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Simultaneous effect of disabling conditions on primary health care use through a capability approach

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ABSTRACT

There is evidence of social disparities in the use of primary health services in most European countries, and these disparities particularly affect people with disabilities. Many determinants of disabilities interact to limit access to health care (e.g. impairments, functional limitations, educational level). However, these determinants have typically been examined separately. We adopted a capabilities perspective to define multidimensional disability. Capabilities refer to individuals' real opportunities to achieve possible outcomes. In this context, we aimed to assess disability through latent capabilities (shaped by personal, social and environmental variables) and to simultaneously analyze their effects on primary health care use (GP and nurse care; cervical, breast, and colorectal cancer screenings). We used a structural equation modeling framework, which allowed complete and simultaneous tests of relationships taking into account measurement errors. The data source was the 2008 French Health and Disability Survey (29,931 individuals). Potential disability-related determinants were selected to measure five latent variables: *health condition* and *cognitive, physical, societal,* and *socioeconomic capabilities*. All things being equal, we did not identify any specific barriers to GP care use. We found a lower likelihood of nursing care use among people with lower *cognitive capabilities*. Unlike usual findings, we did not observe a significant influence of either *cognitive* or *physical capabilities* for any type of cancer screening use. However, cancer screening participation was mainly affected by *societal* and *socioeconomic capabilities*. Considering the capability approach, which suggests public action oriented toward restoring capabilities of individuals, future programs should seek to increase societal support to compensate for disability. This approach could be helpful in reducing inequalities in health care access.

1. Introduction

The Alma-Ata Conference (WHO, 1978) mobilized a “Primary Health Care Movement” to address “politically, socially and economically unacceptable” health inequalities within all countries. Unfortunately, there are social disparities in the uptake of primary health services in most European countries, where evidence indicates differences in the utilization of primary health services for equal care needs (van Doorslaer et al., 2006). Several studies have shown that the likelihood of an individual using health services is not equally distributed across socioeconomic and sociodemographic groups. Gender, education, occupation, and income are all attributes that are closely linked to the way a person uses health care services.

People with disabilities constitute a significant part of the population: in 2010 approximately 15% of the world's population reported a disability. This population continues to expand as the numbers of aging individuals and of people with chronic health diseases both increase (WHO, 2011). As a disadvantaged population in terms of socioeconomic characteristics and health outcomes (Iezzoni, 2011), people with disabilities experience barriers to accessing many services, including health care services (Diab and Johnston, 2004). To date, the determinants of disability have typically been examined separately (Angus et al., 2012). Indeed, the literature has mainly considered limitations or restrictions to daily activity as the only aspect of disability without taking into account the complex relationship between disability and disadvantageous situations.

Disability is causal in certain cases because it leads to precarious situations and greater vulnerability in terms of social integration

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(Mithen et al., 2015; WHO, 2011). Disability can also be a consequence in other cases because the most disadvantaged populations are more often affected by disability, and a person's socioeconomic environment may also be disabling (Mäki et al., 2013; Morciano et al., 2015). The strong relationship between disability and disadvantage can be described as a vicious circle that suggests many interactions between what constitutes disability and its consequences. The different determinants of a disability situation (e.g., impairment, functional limitations, socioeconomic factors) can interact to limit access to health care, and it is relevant to examine their simultaneous effects.

We adopted a capability perspective to define a disability situation. The capability perspective focuses on the extent to which people are empowered to make decisions about important aspects of their life (Burchardt and Vizard, 2014) and how they "convert" certain resources into possible outcomes (e.g., being healthy, participating in social activities). Hence, capabilities refer to an individual's real opportunities to achieve these outcomes (i.e., the ability to be healthy, the ability to participate in society). By acknowledging that all people differ in their abilities to convert resources into outcomes, Nussbaum's capability approach can take disabled people into account (Nussbaum, 2011). The capability approach is a useful framework for defining disability (Mitra, 2006). Using this framework, disabling conditions can be analyzed as deprivations in terms of capabilities that result from the interaction of a variety of factors ('conversion' factors, in the capability terminology), such as an individual's personal characteristics, available resources, and social and environmental factors (e.g., architectural, economic, and political). These factors can influence people's ability to utilize health care services. The capability approach that we adopt has the benefit of offering a much richer set of dimensions to capture potentially diverse disabling determinants rather than focusing solely on a few indicators of disability.

To explore the complexity of the relationships among variables (i.e., disabling determinants, capabilities and health care use), we used structural equation modeling (SEM) to conduct simultaneous tests of all relationships and as the most appropriate way to assess latent capabilities, taking into account measurement errors.

The aim of the study was to assess the effect of a set of disabling conditions on primary health care use through a capability perspective. We first developed and empirically tested a theoretical model in which disabling conditions were assessed through capabilities. Then, we analyzed the simultaneous effects of these latent capabilities on primary health care use.

This paper is organized as follows. Section 2 presents the materials and methods, introduces the capability approach background and the general principles of SEM, and describes the data, the econometric model and the statistical analysis. Section 3 contains our empirical results and presents robustness checks. Section 4 discusses the results and the method and concludes.

2. Materials and methods

2.1. The theoretical background to assess disability: the capability approach and the international classification of functioning, disability and health (ICF) framework

2.1.1. The capability approach

The capability approach was initiated by Sen (Sen, 1985). In his seminal work 'Commodities and Capabilities, he focused on the type of life that people are able to live. Capability (what I am able to do or be) appeared as the substantive freedom to achieve alternative functioning (what I actually do or am) combinations. This approach is concerned with people's ability to do valuable things rather than focusing only on things people actually do. Health is a major concern in Sen's capability approach; it is considered as a component of individuals' well-being and analyzed as a component of the social justice arrangements (Sen, 2009, 2002). The capability approach is particularly suited for investigating issues such as health because it offers a wider space to evaluate the freedom and opportunities to achieve different outcomes. Nussbaum's work (Nussbaum, 2011) refined the new conception of social justice initiated by Sen. Starting with the idea of a life in accordance with human dignity, Nussbaum listed ten central capabilities that represent a minimum standard of a just life: bodily health; bodily integrity; senses, imagination and thought; emotions; practical reason; affiliation; other species; play; and control over one's environment.

More recently, Harnacke explored disability rights within Nussbaum's capability perspective (Harnacke, 2013). He acknowledges that all people differ in their abilities to convert resources into functioning and believes that the Nussbaum's capability approach provides a good starting point from which to analyze disability. A person with impairments might not be able to do many things that a person without impairments can do with the same resources. Therefore, following the idea of social justice, a person becomes disabled due to unjust social arrangements and environments, and this person should simply receive more resources to be compensated for their disability. Examining the literature, Fleurbaey and Maniquet confirmed that some of the characteristics that make individuals unequal call for compensating transfers; these characteristics are involved in distributive issues (Fleurbaey and Maniquet, 2011). Thus, in a good resource allocation system, no actor should be envious of another actor with same circumstances (Fleurbaey, 2008).

Interpreting Sen's work, Mitra argued that the capability approach is a useful framework for defining disability, which can be analyzed as a lack of capability due to restriction in the range of opportunities that results from the interaction of a variety of factors. In particular, the capability approach suggests the possibility that the economic environment of a person can be disabling (Mitra, 2006). Following this idea, Welch noted that the capability approach emphasizes the need to move beyond the individual body level to understand the influence of the environment on individual functioning and disability (Welch Saleeby, 2007). Several other authors in different disciplines have defined disability using Sen's capability approach (Burchardt, 2004; Le Fanu, 2014; Morris, 2009), and many authors have argued that this approach opens new perspectives for policy making because it focuses on the specificities of the disabling situation to consider equality in terms of possibilities, such as reducing the consequences of disability (Biggeri et al., 2011; Dubois and Trani, 2009; Trani et al., 2011). The benefit of using the capability approach is that it can address the complexity of disability and cover the full range of the disability experience by shifting the focus away from the restricted view of identifying impairments (Dubois and Trani, 2009).

