Understanding sexual orientation and health in Canada: Who are we capturing and who are we missing using the Statistics Canada sexual orientation question?

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ABSTRACT

OBJECTIVE: Public health research on inequalities in Canada depends heavily on population data sets such as the Canadian Community Health Survey. While sexual orientation has three dimensions – identity, behaviour and attraction – Statistics Canada and public health agencies assess sexual orientation with a single questionnaire item on identity, defined behaviourally. This study aims to evaluate this item, to allow for clearer interpretation of sexual orientation frequencies and inequalities.

METHODS: Through an online convenience sampling of Canadians ≥ 14 years of age, participants ($n = 311$) completed the Statistics Canada question and a second set of sexual orientation questions.

RESULTS: The single-item question had an 85.8% sensitivity in capturing sexual minorities, broadly defined by their sexual identity, lifetime behaviour and attraction. Kappa statistic for agreement between the single item and sexual identity was 0.89; with past year, lifetime behaviour and attraction were 0.39, 0.48 and 0.57 respectively. The item captured 99.3% of those with a sexual minority identity, 84.2% of those with any lifetime same-sex partners, 98.4% with a past-year same-sex partner, and 97.8% who indicated at least equal attraction to same-sex persons.

CONCLUSION: Findings from Statistics Canada surveys can be best interpreted as applying to those who identify as sexual minorities. Analyses using this measure will underidentify those with same-sex partners or attractions who do not identify as a sexual minority, and should be interpreted accordingly. To understand patterns of sexual minority health in Canada, there is a need to incorporate other dimensions of sexual orientation.

KEY WORDS: Questionnaire design; homosexuality; sexual orientation; gender identity; inequalities

La traduction du résumé se trouve à la fin de l'article.

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Many population studies have documented significant health inequalities between sexual minorities and heterosexuals, highlighting the importance of including sexual orientation questions.^{1–5} Statistics Canada, Canada's statistical agency, has been using a single-item sexual orientation question since 2003 for large national surveys such as the Canadian Community Health Survey (CCHS)⁶ and the General Social Survey (GSS);⁷ a similar version of this item is replicated in public health surveys such as Ontario's Rapid Risk Factor Surveillance System.⁸

Researchers have used data from these surveys to highlight health inequalities experienced by sexual minorities,^{2–5} though no published studies have critically evaluated this single measure. It is well established that one's sexual identity, behaviour and attraction do not always match one another.⁹ Discordance between these multiple dimensions of sexual orientation has been documented to be an important health determinant itself.^{10–14} While researchers have interpreted the Statistics Canada question to measure sexual identity,^{2–5} it is still unclear if respondents actually interpret the question in this way, given that the measure defines these categories behaviourally, e.g., "bisexual (sexual relations with both sexes)". Furthermore, it is unknown how trans and non-binary persons who may not identify as strictly

male or female may understand such a question, as the concepts of "opposite sex" or "same sex" may not make sense.

Hence, the current study has two objectives: 1) to evaluate the extent to which this measure captures sexual minorities as defined by multiple dimensions of sexual orientation, and 2) to measure the agreement of the measure with other sexual orientation questions. Together, these analyses will help us better interpret findings from Canadian health studies in the context of a body of research that defines sexual orientation variably.

METHODS

This analysis was part of a larger mixed methods study to evaluate various demographic questions (including sexual orientation) that

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are commonly used in population surveys of Canadians across diverse demographic characteristics. The research protocol was approved by the Research Ethics Board at The University of Western Ontario.

Recruitment and sampling

Participants were recruited through convenience sampling using Facebook ads and organizational networks in order to both maximize demographic variation and overrecruit sexual and gender minorities. Those living in Canada who were 14 years of age or above and able to complete an English language online survey were eligible to participate. Participants completed a five to ten minute survey of standard demographic questions along with three of six paired question sets (randomly assigned) on sexual orientation, sex/gender and race/ethnicity. To reduce priming effect, participants were followed up to complete the remaining three sets of questions within one to three weeks without incentives. Participants could skip any questions that they did not wish to answer.

