrie, 2018).
 2. Only difficulties or long-term conditions that have lasted or are expected to last for six months or more were asked to be considered.
 3. The target population was persons residing in all provinces and territories, which included permanent residents, non-permanent residents, and individuals living on Indian reserves and other Indian settlements. Excluded persons were those residing in institutional collective dwellings (hospitals, nursing homes, penitentiaries) and non-institutional collective dwellings (hotels, work camps, student residences); foreign residents staying in Canada on a temporary basis or serving as representatives of another country; and Canadian citizens residing in other countries, including full-time members of the Armed Forces.

The DSQ filter questions

The 2016 Census long-form questionnaire included a module on difficulties with activities of daily living because of physical, mental, or other health-related conditions or problems (Statistics Canada, 2018a, pp. 135–137).⁴ Respondents were asked

Does this person have any:

- a) difficulty seeing (even when wearing glasses or contact lenses)?
- b) difficulty hearing (even when using a hearing aid)?
- c) difficulty walking, using stairs, using his/her hands or fingers or doing other physical activities?
- d) difficulty learning, remembering or concentrating?
- e) emotional, psychological or mental health conditions (e.g., anxiety, depression, bipolar disorder, substance abuse, anorexia, etc.)?
- f) other health problem or long-term condition that has lasted or is expected to last six months or more?

The response categories for each of these questions were “no,” “sometimes,” “often” and “always.” Respondents who provided an affirmative response (i.e., “sometimes,” “often” or “always”) to at least one question are identified as “persons likely to have a disability,” while those who responded “no” to all questions are considered to be persons without disabilities.

Methods

This study described the sociodemographic profile of children aged 0 to 14 years with an affirmative response to at least one of the census filter questions. These data were largely collected based on parental reports. An aggregate measure of any activity limitation was derived from an affirmative response to one or more of the filter questions to estimate the total proportion of children with activity limitations. Children with missing responses to the census filter questions (0.91%) were excluded from the analysis. Cross tabulations were run for total and specific types of activity limitations by children’s age, sex and family socioeconomic characteristics.⁵

Results

General patterns

Table 1 shows the proportions of total and specific types of activity limitations in the child population aged 0 to 14 years. About 13.5% of children had at least one activity limitation as a result of a difficulty or a long-term condition. About 4.5% of children “always” experienced activity limitations, while 2.3% “often”

4. According to the Census Dictionary, this question set “provides information on the number of people in Canada who have difficulties with their daily activities, and whose activities are reduced because of a long-term physical, mental or other health condition. This question set, which is intended only to be used to identify people who are likely to have a disability for a follow-up survey, does not itself provide an estimate of disability in Canada” (Statistics Canada, 2018a, p. 136).

5. These cross tabulations present the frequency distributions of activity limitations by the selected sociodemographic characteristics and are not intended to be estimates of causation or risk of activity limitations.

experienced activity limitations. About 6.7% of children “sometimes” experienced activity limitations. About 4.8% of children had two or more types of activity limitations, making up 35% of children with any activity limitation. Over half (53%) of children who reported “always” experiencing activity limitations had multiple types of activity limitations (data not shown).

Table 1

Activity limitations of Canadian children aged 0 to 14 years, weighted estimates of population percentages¹

Presence and frequency of activity limitations	Any activity limitation	Seeing	Hearing	Mobility, flexibility or dexterity percent	Learning, remembering or concentrating	Emotional, psychological or mental health	Other health problem or condition
No	85.6	96.4	98.0	97.4	90.9	94.9	94.8
Yes	13.5	2.6	0.9	1.5	7.9	4.0	4.0
Always	4.5	0.8	0.1	0.5	1.4	1.0	2.6
Often	2.3	0.3	0.1	0.3	1.8	0.7	0.5
Sometimes	6.7	1.5	0.6	0.8	4.6	2.3	1.0
Not stated	0.9	1.0	1.1	1.1	1.2	1.1	1.2

1. Weighted number = 5,765,285

Source: Statistics Canada, Census of Population, 2016.

Difficulty learning, remembering or concentrating (7.9%) was the most prevalent type of activity limitation among children aged 0 to 14, followed by other health problems or conditions (4.0%),⁶ and emotional, psychological or mental health conditions (4.0%). About 2.6% of children had difficulty seeing (even with corrective lenses) and 0.9% had difficulty hearing (even with hearing aids). Difficulty with mobility, flexibility or dexterity was identified in 1.5% of children aged 0 to 14.