2.1.2. The international classification of functioning, disability and health (ICF) framework

As the closest statement to a definition of disability under the capability approach (Mitra, 2006), the ICF proposes a biopsychosocial perspective in which disability is defined as a complex phenomenon that reflects the interaction between the features of a person's body and the features of the society in which he or she lives (WHO, 2001). The ICF shares several common aspects with the capability approach, which facilitates the combined use of both

frameworks and provides helpful disability-related terminology (Dubois and Trani, 2009; Welch Saleeby, 2007).

The ICF model posits that disability originates from a health condition that gives rise to impairments and to activity limitations and participation restrictions in relation to contextual factors. Impairment is a significant deviation or loss of normal body function or structure. An activity limitation is a difficulty that an individual encounters when executing a task or action, and a participation restriction is a problem that an individual experiences with regard to involvement in daily life situations. Contextual factors have two components: (1) environmental factors (the physical, social and attitudinal environment in which people live), which either facilitate or hinder functioning, and (2) personal factors (e.g., sociodemographic and socioeconomic characteristics). The ICF recognizes that an individual may experience restricted participation in a major life area for many reasons, including personal factors. However, the ICF classification does not include this area. The assessment of these personal factors is left to the discretion of the user of the classification (Bickenbach et al., 1999; Rouquette et al., 2015).

2.2. The general SEM framework

SEM was used to examine the empirical validity of the hypothesized pathways. SEM is the most appropriate methodology to assess latent capabilities and to model their joint impact on health care use. Latent variables represent constructs that have fundamental substantive importance but are measured only indirectly through multiple observed variables that capture different aspects of the construct (Muthén, 2002). SEM can handle multi-equations and measurement errors that are inherent in self-reported data (Bollen and Noble, 2011; Loehlin, 2004; Skrondal and Rabe-Hesketh, 2004). Thus, it is essential to our research purposes.

The methodology of SEM has two components (Byrne, 2013; Muthén and Muthén, 2012): a measurement component and a structural component. The measurement part is estimated through confirmatory factor analysis (CFA) and describes the relationships between a set of observed variables (also called indicators) and a set of continuous latent variables. Once the measurement model has been specified, the structural part is modeled, describing the relationships of latent variables to other observed variables (that are not included in the measurement part). The SEM framework simultaneously estimates both parts. Using this method, one can study the effect of the theoretical variables of primary interest (latent variables) without biasing the estimations because of measurement errors (Bollen, 1989).

2.3. Data, selection of variables and selection of the study population

2.3.1. Data source

Data came from the *Health and Disability Survey – Ordinary Household Section* (HSM, available at http://www.drees.sante.gouv.fr/les-enquetes-handicap-sante,4267.html), which was conducted in 2008 by the French National Institute of Statistics and Economic Studies (INSEE) and the Social Affairs Ministry. The database was made available to the authors in accordance with the French law (decree of the 21 November 2008 concerning the recipients of anonymous individual data files from the national health and disability survey, available at http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000019934696).

The HSM is a national cross-sectional survey that aimed to measure the prevalence of various forms of disabling situations to assess the social disadvantages of disabled people. It aimed to be used to assess the need for assistance, including formal and informal care (e.g., professional or family assistance) as well as technical support (e.g., necessary alterations of home, medical devices) and measuring the social disadvantages experienced by disabled people.

The HSM asked detailed questions regarding individuals' health, such as diseases and impairments (physical, cognitive, sensory), and their consequences, such as functional limitations (physical, cognitive, sensory) and restrictions of social participation (e.g., difficulties in accessing to the labor market, lower educational opportunities and leisure, poorer social network). People were asked about their use of health care and the different forms of assistance that they received or required. Information regarding their sociodemographic characteristics was also collected.

The HSM database contains 29,931 individuals. Final weights calculated by the INSEE ensured that the data were representative of the French population living in households (Bouvier, 2011). All information was directly gathered by trained investigators who collected data from people in their homes. When individuals were unable to independently respond to the questionnaire, a proxy was asked to provide help.

2.4. Selection of variables from the HSM survey

For the measurement model, the selection of potential disability indicators was based on the conceptual list of the ICF. We modeled five latent variables to describe a complete potential situation of disability.

The first set of indicators was chosen to underline health conditions in terms of diseases, impairments, perceived health status and symptoms (e.g., sleep disorders, tiredness, stress, palpitations, discomfort). This latent construct was called *health condition capabilities*. The second set of indicators was chosen to underline cognitive activity limitations (e.g., understanding what people say, concentrating, remembering, being aggressive) and the resulting activity restrictions (e.g., establishing relationships, being disturbed in daily life because of a psychological problem). This latent construct was called *cognitive capabilities*. The third set of variables focused on physical activity limitations (e.g., walking, raising arms, seeing, hearing) and resulting activity restrictions, primarily in terms of activities of daily living (e.g., washing, using the toilet, dressing). This latent construct was called *physical capabilities*. The fourth set of variables focused on the participation restrictions of an individual in society (e.g., instrumental activities of daily living, leisure, employment, living as a couple), including environmental barriers (e.g., negative attitudes, inaccessible transportation and public buildings, limited social support, and the need for human/technical assistance). This latent construct was called *societal capabilities*. The last set of variables was added to include some personal factors, specifically socioeconomic factors (educational level, insurance, income, homeownership, savings). This last latent construct was called *socioeconomic capabilities*. We included personal factors, which were proposed in the ICF but have not yet been classified, as a component of the model because they may limit full participation in society. A complete description of these variables (label, definition, type and categories) is shown in Appendices 1–5. The lowest category always represents the worst situation in terms of capability, whereas the highest category represents the best possible situation. A person with a lower score on the latent variable scale should be considered more disabled than an individual with a higher score.

The latent variables were simultaneously entered into regression equations to examine primary health care use. The term “primary care” is often used to denote “first contact” and the accessibility, continuity and permanence of care provided. Here, the general practitioner (GP) plays an essential role, although other

health professionals, notably nursing staff, can also be involved. Primary health care covers a broad range of health services, including diagnosis and treatment, disease prevention and screening. The following empirical analysis focused on GP care use, nursing care and the receipt of Pap tests (cervical cancer screening), mammography (breast cancer screening), and the Fecal Occult Blood Test (FOBT) (colorectal cancer screening). Appendix 6 shows the primary health care variables used in the structural part.

The CFA model in which the simultaneous measurement of the five latent variables (and covariance relationships between these variables) were estimated was termed the *capability model.* All variables that were included in the model were either dichotomous or categorical. Age and gender were included as explanatory variables of health care use in SEM models and not included as indicators in the measurement part because they are individuals' intrinsic characteristics and therefore do not vary with the latent factors (see Appendix 7 for descriptive statistics).

2.5. Selection of the study population from the HSM survey

From the HSM population, we selected individuals aged over 18 years. This primary sample comprised 25,036 individuals and was the sample in which the measurement part was conducted. The resulting *capability model* was applied to the primary health care use of four samples according to the health services studied (i.e., the baseline sample for GP care and nursing care and the three subsamples for the three cancer screenings).

The GP visits and nursing care were analyzed with the total sample of 25,036 individuals. The analyses of the receipt of Pap tests were conducted with a subsample of 8732 women aged 20–65 years. The analyses of mammography tests were conducted with a subsample of 6061 women aged 40–75 years. The analyses of FOBT receipt were conducted with a subsample of 11,035 individuals aged 50–75 years. The ages of the latter three groups were based on international recommendations (American Cancer Society, US Preventive Services Task Force, European Union Council).

2.6. The econometric formulation and the theoretical diagram

The econometric model notation was inspired by Muthén's model with categorical data (Muthén, 1984, 1983).