Measures

Socio-demographic variables

Demographic variables included age, gender, trans status, ethnoracial background, education, and immigration history. Measures of gender and trans status came from a multidimensional sex/gender measure.¹⁵ The first question asked whether one is “male”, “female” or “something else”; the second, whether one considers themselves to be trans, with options of “yes”, “no” or “don’t know”. Those who chose yes were considered as trans, those responding otherwise were considered as cisgender (non-trans and may include genderqueer individuals who do not consider themselves as trans).

For the remaining demographic variables, questions were either developed for the study (e.g., immigration history) or slightly adapted from Statistics Canada questions (e.g., education, ethnicity). For this analysis, ethnoracial background was coded into three categories: Indigenous (First Nations, Métis and Inuit), white (non-Indigenous) or racialized (non-Indigenous),¹⁶ while education was recoded into four.¹⁷ Those <25 years of age were considered youth.¹⁸

Statistics Canada sexual orientation question

This item reads as: “Do you consider yourself to be: “heterosexual (sexual relations with people of the opposite sex)”, “homosexual, that is lesbian or gay (sexual relations with people of your own sex)”, “bisexual (sexual relations with people of both sexes)” or “don’t know”.”⁶ For our analysis, those who responded as anything other than heterosexual were coded as a sexual minority, while “don’t know” was coded as “undetermined”.

SMART Guide sexual orientation questions

The SMART Guidelines are best practices guidelines developed by a US team, which include multiple domains of sexual orientation: sexual identity, past-year behaviour, lifetime behaviour and attraction. This questionnaire has been validated across many subpopulations in the US.¹⁹ The sexual identity question was: “Do you consider yourself to be?”, with options: “heterosexual or straight”, “gay or lesbian”, “bisexual” and “don’t know”.¹⁹

The lifetime and past-year behaviour items asked: “In your lifetime, who have you had sex with?” and “In the past 12 months, who have you had sex with?”, with options: “Men only”, “Women only”, “Both men and women” and “I have not had sex”. Sexual minority behaviour was defined as having ever had a same-sex partner; those who had not had sex were classified as undetermined.¹⁰ Finally, the sexual attraction question asked: “People are different in their sexual attraction to other people. Which best describes your feelings? Are you ...?”, with the options: “Only attracted to females”, “Mostly attracted to females”, “Equally attracted to females and males”, “Mostly attracted to males”, “Only attracted to males” and “not sure”.¹⁹ Minority attraction was defined as anyone attracted equally to both sexes, mostly to the same sex, or only to the same sex, while “not sure” was classified as undetermined. For those who chose a gender other than male or female, sexual behaviours and sexual attraction were classified as undetermined, as it was not possible to ascertain what would constitute “same sex” or “opposite sex” partners.

To capture the broadest group of sexual minorities, a composite measure was created wherein those who were coded as a sexual minority on one or more dimensions (lifetime or past-year behaviour, identity, or attraction) were classified as sexual minorities; those who were heterosexual on all measures were classified as heterosexual. Those who were “undetermined” in any of the measures without reporting any sexual minority responses were classified as undetermined (example: a male who indicated he did not know his sexual identity, had not had sex and reported attraction to “mostly females”). In this composite measure, since it is unclear how a non-binary person with a gender other than male or female would be heterosexual as there is no “opposite” sex, those who chose a gender that is “something else” were classified as a sexual minority; only two of these participants indicated that they were heterosexual.

Statistical analysis

First, we examined the sensitivity and specificity of the Statistics Canada measure to determine to what extent this single-item question correctly captures sexual minorities and heterosexuals (after excluding undetermined responses), broadly defined; and defined by each domain: identity, past-year behaviour, lifetime behaviour, and attraction. We also measured the concordance level between the Statistics Canada question and each other item, using Cohen’s kappa statistics for all participants who completed both questions. “Don’t know” responses to the Statistics Canada question were considered concordant with a “not sure” attraction. “Undetermined” responses, which are: “I have not had sex” and “something else” gender were included but not considered concordant with any responses on the Statistics Canada question. Attraction to “mostly the opposite sex” was considered concordant with reporting of heterosexual on the Statistics Canada question, while “mostly the same sex” attraction was considered concordant with reporting of homosexual. These analyses were stratified by trans status, as measures may perform differently for trans respondents. Using Fisher’s exact test, the socio-demographics of participants whose responses to the Statistics Canada questions were concordant with the other items from SMART Guide were compared with those who were discordant. All analyses were conducted using SAS 9.3.