Children with difficulty seeing, and learning, remembering or concentrating were the least likely to have activity limitations in other functional domains. Among children with difficulty seeing, 40.7% were reported to have another type of activity limitation, and 52.1% of children with difficulty learning, remembering or concentrating also had another type of activity limitation (data not shown). Children with mobility, flexibility and dexterity difficulty (75.8%), as well as with emotional, psychological or mental health conditions (70.7%), were most likely to have multiple types of activity limitations.

Sex and age patterns

The distribution of activity limitations varied across sex and age (Table 2). The proportion of children with any activity limitation was significantly higher in boys (15.5%) than girls (11.7%), and was generally associated with age. The proportion of children with any activity limitation was lowest among those aged 0 to 3 years (5.3%) and highest among those aged 13 to 14 years (20.7%). A similar age pattern was observed among boys and girls (data not shown).

The distribution of specific types of activity limitations also varied by sex and age. With the exception of difficulty seeing, the presence of activity limitations in all other domains was reported to be significantly higher in boys than in girls. For example, 10.0% of boys had difficulty learning, remembering or concentrating, compared with 5.9% of girls. About 4.6% of boys had emotional, psychological or mental health conditions, compared with 3.4% of girls. Finally, 4.9% of boys had some other health problem or condition, compared with 3.2% of girls. Sex differences in difficulty hearing and with mobility, flexibility or dexterity were smaller, but still significantly higher among boys than girls.

6. The category of “other health problem or condition” is exclusive of the other five categories in the census filter questions and is designed to be a catch-all category that captures respondents likely to have a disability but missed in the other questions.

Table 2
Activity limitations of Canadian children aged 0 to 14 years by age and sex, weighted estimates of population percentages

	Any activity limitation (n=5,712,815)	Seeing (n=5,705,555)	Hearing (n=5,701,915)	Mobility, flexibility or dexterity (n=5,700,305)	Learning, remembering or concentrating (n=5,698,360)	psychological or mental health (n=5,699,870)	Other health problem or condition (n=5,698,240)
Child's sex							
Female	11.7 *	2.8 *	0.8 *	1.3 *	5.9 *	3.4 *	3.2 *
Male (reference)	15.5	2.5	1.1	1.7	10.0	4.6	4.9
Child's age (total)							
0 to 3 (reference)	5.3	0.5	0.5	1.9	2.2	0.5	2.1
4 to 5	9.6 *	1.6 *	1.0 *	1.3 *	5.3 *	2.0 *	3.8 *
6 to 9	15.9 *	2.9 *	1.1 *	1.3 *	10.1 *	4.6 *	4.7 *
10 to 12	19.4 *	4.1 *	1.1 *	1.4 *	12.0 *	6.7 *	5.2 *
13 to 14	20.7 *	4.9 *	1.1 *	1.5 *	11.5 *	7.9 *	5.4 *

* significantly different from reference category ($p < 0.05$)

Source: Statistics Canada, Census of Population, 2016.

Difficulty learning, remembering or concentrating was strongly associated with age, as would be expected based on the increased likelihood of diagnosis once children enter school (Visser et al., 2015). Among those aged 0 to 3 years, 2.2% of children were reported to have difficulty learning, remembering or concentrating, while the proportion was more than double among children aged 4 to 5 (5.3%) and almost five times higher among children aged 6 to 9 (10.1%). After age 10, the difference between adjacent age groups in the presence of this activity limitation was smaller.

Similarly, there was a strong association between age and the presence of emotional, psychological or mental health conditions. At 0 to 3 years, less than 1% of children were reported to have emotional, psychological or mental health conditions, compared with 4.6% of those aged 6 to 9 and 7.9% of those aged 13 to 14. An association with age was apparent for those with difficulty seeing and with other health problems and conditions, with the likelihood of having these activity limitations increasing in each subsequent age group, compared with children aged 0 to 3. Similar age patterns in these limitations were observed among boys and girls (data not shown).⁷

For difficulties hearing and with mobility, flexibility or dexterity, the differences between age groups were small. This suggests that difficulties in these functional domains were manifested similarly throughout the childhood years, compared with those in the cognitive and emotional, psychological or mental health domains, where difficulties with daily activities tended to become apparent at school age (Johnson and Myers, 2007).