Consider a random vector $y(j\times1)$ that comprises j observed categorical dependent variables y_n, that are the indicators of the latent capabilities in our model. Let $y^*(j\times1)$ be a vector of continuous underlying response variables, one for each observed categorical variable. Let $\eta(m\times1)$ be a vector of m continuous latent variable measured from the y^*'s. The linear measurement relationships between the continuous response variables and the continuous latent variable is represented by:

$$y^* = \Lambda\eta + \varepsilon,$$

where $\Lambda(j\times m)$ is the parameters matrix, named *loadings*, for the regressions of the response variables on the latent variables and $\varepsilon(j\times1)$ is a random vector for residuals (measurement errors) with zero expectation.

We used the WLSMV estimator (weighted least square mean and variance adjusted), which provides the best option for modeling with categorical data. The coefficients are probit regression coefficients, and their sign and significance must be interpreted. A higher loading indicates that a greater proportion of the indicator variance is attributable to the latent variable. Loadings are usually standardized, and they translate their respective contributions to the assessment of the latent variable.

Our particular model, in which five latent variables are modeled, is represented by the following equation:

$$y_n^{p*} = \Lambda_n^p \eta^p + \varepsilon_n^p,$$

where y_n^{p*} $(n = 1, \ldots, N)$ are the indicators measuring the latent variable η^p ($p = 1$ (*health condition capabilities*), $p = 2$ (*cognitive capabilities*), $p = 3$ (*physical capabilities*), $p = 4$ (*societal capabilities*), and $p = 5$ (*socioeconomic capabilities*)) (see Appendices 1–5), and Λ_n^p is the matrix of loadings of the indicators on the latent variable.

The five latent variables ($\eta^1,\eta^2,\eta^3,\eta^4,\eta^5$) were simultaneously entered into regression equations to explain health care use:

$$z_i = \lambda_i + \sum_{p=1}^{5} \delta^p \eta^p + \beta^q \cdot covariates^q + \upsilon_i,$$

where $z_i's$ ($i = 1$ (GP care), $i = 2$ (nursing care), $i = 3$ (cervical cancer screening), $i = 4$ (breast cancer screening), and $i = 5$ (colorectal cancer screening)) are dichotomous variables of the use of primary health care (see Appendix 6); $\delta^p's$ $(p = 1, \ldots, 5)$ are the coefficients for the regression of z_i on the five latent variables η^p; β and α are the coefficients for the regression of z_i on age and gender, respectively; λ_i is the intercept term; and υ_i is the error term. The equations for the analysis of cancer screening use were slightly different. For the three types of screening, we added an adjustment for the number of visits to the GP. Moreover, gender was not included as an explanatory variable for female cancer screenings.

Measurement and structural models are generally represented by diagrams (Byrne, 2013; Loehlin, 2004). The hypothesized SEM in which the *capability model* is measured and that simultaneously explains health care consumption is represented in Fig. 1. In the diagram, the errors ε_n^p linked to indicators include all other variables that influence the indicator beyond its respective latent variable. The diagram shows how errors influence each capability indicator but do not influence the latent variables.

2.7. Statistical analysis

Descriptive statistics of all observed variables used in the study were conducted. These statistics were computed with the total sample of 25,036 individuals, except for the screening use variables, for which statistics were computed only for the appropriate subsample.

Estimations were conducted using Mplus Version 7.11 software. All of the following analyses were weighted to be representative of the French population living at home (Asparouhov, 2005). The general *capability model* was estimated (using CFA) on the baseline sample of 25,036 individuals. The entire SEM was estimated with respect to the outcome of interest (health care use variable) and the respective subsample.

In SEM framework, we can reject models that identify evidence of discrepancies when the model does not match the data. To approach such a validation, our model was evaluated using three indices of model fit (Hair et al., 2006; Hooper et al., 2008): the root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker Lewis Index (TLI). The RMSEA (MacCallum et al., 1996) is an absolute fit index that measures the degree of model adequacy. Higher values indicate worse fit, and a value of less than 0.08 was considered acceptable. The CFI and TLI (Bentler and Bonnet, 1980) are incremental fit indices that compare the improvement of the fit of the proposed model over the null model. They range from 0 to 1.0, with values closer to 1.0 (or more than 0.80) indicating a better fit.

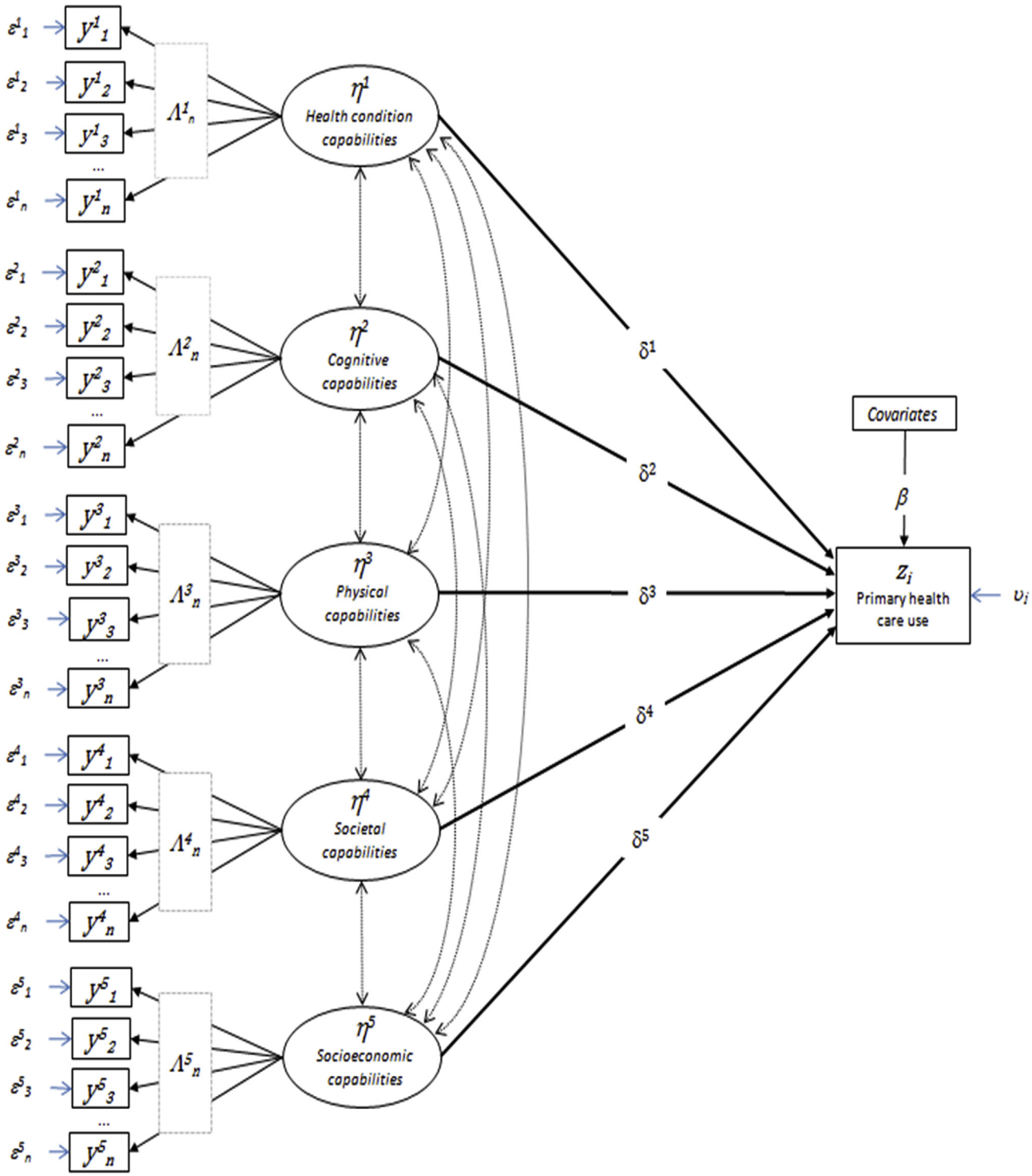

Fig. 1. The theoretical SEM. *Note*. (1) The latent variables are represented by ovals. The observed variables are represented by the boxes. The single-headed straight arrows that originate with the latent variables and terminate at the indicators represent direct relationships from the latent to the observed variables. The single-headed straight arrows that originate with the latent variables and terminate at the health care use variable represent the regression relationships of health care use variable on the latent variables. The small arrow are the error terms. The double-headed curved arrows between latent variables indicate the estimated covariance relationship between each pair of latent capabilities. (2) The covariates included in the analysis of primary care were different depending on the type of care considered. In the analysis of cervical, mammography and colorectal cancer screening, we added and adjustment for the number of visits to the GP. We did not include the gender explanatory variable for female cancer screenings.