RESULTS

In total, 588 Canadians completed the first survey and provided information and consent for recontact; 311 participants completed both the Statistics Canada and the SMART Guide questions. There were no statistically significant socio-demographic differences between those who returned to complete the follow-up questions and those who did not (results not shown). As shown in Table 1, a majority of participants were multi-generational Canadian (68.2%), were white (76.0%), identified as female (69.1%), resided in Ontario (55.6%) and had a post-secondary degree (77.5%). About 45.3% identified as a sexual minority and 17.0% as trans. There were no statistically significant differences in demographics between sexual minorities who were captured by the Statistics Canada question ($n = 139$) and those who were not ($n = 23$) (results not shown). Albeit not significant, there may be a higher proportion of sexual minority females who were not captured by the Statistics Canada question, compared to males or other gender (18.3% vs. 6.3% vs. 7.7%, $p = 0.18$). This was supported by a closer examination of those who were not captured by the Statistics

Table 1. Socio-demographics of participants ($n = 311$)

	<i>n (%)</i>
Gender	
Male	61 (19.6)
Female	215 (69.1)
Something else	35 (11.3)
Trans status	
Yes	53 (17.0)
No	258 (83.0)
Education	
Post-secondary graduation	241 (77.5)
Some post-secondary	47 (15.1)
Secondary graduation (no post-secondary)	14 (4.5)
Less than secondary graduation	9 (2.9)
Ethnoracial background	
Indigenous (First Nations, Métis or Inuit)	11 (3.6)
White (non-Indigenous)	234 (76.0)
Racialized (non-Indigenous)	63 (20.5)
Age, years (Mean = 35.3)	
14–18	17 (5.5)
19–24	50 (16.1)
25–34	113 (36.3)
35–44	60 (19.3)
45–54	35 (11.3)
55–64	33 (10.6)
65+	3 (1.0)
Family immigration history	
Multi-generational Canadian	212 (68.2)
First generation Canadian	47 (15.1)
Immigrants	52 (16.7)
Sexual orientation (Statistics Canada)	
Heterosexual	151 (48.6)
Homosexual	57 (18.3)
Bisexual	84 (27.0)
Don't know	18 (5.8)
Skipped	1
Residences	
Alberta	20 (6.4)
British Columbia	57 (18.3)
Manitoba	7 (2.3)
New Brunswick	16 (5.1)
Newfoundland and Labrador	2 (0.6)
Nova Scotia	14 (4.5)
Ontario	173 (55.6)
Prince Edward Island	0
Quebec	11 (3.5)
Saskatchewan	11 (3.5)
Northwest Territories, Nunavut and Yukon	0

Canada question; 79.0% of these were females who responded as heterosexual on the Statistics Canada question but reported sexual experiences with both sexes in their lifetime. There was also a suggestion that fewer youths than adults may have been misclassified by the Statistics Canada question; this difference approached significance (3.3% vs. 16.7%, $p = 0.08$).

Sensitivities and specificities for the Statistics Canada item, with regard to other measures of sexual orientation, are displayed in Table 2. The single-item question had an overall sensitivity and specificity of 85.8% and 100.0%, which indicates that 14.2% of sexual minorities were incorrectly classified as heterosexual by the Statistics Canada question; while all heterosexuals were classified correctly. The sensitivity among trans individuals was 92.1% (no trans individuals were classified as a minority from the composite measure, so specificity could not be calculated). In capturing past-year behaviour, the sensitivity and specificity of the Statistics Canada question were 98.4% and 80.4%. Sensitivity analysis was conducted to determine whether results would hold when the definition of minority sexual attraction was broadened to include “mostly opposite sex” attraction; sensitivity and specificity were changed to 68.0% and 100.0% respectively.

Kappa statistics for chance-corrected agreement between measures are shown in Table 3. Agreement between the Statistics Canada question and the SMART identity question was 0.89 overall, 0.76 for trans people and 0.92 for cisgender. Agreement with past-year behaviour and lifetime behaviour were 0.39 and 0.48; for trans people, they were 0.11 and 0.0, and for cisgender people, 0.41 and 0.55. Finally, agreement with sexual attraction was 0.57 overall, 0.62 for cisgender and 0.27 for trans people.