Socioeconomic patterns

In Table 3, the distribution of activity limitations was estimated across categories of parental education, which was measured by the highest attainment of either household head. The lowest proportion of children with any activity limitation was observed in those from households where one or both parents had a university degree or diploma (10.4%). The highest proportion was observed among children where one or both parents had less than a secondary school education (no certificate, diploma or degree) (17.1%). This pattern was observed across all specific types of activity limitations.

7. In functional domains where activity limitations increased with age, comparatively higher age-specific rates were generally observed in boys than in girls, with two exceptions: for seeing, girls had higher rates from ages 10 to 12 years and older, and for emotional, psychological or mental health conditions, where rates were statistically equivalent between the sexes at ages 13 to 14 (data not shown).

The proportion of children with any activity limitation was lowest among those from two-parent households with two full-time employed parents (11.7%). The proportion was 1 percentage point higher in children from two-parent households where both parents worked part time (12.7%) or where one parent worked full time and the other part time (12.8%). By comparison, the proportion of children with any activity limitation from either single-parent or two-parent households was 14.5% among those with one full-time working parent, 18.6% among those from households with one part-time working parent, and 19.2% among those from households with no working parent.

There was a gradient in the association between household income and the distribution of activity limitations in the child population. The lowest proportion of children with any activity limitation was observed in those from households in the highest income quintile (10.7%), and the proportion increased in each descending quintile of household income. The highest proportion of children with any activity limitation was observed in those from the lowest income quintile (16.4%).⁸ This pattern was observed across all types of activity limitations. Overall, the socioeconomic patterns were consistent across all functional domains.

These associations between parental education, employment status and household income, and the likelihood of activity limitation should not be interpreted to suggest that lower levels of household socioeconomic status are the cause of activity limitations among children. Reverse causality is a possible explanation for these associations. Indeed, caring for a child with a disability may be a constraint on parents' educational and labour market opportunities, and the lack of accommodations in these domains may be a source of lower socioeconomic status among families of children with disabilities (Porterfield, 2002; Spencer et al., 2015; Stabile and Allin, 2012).

8. Quintiles were formed based on the ranked value of adjusted after-tax household income in the weighted sample of children aged 0 to 14. The adjustment took the aggregate after-tax income and divided it by the square root of the number of persons in the household to account for economies of scale. The quintiles correspond to adjusted household incomes up to \$23,429 (quintile 1), \$23,430 to \$34,179 (quintile 2), \$34,180 to \$45,450 (quintile 3), \$45,451 to \$61,103 (quintile 4), and \$61,104 and higher (quintile 5).

Table 3
Activity limitations of Canadian children aged 0 to 14 years by family socioeconomic characteristics, weighted estimates of population percentages

	Any activity limitation (n=5,712,815)	Seeing (n=5,705,555)	Hearing (n=5,701,915)	Mobility, flexibility or dexterity (n=5,700,305)	Learning, remembering or concentrating (n=5,698,360)	Emotional, psychological or mental health (n=5,699,870)	Other health problem or condition (n=5,698,240)
percentages							
Highest parental education							
No certificate, diploma or degree	17.1 *	4.5 *	1.6 *	1.8 *	10.3 *	4.5 *	4.9 *
Secondary school or equivalent	15.4 *	3.5 *	1.2 *	1.8 *	9.2 *	4.6 *	4.6 *
Apprenticeship, trades, college, CEGEP	16.5 *	3.0 *	1.1 *	1.7 *	10.3 *	5.1 *	4.8 *
University degree or diploma (any) (reference)	10.4	1.7	0.7	1.3	5.5	3.0	3.3
Census family work arrangement							
Parent or parents not employed ¹	19.2 *	4.8 *	1.8 *	2.6 *	11.8 *	6.4 *	6.6 *
One parent works part time ^{1,2}	18.6 *	4.1 *	1.4 *	2.1 *	11.5 *	6.1 *	5.9 *
One parent works full time ^{1,2}	14.5 *	2.9 *	1.0 *	1.6 *	8.6 *	4.5 *	4.4 *
One parent works full time, one part time ^{2,3}	12.8 *	2.2 *	0.8 *	1.5 *	7.2 *	3.8 *	4.0 *
Two parents work part time ^{2,3}	12.7 *	3.0 *	1.1 *	1.7 *	7.2 *	3.7 *	3.8 *
Two parents work full time ^{2,3} (reference)	11.7	2.0	0.7	1.2	6.7	3.1	3.2
Household income quintile							
Quintile 1 (lowest)	16.4 *	4.0 *	1.4 *	1.9 *	9.8 *	4.9 *	5.0 *
Quintile 2	14.9 *	3.1 *	1.1 *	1.6 *	9.2 *	4.3 *	4.2 *
Quintile 3	13.7 *	2.4 *	0.9 *	1.5 *	8.2 *	4.0 *	4.1 *
Quintile 4	12.5 *	2.0 *	0.8 *	1.4 *	7.2 *	3.7 *	3.8 *
Quintile 5 (highest; reference)	10.7	1.6	0.6	1.2	5.7	3.1	3.4