Following the direction of the robustness check, it is important to note that the indicators' selection process was guided by preliminary analyses (in addition to the basics in the literature) before the estimation of the CFA. In this process, Cronbach's alpha coefficients of reliability (Cronbach, 1951) were computed to verify the homogeneity for each set of items (i.e., the average intercorrelation among indicators) used to measure the latent constructs (health condition, cognitive, physical, societal, and socioeconomic capabilities). Then, exploratory factor analyses (EFAs) were conducted separately for each set of indicators. Following the

Kaiser-Guttman rule, an eigenvalue of one or more identified the factors; otherwise, the latent construct contributes little to explaining the variances in the indicators (Brown, 2015; Muthén and Muthén, 2012). Based on the EFA results, only variables that were significantly associated with their respective latent construct were considered in the CFA. The *capability model* estimated through CFA was applied to each cancer screening sample, and we verified whether it fit the data according to the fit indices' values.

3. Results

3.1. Descriptive statistics

Descriptive statistics are displayed in Appendices 1 To 7. With regard to our outcomes of interest, these statistics showed that among the baseline sample of 25,036 individuals, 91.5% had visited a GP during the past 12 months, and 21.4% received care from a nurse. Among this sample, 55.6% were women, and the mean age was 55.0 years (standard deviation, SD = 18.7).

Among the subsample of 8732 women, 71% reported having received a Pap test in the recommended interval, and the mean age was 46.7 years (SD = 11.6). Among the subsample of 6061 women, 81% reported a mammography, and the mean age was 61.4 years (SD = 7.6). Among the subsample of the 11,035 individuals, 21.4% reported a FOBT, and the mean age was 61.2 years (SD = 7.5).

3.2. CFA results

Table 1–5 show the measurement model results (standardized loadings) estimated from the primary sample of 25,036 individuals. The significance of the entire path between observed variables and their relative latent constructs was confirmed because all loadings between each indicator and its latent factor were statistically significant ($p < .0001$). Furthermore, all indicators loaded positively onto their respective latent constructs.

Given the large amount of information, it is not possible to present all the tables summarizing the results of the measurement models estimated from the other three subsamples. These results are available as online Appendices 1–5.

Table 6 shows the estimated covariance values. The covariance relationships among all pairs of latent constructs were highly significant at the 1% level. The positive correlations between each construct showed that all of the constructs were dependent on one

Table 1
Measurement of the health condition capabilities.

Diseases	**0.71** $_{(0,01)}^{***}$
Chronic	**0.76** $_{(0,01)}^{***}$
Cognitive	**0.72** $_{(0,01)}^{***}$
Motor	**0.87** $_{(0,01)}^{***}$
Visual	**0.34** $_{(0,01)}^{***}$
Hearing	**0.52** $_{(0,01)}^{***}$
Speech	**0.83** $_{(0,01)}^{***}$
Symptom1	**0.52** $_{(0,01)}^{***}$
Symptom2	**0.55** $_{(0,01)}^{***}$
Symptom3	**0.55** $_{(0,01)}^{***}$
Symptom4	**0.49** $_{(0,01)}^{***}$
Symptom5	**0.58** $_{(0,01)}^{***}$
Symptom6	**0.63** $_{(0,01)}^{***}$
symptom7	**0.29** $_{(0,01)}^{***}$
Obesity	**0.38** $_{(0,01)}^{***}$
Oral health	**0.43** $_{(0,01)}^{***}$
Perceived health	**0.89** $_{(0,00)}^{***}$

Notes. Figures in bold are standardized factor loadings of the indicators on the latent factor. Standard errors are in parentheses.
***P < .0001.

Table 2
Measurement of the *cognitive capabilities*.

understand	**0.83** $_{(0,01)}^{***}$
Concentrate	**0.83** $_{(0,01)}^{***}$
Danger	**0.53** $_{(0,01)}^{***}$
Impulsive	**0.28** $_{(0,01)}^{***}$
Memory	**0.67** $_{(0,01)}^{***}$
Confusion	**0.78** $_{(0,01)}^{***}$
Dealing with people	**0.66** $_{(0,01)}^{***}$
Psycho	**0.66** $_{(0,01)}^{***}$
Solve	**0.98** $_{(0,01)}^{***}$

Notes. Figures in bold are standardized factor loadings of the indicators on the latent factor. Standard errors are in parentheses.
***P < .0001.

Table 3
Measurement of the *physical capabilities*.

Kneel	**0.90** $_{(0,00)}^{***}$
Arms	**0.78** $_{(0,01)}^{***}$
Walk	**0.96** $_{(0,00)}^{***}$
Stairs	**0.96** $_{(0,00)}^{***}$
Carry	**0.92** $_{(0,00)}^{***}$
Hand	**0.77** $_{(0,01)}^{***}$
Hear	**0.55** $_{(0,01)}^{***}$
See close	**0.60** $_{(0,01)}^{***}$
See far	**0.61** $_{(0,01)}^{***}$
Get dressed	**0.95** $_{(0,00)}^{***}$
Wash	**0.97** $_{(0,00)}^{***}$
Eat	**0.93** $_{(0,00)}^{***}$
Stand/sit	**0.92** $_{(0,00)}^{***}$
Toilet	**0.97** $_{(0,00)}^{***}$

Notes. Figures in bold are standardized factor loadings of the indicators on the latent factor. Standard errors are in parentheses.
***P < .0001.

Table 4
Measurement of the *societal capabilities*.

Shop	**0.97** $_{(0,0)}^{***}$
Administrative	**0.91** $_{(0,00)}^{***}$
Cook	**0.96** $_{(0,00)}^{***}$
Clean	**0.95** $_{(0,00)}^{***}$
Transport	**0.95** $_{(0,00)}^{***}$
Tel	**0.90** $_{(0,01)}^{***}$
Computer	**0.65** $_{(0,01)}^{***}$
Literate	**0.55** $_{(0,01)}^{***}$
Get out	**0.96** $_{(0,00)}^{***}$
Outings frequency	**0.83** $_{(0,01)}^{***}$
Friends	**0.29** $_{(0,01)}^{***}$
Family/friend meals	**0.33** $_{(0,01)}^{***}$
Work	**0.63** $_{(0,01)}^{***}$
Holidays	**0.55** $_{(0,01)}^{***}$
Sport	**0.62** $_{(0,01)}^{***}$
Garden	**0.49** $_{(0,01)}^{***}$
Cinema	**0.55** $_{(0,01)}^{***}$
Concert	**0.43** $_{(0,01)}^{***}$
Museum	**0.44** $_{(0,01)}^{***}$
Human assist	**0.80** $_{(0,01)}^{***}$
Technical assist	**0.56** $_{(0,01)}^{***}$
Discrimination	**0.33** $_{(0,01)}^{***}$
Access difficulty	**0.90** $_{(0,01)}^{***}$
Inadequate road	**0.86** $_{(0,01)}^{***}$
Feel disabled	**0.81** $_{(0,01)}^{***}$

Notes. Figures in bold are standardized factor loadings of the indicators on the latent factor. Standard errors are in parentheses.
***P < .0001.