Those who identified as something other than male or female were more likely to report sexual identity, behaviours and attraction that were discordant to their Statistics Canada response compared to those who identified as males or females ($p < 0.0001$). Discordance among this group was extremely high; proportion of reported discordant identity, 12 months behaviour, lifetime behaviour and sexual attraction were 22.9%, 80.0%, 80.0% and 91.4% respectively, which were much higher than any of the proportions for males and females. Analyses also showed that compared to adults, youths were significantly more likely to report a 12 months sexual behaviour (56.7% vs. 38.9%, $p = 0.01$) and sexual attraction (39.7% vs. 25.4%, $p = 0.02$) that were discordant to their Statistics Canada responses; youths' discordance in their reported lifetime sexual behaviour (44.8% vs. 32.8%, $p = 0.08$) and sexual identity (12.0% vs. 5.7%, $p = 0.10$) also approached significance. Other demographic groups were not significantly different in their discordance (results not shown).

DISCUSSION

Our findings have documented that there is potential underestimation of sexual minorities from the single-item Statistics Canada question: about 14% of sexual minorities (broadly defined) would not be identified; 79% of the misclassification were heterosexual females who have had a same-sex partner. Given our method of ascertaining sexual minority status that classified some who responded as “don't know”, “I have not had sex” and “not sure” as “undetermined”, the actual rate of misclassification could be higher. When we examined Statistics Canada's question with participants' past-year

Table 2. Sensitivity of Statistics Canada question in capturing sexual minorities status and specificity at capturing non-minorities, using different measures

	Cisgender % (95% CI)	Trans % (95% CI)	Overall % (95% CI)
Sexual minority status, broad composite measure*			
Sensitivity	<i>n</i> = 225 83.9 (77.4–90.3)	<i>n</i> = 38 92.1 (83.5–100)	<i>n</i> = 263 85.8 (80.4–91.1)
Specificity	100	–†	100
Sexual minority identity*			
Sensitivity	<i>n</i> = 244 98.1 (94.3–100)	<i>n</i> = 37 100	<i>n</i> = 281 99.3 (97.8–100)
Specificity	100	100	100
Sexual minority behaviour, past year*			
Sensitivity	<i>n</i> = 196 98.1 (94.3–100)	<i>n</i> = 15 100	<i>n</i> = 211 98.4 (95.3–100)
Specificity	81.9 (75.6–88.2)	25 (0–67.4)	80.4 (74.0–86.8)
Sexual minority behaviour, lifetime*			
Sensitivity	<i>n</i> = 231 82.7 (75.4–90.0)	<i>n</i> = 17 –‡	<i>n</i> = 248 84.2 (77.6–90.7)
Specificity	94.5 (90.5–98.5)	–‡	93.7 (89.6–97.9)
Sexual minority attraction*			
Sensitivity	<i>n</i> = 240 97.3 (93.7–100)	<i>n</i> = 20 100	<i>n</i> = 260 97.8 (94.7–100)
Specificity	87.8 (82.9–92.9)	40 (0–82.9)	86.5 (81.3–91.6)

* Sample size differs because each analysis excludes those who were unclassifiable based on each dimension of sexual orientation. Unclassifiable by Statistics Canada question (*n* = 19); composite measure of sexual minorities from SMART Guide (*n* = 32); both (*n* = 3). Unclassifiable by SMART Guide sexual identity (*n* = 25); unclassifiable by sexual behaviour in the past year (*n* = 96); unclassifiable by sexual behaviour in their lifetime (*n* = 55); unclassifiable by sexual attraction (*n* = 44).

† Specificity for this dimension cannot be calculated because no trans persons were classified as heterosexual by the composite measure.

‡ These numbers are uninterpretable for trans people since it is unknown when they have sex.