* significantly different from reference category (p < 0.05)

1. May indicate the employment status of one parent in couple families or the employment status of a lone parent.
2. Full-time work was defined as 30 hours per week or higher and part-time work as less than 30 hours per week.
3. Only includes couple families.

Source: Statistics Canada, Census of Population, 2016.

Conclusion

Overall, 13.5% of children aged 0 to 14 years had one or more affirmative responses to the census filter questions that identified them as likely to have a disability. On previous census filter questions, the filter-in rates for children aged 0 to 14 were comparatively lower than the 13.5% observed in 2016 Census data. For example, on the 1991 Census, 2.6% of children aged 0 to 14 were filtered in (Statistics Canada, 2002). These filter questions were revised for the 2001 Census and used until the 2011 National Household Survey. In the 2001 Census, 5.0% of children aged 0 to 14 were filtered in. These comparisons suggest that the DSQ filter questions in the 2016 Census are more inclusive than the filter questions that were used in past censuses, and are therefore capturing more children who are likely to have a disability.⁹

To better contextualize these results, the conceptual and methodological “evolution” of the census filter questions across the years should be acknowledged (Furrie, 2018). Notably, earlier filter questions consisted of two items that asked about (1) the presence of either a disability or handicap (1986 to 1996) or a functional impairment (2001 to 2011) and (2) either personal limitations (1986 to 1996) or condition-related reductions in the amount and type of activities that a person can do at home, school or work, or in other activities (Grondin, 2016; Statistics Canada, 2002). By contrast, the filter questions in 2016 consisted of six items that asked about difficulties with daily activities in five different functional domains, as well as a question on the presence of other health problems or long-term conditions (Grondin, 2016). Previous research (Pettinicchio and Maroto, 2021; Schneider et al., 2009) has shown that single-item or restricted questions on disability, including questions with potentially stigmatizing language (e.g., handicap), administered on population censuses result in lower estimates than question sets that have broader definitions of disability. However, these studies have also shown that multiple questions about specific types of limitations or complex domains of functioning are associated with higher estimated disability rates. It remains unknown how long and detailed census filter questions need to be to effectively cover the target population of children, without capturing too many of those without disabilities (i.e., false positives). Further research is required to better understand the implications of these findings in the context of childhood disability.

The way filter questions are asked also matters. Earlier filter questions had more limited response categories, which missed persons in the target population and subsequently biased estimates in postcensal surveys on disability (Grondin, 2016). From 1986 to 1996, only “yes” or “no” responses were allowed, which excluded many persons with milder or recurrent disabilities who tended to report a “no” response (Statistics Canada, 2002). In the 2001 Participation and Activity Limitation Survey, the filter questions included “yes, sometimes” and “yes, often” responses to allow for a “yes” category for respondents with milder disabilities, which improved filter-in rates (Statistics Canada, 2002). However, because their content was similar to the previous filters, the filter questions from 2001 to 2011 still missed persons with non-physical disabilities (Grondin, 2016). The filter questions in the 2016 Census allowed three affirmative responses (i.e., sometimes, often, always), and an attempt to appropriately filter in persons with non-physical disabilities by asking about learning difficulties, as well as mental health conditions—both prevalent among children aged 0 to 14 in this study. Overall, this discussion highlights that the way disability is conceptualized and measured influences the identification of the population at risk of experiencing disability (Pettinicchio and Maroto, 2021; Schneider et al., 2009). Future research is