Table 5
Measurement of the *socioeconomic capabilities*.

CMU-C	**0.29**$_{(0,02)}^{***}$
Couple	**0.33**$_{(0,02)}^{***}$
Education	**0.94**$_{(0,02)}^{***}$
Income	**0.53**$_{(0,01)}^{***}$
Homeowner	**0.13**$_{(0,02)}^{***}$
Interests	**0.15**$_{(0,02)}^{***}$

Notes. Figures in bold are standardized factor loadings of the indicators on the latent factor. Standard errors are in parentheses.
***P < .0001.

another and varied in the same manner.

3.3. The primary health care use analysis

Table 7 presents the result of the regressions of the primary health care use variables on the latent variables and covariates (the explanatory variables, in columns).

The results showed that for GP care and nursing care, growing older and being a woman had significant positive effects on their likelihood of use.

When adjusting for latent variables and covariates, the only capability regression coefficient that remained significant for GP use was *health condition capabilities*. When *health condition capabilities* increased, the likelihood of GP use decreased, all other factors being equal (coefficient = −0.62).

We observed a similar result concerning the effect of *health condition capabilities* on nursing care (coefficient = −0.44). However, unlike GP visits, *societal capabilities* had a significant negative effect on the likelihood of nursing care use (coefficient = −0.33). Conversely, *cognitive capabilities* had a significant positive effect (coefficient = 0.26), indicating that, all factors being equal, individuals with higher *cognitive capabilities* had a higher likelihood of utilizing nursing care.

Concerning preventive care, *socioeconomic capabilities* had a significant effect on women receiving Pap tests: women with higher *socioeconomic capabilities* were more likely to have a Pap test, all other factors being equal (coefficient = 0.34). This finding was identical to the finding regarding mammography use (coefficient = 0.31). However, for mammography use, *societal capabilities* also had a significant effect: women with higher *societal capability* were more likely to use mammography services, all other factors being equal (coefficient = 0.63). For FOBT use, *societal capabilities* were the only capabilities variable with a significant coefficient (coefficient = 0.31). Notably, the number of visits to the GP positively affected the likelihood of mammography and FOBT use (resp. coefficients = 0.05, 0.06). Finally, we observed that neither *physical* nor *cognitive capabilities* significantly influenced the likelihood of screening use, all factors being equal.

Table 6
Covariance relationships between all pairs of latent variables.

Latent variables	η^1	η^2	η^3	η^4	η^5
η^1	0.5	–	–	–	–
η^2	**0.4**	0.7	–	–	–
η^3	**0.5**	**0.5**	0.8	–	–
η^4	**0.5**	**0.6**	**0.8**	0.9	–
η^5	**0.1**	**0.1**	**0.1**	**0.2**	0.1

Notes. All covariances were significant at p < .0001.
η^1: the health condition capabilities latent variable.
η^2: the cognitive capabilities latent variable.
η^3: the physical capabilities latent variable.
η^4: the societal capabilities latent variable.
η^5: the socioeconomic capabilities latent variable.

3.4. Robustness

We obtained Cronbach's alpha values of 0.58, 0.63, 0.87, 0.80, and 0.73 for the five sets of indicators that measured *health condition*, *cognitive*, *physical*, *societal*, and *socioeconomic capabilities*, respectively. . The results of the EFAs in terms of fit indices (RMSEA, CFI and TLI) for each set of observed variables indicated that the one-factor propositions (for each set of indicators) provided a good fit to the data. In other words, EFAs confirmed that each set of indicators could satisfactorily represent a unique latent. These results are presented in the online Appendix 6.

The proposed *capability model* (CFA among the sample of 25,036 individuals) fit the data reasonably well: RMSEA = 0.027 (90% CI: 0.027 to 0.028), CFI = 0.98, and TLI = 0.96. The *capability model* also fit the data well under the index cut-offs for every subsample. This result favors the stability of the present proposed model. Fit indices for the different data samples are presented in the online Appendix 7. None of the inter-correlations between the latent constructs contained 1. Thus, we concluded that each construct was distinct from the others.

Finally, there was evidence that the entire SEM model (both the measurement part and the structural part) matched the data (according to the cut-off values of the fit indices). However, this evidence only suggested not rejecting our model. Hence, validation of the SEM model was supported since we have considered different populations (i.e., the baseline sample and the three subsamples) and different types of primary health care, adjusting for different covariates (age and/or gender and/or GP visits). In all of these cases, model fits were acceptable with regard to the cut-off values: the RMSEA ranged from 0.025 to 0.031, and CFI and TLI ranged from 0.91 to 0.98. These findings provide strong support for our conceptual SEM model.

4. Discussion

Using national survey data, the main novel contribution of the study was to assess the simultaneous effect of disabling conditions on primary health care use through a capability approach. The SEM model's goodness of fit provides strong support for our conceptual *capability model* explaining the likelihood of health care use while controlling for covariates (e.g., age, gender).

We first discuss the results in relation to a public hearing conducted by the French High Authority for Health (HAS, 2009), in which two types of barriers to accessing routine health care for disabled people were reported: (1) general barriers related to the person (intrinsic or extrinsic), lack of competence or availability from professionals, and logistical and architectural obstacles such as access to buildings, machines, and examination tables; and (2) specific barriers dependent on the type of disability and the type of care (e.g., general medicine, prevention, emergency).

Our empirical work confirmed some of the specific barriers since we found a positive association between *cognitive capabilities* and nursing care, all things being equal. This suggested a reduced likelihood of the use of specific care, namely, nursing care, for a specific population, namely, individuals with lower *cognitive capabilities*,. This finding may be associated with some individual's barriers, a lack of qualification or the availability of professionals who “manage” this type of disability. Previous studies have reported that people with cognitive disabilities may have a poor understanding of, fear of, and anxiety toward medical procedures, which may render the provision of medical care in this population difficult (Alborz et al., 2005; Aulagnier et al., 2005; Verger et al., 2005). It has previously been shown that people with cognitive

Table 7
Results of the regressions of primary health care use.

Explanatory variables	Health care use variables														
	GP n = 25,036			Nursing care n = 25,036			Pap test n = 8732			Mammography n = 6061			FOBT n = 11,035		
Latent capabilities:															
Health condition capabilities δ^1	**−0,62**	***	(0,10)	**−0,44**	***	(0,07)	−0.29	ns	(0,16)	−0.19	ns	(0,15)	−0.18	ns	(0,11)
Cognitive capabilities δ^2	0.11	ns	(0,08)	**0,26**	***	(0,05)	0.03	ns	(0,12)	−0.15	ns	(0,10)	−0.09	ns	(0,08)
Physical capabilities δ^3	−0.20	ns	(0,18)	−0.09	ns	(0,11)	0.04	ns	(0,22)	−0.24	ns	(0,17)	−0.11	ns	(0,13)
Societal capabilities δ^4	0.12	ns	(0,18)	**−0,33**	**	(0,11)	0.28	ns	(0,22)	**0,63**	***	(0,15)	**0,31**	**	(0,13)
Socioeconomic capabilities δ^5	0.15	ns	(0,08)	0.11	ns	(0,06)	**0,34**	***	(0,09)	**0,31**	***	(0,09)	0.09	ns	(0,07)
Covariates:															
Age β^1	**0,19**	***	(0,02)	**0,24**	***	(0,14)	**−0,14**	***	(0,03)	**−0,23**	***	(0,06)	0.04	ns	(0,05)
Gender β^2	**0,33**	***	(0,03)	**0,21**	***	(0,03)	–	–	–	–	–	–	−0.03	ns	(0,04)
GP visit(s) β^3	–	–	–	–	–	–	−0.02	ns	(0,02)	**0,05**	**	(0,03)	**0,06**	**	(0,02)