Table 3. Chance-corrected agreement between the Statistics Canada measure and other measures of sexual orientation

	Kappa (95% CI)		
	Cisgender (<i>n</i> = 258)	Trans (<i>n</i> = 53)	Overall (<i>n</i> = 311)
Statistics Canada vs. sexual minority, broad composite measure	0.65 (0.58–0.73)	0.1 (–0.05 to 0.24)	0.62 (0.55–0.69)
Statistics Canada vs. sexual identity	0.92 (0.87–0.96)	0.76 (0.62–0.90)	0.89 (0.85–0.93)
Statistics Canada vs. sexual behaviour, past year	0.41 (0.33–0.48)	0.11 (–0.02 to 0.24)	0.39 (0.33–0.46)
Statistics Canada vs. sexual behaviour, lifetime	0.55 (0.47–0.63)	0 (–0.15 to 0.15)	0.48 (0.41–0.55)
Statistics Canada vs. sexual attraction	0.62 (0.55–0.70)	0.27 (0.15–0.41)	0.57 (0.50–0.63)

behaviour, sensitivity and specificity were 98.4% and 80.4% respectively. This meant that those who reported sexual minority behaviours in the past year were correctly identified 98.4% of the time. About 20% of those who had only heterosexual behaviours in the past year identified as bisexual, which produced a lower specificity. On the other hand, trans people appear to be correctly classified with both measures, given the high sensitivity and because no trans participants were classified as heterosexual by the broadest composite measure. While research has shown that most trans people identify as sexual minorities and indicate attraction to more than one gender, some trans persons do identify as straight.^{20,21}

This misclassification may explain the low proportions of sexual minorities observed in CCHS surveys, where 3% identified as gay, lesbian or bisexual.²² While this is similar to the proportion of those who identify as sexual minorities in the US,²³ population surveys indicate up to 20% of women and 7% of men reported behaviour or attraction that is not exclusive to the opposite sex.²³ Health varies depending on identities, behaviour and attraction; for example, heterosexual-identified women with same-sex partners were at much higher risk for smoking and alcohol abuse compared to lesbian-identified women with same-sex partners.^{12,13}

These complexities cannot be studied using the single Statistics Canada item, as they require assessment of multiple domains of orientation.

While sexual behaviour questions were added to the 2015–2016 CCHS cycle, it is unclear whether these will become permanent.²⁴ We are not aware of any plans to add a sexual attraction question to any future Statistics Canada survey, but our findings suggest that this dimension is important. The Statistics Canada question had only moderate agreement with sexual attraction when “mostly” attractions were combined with their respective categories. Previous studies found those who are “mostly heterosexual” are a distinct group from those who identify as exclusively heterosexual or bisexual. “Mostly heterosexuals” were found to have higher risk for mental and physical health compared to those who were exclusively heterosexuals.^{25,26}

While asking the single-item question may not be enough, our results suggest that past studies have correctly interpreted this question as a sexual identity question, as shown by the high but imperfect agreement of 0.89 between the Statistics Canada item and the SMART Guide sexual identity item. However, as an identity measure, the item performed better for cisgender participants (*K* = 0.92) than for trans participants (*K* = 0.76).

As the Statistics Canada item had much lower agreement with both past-year and lifetime sexual behaviours, it can be less accurately interpreted as a behaviour question. This was particularly true for trans people and youth, since the proportion with discordance between the Statistics Canada question and behavioural measures was higher among these groups compared to cisgender persons and adults respectively. In fact, we observed an agreement of zero with lifetime behaviour among trans people, which suggests an agreement no better than by chance alone. This was primarily due to the circumstance of participants not having had sex in the past 12 months.

As one might expect, there was also a higher discordance among those who identified with a gender other than male or female, as these questions assumed cisnormativity (that everyone is cisgender).²⁷ Participants who were not male or female were always unclassifiable by these measures; the only way their reported attraction and behaviour could be concordant was if they had not had sex or were unsure of their attraction. Even reported sexual identities were more likely to be discordant to their Statistics Canada item response for those who identified as neither male nor female. This may have been due to the limiting terminologies of “opposite sex” and “your own sex” accompanying the identities presented in the Statistics Canada question. The same problem might occur for cisgender people who may have a trans or non-binary partner, since they were unable to indicate their partner’s gender in the question. We note that within Statistics Canada surveys, trans persons remain invisible, and priority should be given to addressing ways to identify trans people who may have unique health needs regardless of sexual orientation.