9. To be inclusive, the filter-in rates should be higher than subsequent estimates of disability; however, the opposite was the case for earliest filters. For example, while the 1991 Census identified 2.6% of children as likely to have a disability, the postcensal 1991 Health and Activity Limitation Survey (HALS) estimated that 7.0% of children had a disability (Statistics Canada, 2002). In other words, the majority of children identified as having a disability on the HALS came from a sample that reported “no” to the census filter questions. The imprecision of these filters meant that the HALS sampling strategy was inefficient, as it needed to include both “yes” and “no” respondents from the census to avoid biased estimates.

required to further assess the suitability of the DSQ filter questions for generating an appropriate sampling frame for prospective child disability surveys.

The associations between child-level and family-level characteristics and the presence of activity limitations observed in the 2016 Census data were largely in line with findings from previous research on child disability. For example, the presence of activity limitations was observed to be higher among boys than girls and increased with child age. This is consistent with sex and age patterns of disability among Canadian children aged 0 to 14 years in the 2006 Participation and Activity Limitation Survey (Statistics Canada, 2008) and from the 2017 national survey data on the prevalence of developmental disabilities in the United States (Zablotsky et al., 2019). Additionally, the proportion of children with activity limitations in the 2016 Census was higher among children from households with lower levels of income and parental education. This is also consistent with the international literature that shows an association between the likelihood of child disability and socioeconomic disadvantage (Boyle et al., 2011; Emerson, 2012; Spencer et al., 2015). Although causality cannot be assumed from these observations, the similarities between the sociodemographic profiles of children filtered in from the 2016 Census and previous studies of children with disabilities provide corroborating support as to the suitability of the 2016 Census filter questions for identifying children likely to have a disability.

However, some unexpected findings should be noted. Specifically, rates of emotional, psychological or mental health conditions were more prevalent for boys than girls at younger ages, and equivalent at ages 13 to 14, and this is inconsistent with past research (Comeau et al., 2019). One potential reason for this unexpected finding could be the inclusion of substance use under this domain, which is generally higher for boys than girls (Leatherdale and Burkhalter, 2012). Alternatively, respondents may attribute attention deficit hyperactivity disorder to this domain, a common childhood condition with much higher prevalence in boys than girls (Vasiliadis et al., 2017), or behavioural and conduct problems that are also more prevalent in boys than girls (Ghandour et al., 2019). Neither of these explanations can be confirmed in the data. In addition, the rate of other health problems or conditions was the second-most prevalent type of activity limitation, indicating a need for a deep-dive analysis to discover what types of health problems or long-term conditions are captured under this question, and whether these are prevalent or rare conditions among children.

There are several possible directions for future research and analysis. First, a comparison of the DSQ filter questions with another set of filter questions, such as the Washington Group Child Functioning Module in the Canadian Health Survey on Children and Youth, could be done to evaluate whether one set is more useful for children than the other. Second, validation of the 2016 Census filter questions on children aged 15 to 18 years, along with youth in older age groups who completed the Canadian Survey on Disability, may provide robust insights that could be informative for the suitability of the census filters in younger age groups. Third, comparing a sample of children with both affirmative and negative responses to the filter questions on functional status (e.g., Health Utilities Index) may provide a refined approach for assessing the suitability of the filter items. A focused topical survey using larger sample sizes with shorter questionnaires may be helpful in this instance. Other potential opportunities for further validation of the filter questions may arise from data linkages, such as between the census and administrative education data.

From a disaggregated data perspective, there has been a data gap about child disability at a national level (Arim et al., 2016), which the COVID-19 pandemic might have made more apparent. The pandemic has also increased the urgency of addressing issues relevant to children—particularly those with disabilities—such as access to services, including early learning and child care, so that parents can fully participate in the economy and balance the demands of child care, schooling and work. Demand for care of children with disabilities may be particularly challenging, especially during periods when pandemic restrictions have been in place and access to services limited. Given the current context, identification of

children with disabilities and their inclusion in early learning and child care lie at the intersection of future work in the Disaggregated Data Action Plan and a Canada-wide early learning and child care plan.

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