Note. GP = general practitioner; FOBT = faecal occult blood test; Figures in bold are significant regression coefficients; Standard errors in parentheses (S.E).
δ^p are the coefficients for the regression of the given health care use variable (z_i) on the latent variable *p*.
β^q are the coefficients for the regression of the given health care use variable (z_i) on the covariate *q*.
Analysis for GP and nurse receipt were based on the sample of 25,036 individuals aged over 18 years.
Analysis for receipt of a Pap test is based on the subsample of 8732 women aged between 20 and 65 years.
Analysis for receipt of a mammography is based on the subsample of 6061 women aged between 40 and 75 years.
Analysis for receipt of a FOBT is based on the subsample of 11,035 individuals aged between 50 and 75 years.
***P < .0001. **P < .05. ns = not significant.
Reading note: the regression coefficient for the GP care use on the latent variable *health condition capabilities* is −0.62 (P < .0001). That is, when the health condition capabilities increase, the likelihood of GP care use decreases.

disabilities may experience greater disparities in the use of health care than those with other types of disabilities (Mithen et al., 2015; Nocon and Sayce, 2008). The results from Iezzoni's work (Iezzoni, 2011) showed that the odds ratios for delayed or forgone care were higher for this population. However, regarding our results, *cognitive capabilities* is not associated with GP care use, which is the primary gateway to care. Hence, another interpretation may be that individuals with cognitive capability problems receive care through means other than with nurses.

The effects of *societal capabilities* on nursing care that we have identified may suggest that this type of care is considered the most popular type of care and targets a population that is marginalized and isolated; that is, individuals with higher *societal capabilities* have a lower likelihood of utilizing nursing care. This finding is consistent with the work of Buerhaus and colleagues (Buerhaus et al., 2015), who reported that nurses were more likely to provide care in a range of community settings and to treat disadvantaged and vulnerable populations.

Our findings confirm another specific barrier related to one type of care, preventive care assessed through cancer screenings, for which we identified an important role of *societal* and *socioeconomic capabilities*. Indeed, individuals with higher *societal capabilities* were more likely to be screened for breast or colorectal cancers. *Socioeconomic capabilities* positively influenced cervical and breast cancer screening use. It is well established in developed countries that individuals with higher socioeconomic characteristics are more likely to utilize screenings (Lin, 2008; van Doorslaer et al., 2006), but less is known about the influences of one's societal environment. Our results suggest that the societal environment appears to constitute a central factor in reducing screening inequalities.

In this study, general barriers related to professional competence or architectural obstacles were not confirmed because we did not observe any significant influence of either *cognitive* or *physical capabilities* for any type of cancer screening. These two latter capabilities were primarily measured through functional limitations (e.g., understanding, concentrating, walking, and carrying) and restrictions in activities of daily living (e.g., solving problems, coping with people, getting dressed, using the toilet). This finding may suggest that the barriers associated with lower *cognitive or physical capabilities* are balanced since the analyses were adjusted for *societal and socioeconomic capabilities*. Thus, a favorable environment (societal and/or economic) seems to compensate for the negative effect of cognitive/physical limitations or restriction of activities. This is an important finding that contradicts previous results in the literature, which has mainly considered activity limitations or restrictions as the only aspect of disability (Andresen et al., 2013; Angus et al., 2012; Legg et al., 2004).

Finally, we did not identify any specific barrier to GP care. The only latent variable that remained significant for GP visits was the *health condition capabilities*: higher *health condition capabilities* decreased the likelihood of GP use, all else being equal. One can consider that lower *health condition capabilities* (measured by diseases, impairments, symptoms, perceived health) reflect an increased need for care, after taking into account *physical*, *cognitive*, *societal* and *socioeconomic* capabilities, as well as gender and age. Previous studies were interested in measuring health care need with the aim to examine inequity in physician utilization (van Doorslaer et al., 2006, 2004, 2000). The authors standardized the number of visits for need differences. They defined need as the health care utilization that an individual is expected to receive given his or her age, gender and various measures of self-reported health status (e.g. general perceived health status, diseases, chronic conditions). Their definition is similar to the one we used to examine inequalities in health care use. Our results are quite reassuring with regard to access to primary care, particularly when we know that the GP constitutes individuals' first contact with the health care system in France. Literature on the determinants of

primary care use among the disabled population essentially concerns preventive care (mainly cancer screening use) or dental care (Diab and Johnston, 2004; Lupi-Pegurier et al., 2011; Mahmoudi and Meade, 2013). As far as we are aware, the few studies that have examined GP care among disabled have focused on GP behavior and quality of care, but did not examine GP care use (Aulagnier et al., 2005; Verger et al., 2005).

Our study employed existing SEM methods to address some challenges in measuring disability through capabilities, mainly by formulating multiple equations to characterize the disability situation in a broad sense and take into account measurement errors. Within quantitative approaches, techniques that have been used to measure capabilities are diverse including factor analysis, principle component analysis, fuzzy set theory, multidimensional indices, dominance approaches, equivalent income measures and SEM (Alkire, 2007; Comim et al., 2008). A number of instruments have been developed to directly measure capabilities. However, none of them were able to take into account all indicators we selected and the interdependence nature of capabilities. The use of a simultaneous latent variable model was therefore appropriate. The SEM framework that we proposed to measure capabilities has previously been used for estimating basic capabilities (Krishnakumar and Ballon, 2008) or assessing functional attainment (Kuklys, 2005). The main methodological strength of this study was that we incorporated random and systematic measurement errors into our indicators of capabilities. An important advantage of jointly modeling the explanatory variable measurement with error (conventional measurement model, CFA) and the regression of a dependent variable on the true explanatory variables (conventional structural model) is the potential correction of the detrimental effects of measurement errors such as regression dilution (Muthén, 2002; Skrondal and Rabe-Hesketh, 2004).

Substantively, this work provides evidence of latent capability variables that are responsible for the associations among health, environmental, and personal factors and that explain primary health care use. The results reveal the point at which the different components of a disability situation affect the use of primary health care. Using the capability approach in a SEM allowed capturing diverse disability determinants simultaneously. This also allowed challenging the results of previous studies, notably in the domain of prevention, in which disability was primarily defined by the type of impairment and/or the level of limitations (Angus et al., 2012; Chevarley et al., 2006; Reichard et al., 2011), since we did not find significant effect of either *cognitive* or *physical capabilities*, but instead an important role of *societal* and *socioeconomic capabilities.* Thereby, instead of only focusing on the functional limitations side, public authorities should act on the societal and socioeconomic dimensions that constitute disabling barriers.

Our conceptual capability model could be useful to examine other health care uses that are known to be subject to inequalities, such as access to dentists and access to ophthalmologists (Lengagne et al., 2014).

4.1. Study limitations

This study has some limitations that must be addressed. One source of limitations involves SEM framework. The omission of variables that may be related to disability is a weakness. Indeed, some variables that were not investigated, such as behavioral variables (tobacco and alcohol consumption) and residence location, may also enter into the definition of disability and/or influence primary care participation (Duport et al., 2008; Lin, 2008; Merten et al., 2015). Our selection of variables was guided by the literature and based on the ICF framework, which is closely related to the capability approach (Mitra, 2006). We also conducted a preliminary analysis (exploratory) to orient the selection of the indicators in the HMS database.

A second source of limitation involves the data. These data rely solely on self-reports and thus are subject to reporting bias. This limitation is common among declarative surveys. Reporting bias can be particularly relevant for people with cognitive limitations. However, in such cases, because of the design of the survey, responses to the questionnaire were given with the assistance of a proxy. The use of proxies is occasionally a problem in such surveys because the person providing the report may not have intimate or accurate knowledge of the experiences on which they are reporting (Schootman and Jeffe, 2003). It should be noted that 4% of the questionnaires were proxy reported in our study sample. In 97% of these cases, the respondent was a member of the surveyed participant's family; thus, we can assume that the respondents were sufficiently close to the participants to appropriately answer the questionnaire, particularly with regard to the sociodemographic characteristics, health status, health care use, and social participation.