Discordance with sexual identity may also be higher among youths, although the difference only approached significance. This appears to contradict results from our previous analysis, where sexual minority youths were more likely to be correctly classified by the Statistics Canada measure compared to adults. However, this particular analysis excluded those who were unclassifiable; many youths in our study have not had sex. Hence, the Statistics Canada question appears to work well for cisgender youths who have had sexual experiences and have committed to an identity. However, for those who were unclassifiable and have not had sex, the Statistics Canada question performed poorly, since there was no option for them to indicate this. Given that youth will have had fewer opportunities for sexual experience compared to adults, researchers should keep this in mind when interpreting sexual behaviour results comparing youths with adults, particularly over lifetime time frames.

To obtain enough sexual and gender minority participants for analysis, this study utilized a national convenience sample with targeted online recruitment. As a result, the sample contains a deliberate over-representation of sexual and gender minorities, and a less deliberate over-representation of women and those with post-secondary degrees. The elderly and residents of Quebec were under-represented, the latter almost certainly as a result of the English language study. Hence, all proportions presented in this study should be interpreted with regard to the study sample rather than for the Canadian population, and with regard to online survey performance rather than other modes (e.g., telephone, paper).

CONCLUSION

Our study has provided initial evidence that there may be problems with the current sexual orientation measure in Canadian health surveys. Researchers and those working in public health can best interpret findings from data analyses using the Statistics Canada sexual orientation item as applying to groups who indicate a lesbian, gay or bisexual identity, and should be careful of extrapolating to the larger group of sexual minorities who may have same-sex sexual histories or attractions. Our findings call for future research to examine whether there are better ways to address the different concerns over this single-item question. This will allow for a more refined analysis of health inequities, which has the potential to lead to better public health policies and practices and improve understanding of patterns of health in Canada.

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RÉSUMÉ

OBJECTIF : La recherche en santé publique sur les inégalités au Canada est fortement tributaire des jeux de données démographiques comme l'Enquête sur la santé dans les collectivités canadiennes. L'orientation sexuelle a trois dimensions (l'identité, le comportement et l'attraction), mais Statistique Canada et les organismes de santé publique l'évaluent à l'aide d'un seul élément de questionnaire qui porte sur l'identité, laquelle est définie selon le comportement. Notre étude vise à évaluer cet élément afin de clarifier l'interprétation des taux de fréquence et des inégalités liés à l'orientation sexuelle.

MÉTHODE : Au moyen d'un échantillon de commodité de Canadiens de ≥ 14 ans obtenu en ligne, les participants ($n = 311$) ont répondu à la question de Statistique Canada et à un deuxième jeu de questions sur l'orientation sexuelle.

RÉSULTATS : La question à un seul élément avait un taux de sensibilité de 85,8 % pour saisir les minorités sexuelles, définies au sens large par leur identité sexuelle, leur comportement au cours de la vie et leur attirance. Le coefficient kappa de concordance entre l'élément unique et l'identité sexuelle était de 0,89; avec le comportement au cours de l'année précédente, le comportement au cours de la vie et l'attraction, il était de 0,39, 0,48 et 0,57, respectivement. L'élément unique a saisi 99,3 % des personnes ayant une identité sexuelle minoritaire, 84,2 % des personnes ayant déjà eu des partenaires du même sexe durant leur vie, 98,4 % des personnes ayant eu des partenaires du même sexe au cours de l'année précédente, et 97,8 % des personnes ayant indiqué avoir une attirance supérieure ou égale pour les personnes du même sexe.

CONCLUSION : Les résultats des enquêtes de Statistique Canada peuvent au mieux être interprétés comme s'appliquant aux personnes qui s'identifient comme faisant partie de minorités sexuelles. Les analyses qui reposent sur cet indicateur sous-identifient les personnes ayant eu des partenaires du même sexe ou étant attirées par des personnes du même sexe sans s'identifier comme faisant partie d'une minorité sexuelle, et devraient être interprétées en conséquence. Pour comprendre les tendances de santé des minorités sexuelles au Canada, il faudrait intégrer les autres dimensions de l'orientation sexuelle.

MOTS CLÉS : conception de questionnaires; homosexualité; orientation sexuelle; identité de genre; inégalités