Another limitation of the data that is also common to declarative surveys involves the indicators (mainly of societal capabilities). It is unknown whether people have not done any sport or did not live as a couple or whether they were unemployed because of a real lack of ability (less capabilities) or because of other reasons as different preferences, personal choices, or specific life-time periods. This limitation may suggest the need to model a latent factor through the observed variables that are subject to such bias. Indeed, the CFA allowed us to highlight a common latent trait (i.e., a common pattern of responses that demonstrate a particular level of a type of capability) by analyzing the inter-correlations among these variables. Thus, one can assume that when multiple indicators are combined (the set of observed variables), they may reflect the true level of capability, which would not be the case if we had considered them separately because of uncertainty about the reason for the answer.

4.2. Conclusion

The capability approach provided a framework for the analysis of various policy questions, particularly those regarding access to care. We have defined disability by health domains (e.g., diseases, impairments, functional limitations) and other domains that are not typically the area of intervention of health care systems (e.g., education, employment, social interactions). We did not focus on a single indicator of disability such as the type of impairment or limitation because we argued that such factors could be misleading in describing the true level of disability within a given society. Instead, we presented a method that allowed for a multifactorial representation of disability.

Our empirical results can provide useful insights into policy measures concerning access to primary care with the goal of enhancing capabilities. Specifically, appropriate measures should continue to focus on the socioeconomic determinants that remained central factors in determining screening participation. Additionally, we found an important role of the individual societal environment. This latter determinant has not been the focus of many prior studies, although it constitutes a key insight that may orient decision-makers to address the social inequalities in health care use. Furthermore, this issue is particularly important when one considers that people with disabling conditions have less social support than people without disabilities.

Considering the capability approach, which suggests public action oriented toward restoring the capabilities of individuals and focusing on restrictions to this population's freedom, future programs should seek to increase societal support (e.g., greater human

support, easier access to information and explanations of medical procedures, removing architectural barriers, improving professionals' qualifications) to compensate for the disability situation. This approach could be helpful in reducing inequalities in health care access.

Appendix 1. Observed variables used to measure the latent variable *health condition capabilities*

Label	Description	Categories	%
Diseases	Number of diseases based on the International Classification of Diseases	0: ≥6 diseases	20.3
		1: 3–5 diseases	28.0
		2: 1–2 diseases	16.5
		3: 0 disease	35.2
Chronic	Chronic disease	0: yes	66.9
		1: no	33.1
		missing	0.1
Cognitive	Cognitive impairment: disorder	0: yes	37.7
		1: no	62.2
		missing	0.1
Motor	Motor impairment/disorder	0: yes	47.4
		1: no	52.5
		missing	0.1
Visual	Visual impairment/disorder	0: yes	69.9
		1: no	30.0
		missing	0.0
Hearing	Hearing impairment/disorder	0: yes	21.4
		1: no	78.5
		missing	0.2
Speech	Speech disability	0: yes	6.3
		1: no	93.6
		missing	0.0
Symptom1	Tiredness	0: yes	59.1
		1: no	40.8
		missing	0.1
Symptom2	Eating disorders (lack of appetite, anorexia, bulimia)	0: yes	17.3
		1: no	82.7
		missing	0.0
Symptom3	Palpitations, tachycardia	0: yes	20.3
		1: no	79.5
		missing	0.2
Symptom5	Malaise, dizziness, glare	0: yes	26.6
		1: no	73.3
		missing	0.1
Symptom6	Breathlessness, breathing difficulties	0: yes	30.6
		1: no	69.3
		missing	0.0
Symptom7	Stress	0: yes	49.6
		1: no	50.1
		missing	0.3
Obesity	Being obese (BMI > 30)	0: yes	18.4
		1: no	81.6
Oral health	Oral health	0: Very bad	6.4
		1: Bad	12.5
		2: Fair	29.8
		3: Good	38.8
		4: Very good	12.4
		missing	0.2
Perceived health	General perceived health status	0: Very bad	5.4
		1: Bad	23.1
		2: Fair	29.0
		3: Good	28.3
		4: Very good	14.1
		missing	0.2

Note. The descriptive statistics (%) were conducted among the baseline sample of 25,036 individuals.

Acknowledgment

none.

Appendix 2. Observed variables used to measure the latent variable *cognitive capabilities*

Label	Description	Categories	%
Understand	Having difficulty in understanding what people say	0: often	4.3
		1: sometimes	8.7
		2: never	86.9
		missing	0.1
Concentrate	Difficulty in concentrating or doing something for 10 min	0: often	5.5
		1: sometimes	11.9
		2: never	82.3
		missing	0.4
Danger	Endangering themselves because of their behavior	0: often	2.7
		1: sometimes	11.6
		2: never	85.5
		missing	0.2
Impulsive	Being impulsive and/or aggressive	0: often	5.3
		1: sometimes	24.5
		2: never	70.1
		missing	0.1
Memory	Having difficulty in remembering or having memory lapses	0: often	6.4
		1: sometimes	31.3
		2: never	62.0
		missing	0.3
Confusion	Having periods of confusion or losing track of time	0: often	3.5
		1: sometimes	9.5
		2: never	86.9
		missing	0.2
Deal with people	Difficulty in establishing relationships with others, dealing with people	0: often, very often	4.8
		1: sometimes	8.4
		2: never	86.8
		missing	0.1
Psycho	Psychological problems disturbing the daily life	0: often, very often	8.4
		1: sometimes	15.6
		2: never	75.5
		missing	0.5
Solve	Analyzing and finding solutions to problems in day-to-day life	0: often	7.2
		1: sometimes	7.4
		2: never	85.2
		missing	0.1

Note. The descriptive statistics (%) were conducted among the total sample of 25,036 individuals.

Appendix 3. Observed variables used to measure the unobserved latent variable *physical capabilities*

Label	Description	Categories	%
Kneel	Stooping, crouching, and kneeling	0: unable to do	14.8
		1: severe difficulty	9.7
		2: moderate difficulty	15.2
		3: no difficulty	60.3
		missing	0.1
Arms	Raising the arms	0: unable to do	3.5
		1: severe difficulty	5.6
		2: moderate difficulty	11.1
		3: no difficulty	79.8
		missing	0.0
Walk	Walking 500 m on flat ground	0: unable to do	11.3
		1: severe difficulty	5.3
		2: moderate difficulty	8.3
		3: no difficulty	75.1
		missing	0.1
Stairs	Up and down a flight of stairs	0: unable to do	11.3
		1: severe difficulty	7.6
		2: moderate difficulty	12.8
		3: no difficulty	68.3
		missing	0.0
Carry	Lifting and carrying a bag as heavy as 5 kg	0: unable to do	18.3
		1: severe difficulty	5.1
		2: moderate difficulty	9.8
		3: no difficulty	66.7
		missing	0.1
Hand	Fine hand use (picking up, grasping)	0: unable to do	1.5
		1: severe difficulty	3.6

(*continued*)

Label	Description	Categories	%
		2: moderate difficulty	8.9
		3: no difficulty	86.1
		missing	0.0
Hear	Hearing a conversation with several people	0: unable to do	3.9
		1: severe difficulty	6.4
		2: moderate difficulty	15.1
		3: no difficulty	74.5
		missing	0.1
See close	Recognizing someone at 4 m	0: unable to do	2.7
		1: severe difficulty	2.1
		2: moderate difficulty	5.5
		3: no difficulty	89.5
		missing	0.2
See far	Clearly seeing print characters of a newspaper	0: unable to do	2.9
		1: severe difficulty	1.3
		2: moderate difficulty	1.5
		3: no difficulty	94.3
		missing	0.3
Get dressed	Getting dressed	0: unable to do	3.6
		1: severe difficulty	2.2
		2: moderate difficulty	3.5
		3: no difficulty	90.6
Wash	Washing your whole body	0: unable to do	4.8
		1: severe difficulty	2.9
		2: moderate difficulty	2.8
		3: no difficulty	89.5
Eat	Eating and drinking once the food is ready	0: unable to do	2.9
		1: severe difficulty	1.3
		2: moderate difficulty	1.5
		3: no difficulty	94.3
Stand/sit	Standing up from sitting down	0: unable to do	2.0
		1: severe difficulty	1.2
		2: moderate difficulty	1.6
		3: no difficulty	95.3
Toilet	Using toilet alone	0: unable to do	2.2
		1: severe difficulty	0.5
		2: moderate difficulty	0.6
		3: no difficulty	96.7

Note. The descriptive statistics (%) were conducted among the baseline sample of 25,036 individuals.

Appendix 4. Observed variables used to measure the latent variable *societal capabilities*

Label	Description	Categories	%
Shop	Acquisition of goods and services (shopping, etc.)	0: unable to do	13.2
		1: severe difficulty	3.5
		2: moderate difficulty	3.4
		3: no difficulty	79.9
Administrative	Handling administrative affaires	0: unable to do	11.0
		1: severe difficulty	2.7
		2: moderate difficulty	3.1
		3: no difficulty	83.1
Cook	Preparation of meals (cooking etc.)	0: unable to do	7.1
		1: severe difficulty	2.0
		2: moderate difficulty	1.8
		3: no difficulty	89.1
Clean	Doing housework (cleaning house, washing dishes laundry, ironing, etc.)	0: unable to do	9.4
		1: severe difficulty	4.5
		2: moderate difficulty	4.0
		3: no difficulty	82.2
Transport	Using transportation (car, bus, train, plane, etc.)	0: unable to do	9.8
		1: severe difficulty	1.7
		2: moderate difficulty	1.3
		3: no difficulty	87.3
Tel	Using a telephone	0: unable to do	3.4
		1: severe difficulty	0.6
		2: moderate difficulty	0.6

(*continued on next page*)

(*continued*)

Label	Description	Categories	%
		3: no difficulty	95.4
Computer	Using a computer	0: unable to do	5.3
		1: severe difficulty	0.6
		2: moderate difficulty	0.3
		3: no difficulty	93.8
Literate	Can read and write	0: can neither read nor write	3.3
		1: can read and/or write with difficulties	6.2
		1: can read and write	90.5
		missing	0.1
Get out	Getting out of home	0: unable to do	6.6
		1: severe difficulty	1.4
		2: moderate difficulty	0.9
		3: no difficulty	91.1
Outings frequency	Getting out of home (frequencies)	0: never	3.7
		1: rarely	5.8
		2: at least once a week	13.8
		3: almost everyday	76.5
		missing	0.2
Friends	being friends/friends relationships	0: never (or do not have any friend)	12.9
		1: at least once a year	7.7
		2: at least once a month	31.3
		3: at least once a week	31.8
		4: everyday	16.0
		missing	0.1
Family/friends meals	Having meals with friends or family	0: never	9.6
		1: rarely	26.5
		2: at least once a month	40.3
		3: at least once a week	19.5
		4: everyday	4.0
		missing	0.2
Work	Being a working person	0: no	65.4
		1: yes	34.6
Holidays	Going on holiday	0: never	32.6
		1: every two year or less	22.6
		2: every year or more	44.5
		missing	0.3
Sport	Practice of a sporting in the past 12 months	0: no	67.8
		1: yes	32.0
		missing	0.2
Garden	DIY or gardening in the past 12 months	0: no	47.6
		1: yes	52.2
		missing	0.2
Cinema	Went to the cinema in the past 12 months	0: no	59.9
		1: yes	39.8
		missing	0.3
Concert	Went to a concert or spectacle in the last 12 months	0: no	75.3
		1: yes	24.4
		missing	0.3
Museum	Visiting an exhibition or a museum in the past 12 months	0: no	73.8
		1: yes	25.9
		missing	0.3
Human assist	Would need (lack of) human assistance in daily living	0: yes	16.1
		1: no	83.8
Technical assist	Would need (lack of) technical assistance in daily living	0: yes	6.6
		1: no	93.4
Discrimination	Having suffered from discrimination because of a disability or health problem	0: yes	9.4
		1: no	90.6
Access difficulty	Places difficult or impossible to access such as shops, leisure places, public transport	0: never go out of home	3.9
		1: yes	9.0
		2: no	87.1
Inadequate road	Outings by foot or in wheelchairs hindered by inadequate roads, terrain, lack of signage or safety, etc.	0: never go out of home	3.7
		1: yes	18.2
		2: no	78.1
Feel disabled	Feeling disabled/restricted in everyday life	0: yes	40.9
		1: no	56.8
		missing	2.3

Note. The descriptive statistics (%) were conducted among the baseline sample of 25,036 individuals.

Appendix 5. Observed variables used to measure the latent variable *socioeconomic capabilities*

Label	Description	Categories	%
CMU-C	The french complementary health insurance, which is free and only reserved for individuals with income below a certain threshold	0: yes	10.8
		1: no	89.2
Couple	Living-in partnership (married, civil partnership or simple cohabitation)	0: no	39.6
		1: yes	60.4
Education	Educational level	0: none	44.9
		1: under high school graduate	31.7
		2: high school graduate	23.3
Income	Average monthly household income per consumption unit	0: <786€	24.3
		1: 786€ – 1137€	25.0
		2: 1137€ – 1639€	24.9
		3: >1639€	25.7
		missing	0.1
Homeowner	Being homeowner (with loans outstanding or not)	0: no	37.2
		1: yes	62.8
Interests	interest, savings and dividend income	0: no	74.5
		1: yes	25.0
		missing	0.5

Note. The descriptive statistics (%) were conducted among the baseline sample of 25,036 individuals.

Appendix 6. Primary health care variables

Label	Description	Categories	%
GP	Visit to the GP in the past 12 months	0: no	8.5
		1: yes	91.5
		missing	0.0
Nurse	Visit to a nurse in the past 12 months	0: no	76.0
		1: yes	24.0
		missing	0.0
Pap test	Pap test receipt within 3 years	0: no	28.2
		1: yes	71.0
		missing	0.8
Mammography	Mammography receipt within 2 years	0: no	18.5
		1: yes	81.2
		missing	0.3
FOBT	FOBT receipt within 2 years	0: no	77.9
		1: yes	21.4
		missing	0.7

Notes. GP = general practitioners; FOBT = faecal occult blood test.
The descriptive statistics (%) for GP and nurse receipt are based on the entire sample of 25,036 individuals aged over 18 years.
The descriptive statistics (%) for Pap test receipt is based on the subsample of 8732 women aged between 20 and 65 years.
The descriptive statistics (%) for mammography receipt is based on the subsample of 6061 women aged between 40 and 75 years.
The descriptive statistics (%) for FOBT receipt is based on the subsample of 11,035 individuals aged between 50 and 75 years.

Appendix 7. Covariates

Label	Description	Categories	%
Age	Age	0: ≤30 years	11.6
		1: 30–50 years	28.9
		2: 50–70 years	34.8
		3: >70 years	24.7
Gender	Gender	1: male	44.4
		2: female	55.6
GP visit(s)	number of visits to the GP over a period of one year	0: ≤1 visit	22.2
		1: 2–4 visits	22.3
		2: 4–9 visits	29.9
		3: ≥10 visits	24.8
		missing	0.7

Notes. GP = general practitioners.
The descriptive statistics (%) were conducted among the baseline sample of 25 36 individuals.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2016.02.022.

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