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Preliminary Results Report

Effects of Anticipated Architectural Barrier and Perceived Stigma on Social Participation and Psychological Adjustment among People with Physical Disability in Hong Kong

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Acknowledgement

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I would like to especially express my heartfelt thanks to all participants of this study, for spending time completing the long questionnaire and writing me different comments and messages on the questionnaire. The most touching and inspiring part was the active participation and response of the participants. Some participants have offered me suggestions on how to improve the research design such that more meaningful data would be obtained. Some of them even briefly shared with me their personal life story on the questionnaire. One participant gave me a phone call and we talked over the phone for about one hour about his experiences. He said he was happy to have someone to listen to his feelings. All these responses have greatly kept me motivated in conducting research on disability-related issues. I am very thankful for the participants’ support and participation. Thank the participants for sharing with me their life story.

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2013-14. The process of conducting this study was a fruitful and meaningful experience to me. Although it was very demanding for me to handle the research tasks, course assignments and examinations within the same period, I have gained much valuable experiences from this research study which deeply inspired me. This is the second research study in my undergraduate study life. It has further ignited my passion of pursing research career in the future to promote the psychosocial wellbeing of people with disability. The first-hand experiences of conducting a research definitely help consolidate the psychological knowledge and research skills I have learnt.

Most importantly, I would like to thank my family members for their unfailing support and encouragement. The emotional bodings among all my family members are very strong. I am thankful for growing up in my happy, warm, and united family. I would like to especially thank my mom for her unconditional and endless love and caregiving since my birth. With her love and care, I have been living a joyful and meaningful life. That’s also the essential reason why I am strongly determined to pursue research career and specialize in promoting the psychosocial well-being and empowerment among people with physical disability and their caregivers.
Effects of Anticipated Architectural Barrier and Perceived Stigma on Social Participation and Psychological Adjustment among People with Physical Disability in Hong Kong

Background of the Study

Living with congenital muscular dystrophy, every day I experience similar circumstances as follows. Going to restaurant or shopping is a common activity among us; but it would be totally a burden for people with physical disability like me when we encounter stairs in front of the entrance of restaurant or shopping mall, and especially when being stared by the public. We always have to face such embarrassment in everyday life. One commonly-seen coping method is to going out less frequently, so as to avoid the opportunity of encountering such circumstances, thereby seriously affecting the social participation. In view of this, it is a current societal aim to establish a barrier-free environment, and most importantly a barrier-free soul (Hong Kong PHAB Association, 2012), in order to promote social participation among people with physical disability (PWPD). The Rehabilitation Advisory Committee and the Equal Opportunities Commission are actively removing architectural barrier by promoting physical accessibility in the buildings in society; and removing attitudinal barrier through stigma reduction programmes. These two types of environmental barriers are conceptually distinct, but highly related, factors influencing social participation among PWPD. Past research studies have showed how different environmental barriers negatively associated with social participation, but most of them were conducted in western countries and related research in local context is still in paucity.

Literature Review

Social participation

Participation is identified as the major component of health in the International Classification of Functioning, Disability, and Health (ICF) by the World Health Organization (Heinemann et al., 2011). It is operationalized in the ICF as the “involvement in life
situations”, i.e. what an individual is doing in real life situations (Badley, 2008; Levasseur, Desrosiers, & Tribble, 2007). The ICF defined 9 domains of participation in life situations, namely 1) learning and applying knowledge, 2) general tasks and demands, 3) communication, 4) mobility, 5) self-care, 6) domestic life, 7) interpersonal interactions and relationships, 8) major life areas (such as education and employment), 9) community, social and civic life (4). There are numbers of qualifiers under each domain to determine the degree of participation among PWPD (Badley, 2008; Levasseur, Desrosiers, & Tribble, 2007), and the focus is the frequency of “doing” of a particular activity under particular domains (Cummins & Lau, 2003).

Many measures have been developed to assess participation based on the ICF conceptualization. A commonly-used measure is the Craig Handicap Assessment and Reporting Technique (CHART; Mellick, 2000, Whiteneck et al., 2004), an objective measure of physical engagement in particular social roles (Lysack, Komanecky, Kabel, Cross, & Neufeld, 2007), such as “How many hours per week do you spend working in a job for which you get paid?” It is generally conceptualized that the higher the frequency or time of doing in particular activities or being physically present in community, the more the person is socially integrated, i.e. the higher the participation (Cummins & Lau, 2003; Lysack et al., 2007). The CHART score also significantly predicted psychological distress and depression among people with spinal cord injury (Tate, Forchheimer, Maynard, & Dijkers, 1994).

While having sufficient “doing” in life situation is important to one’s health, Cummins & Lau (2003) pointed out that it is merely “community exposure” but not “full participation”; it is the subjective feeling of sense of belonging to the community that really contributes to one’s participation and psychological wellbeing. Qualitative studies in PWPD also emphasized that the subjective appraisal of their social participation, the sense of being valued, and having autonomy and control in societal activities were at the core of their social
participation (Brown, 2010; Dijkers, 1998; Lysack et al., 2007). These subjective components of participation are defined as “participation enfranchisement” by Heinemann et al (2011). Heinemann (2010) concluded six elements of participation enfranchisement among PWPD, namely 1) meaningful engagement, 2) personal and social responsibilities, 3) having an impact and supporting others, 4) social connection and inclusion, 5) access and opportunity; and 6) choice and control in life. Enfranchisement is not tied to any particular life situation, but “doing” is.

Although those subjective components are not mentioned in the ICF, they are the essential and global measure of social participation that cannot be ignored (Cummins & Lau, 2003; Dijkers, 1998; Heinemann et al., 2011; Lysack et al., 2007). PWPD could be feeling unaccepted by the community even though he frequently engages in different activities. Nevertheless, quantitative research on the subjective evaluation of social participation is still in paucity due to the lack of appropriate psychometric measures. The present study will aim at bridge the research gap by incorporating both “doing” and enfranchisement (individual’s global appraisal), the two components of social participation, in the investigation.

**Perceived stigma**

Stigma is defined by Goffman as “an attribute that is deeply discrediting” (Goffman, 1963, p. 3). Goffman (1963) defined three types of stigma, namely 1) physical deformities, 2) traits, character blemishes, and 3) tribal stigma. Physical disability is generally categorized into the “physical deformities” stigma (Link & Phelan, 2001). Moreover, the visibility of the stigmatizing attribute among PWPD, such as the wheelchairs, would readily elicit stereotypes and discrimination in other people without disability (Goffman, 1963; Joachim & Acorn, 2000; Link & Phelan, 2001). The Baseline Survey on Public Attitudes towards Persons with a Disability 2010 (Equal Opportunities Commission, 2011) reported that half of the respondents agreed that physical disability would result in incapacity and increased
dependency on others even if PWPD have received medical treatment; such a stereotype is consistent in studies conducted in Western countries, especially towards wheelchair users (e.g. Altman, 1981; Cahill & Eggleston, 1988; Link & Phelan, 2001).

Perceived stigma not only negatively affects the mental wellbeing among PWPD (Brown, 2010), it is also a major attitudinal barrier among the five environmental factors affecting social participation among PWPD stated in the ICF. Qualitative studies in PWPD emphasized that negative attitudes from the public is a significant barrier to their involvement in society (Putnam, Geenen, & Powers, 2003; Gray, Gould, & Bickenbach, 2003; Rimmer et al., 2004;). However, to our knowledge, no stigma measures have been developed specifically for PWPD. Majority of the environment assessments only globally and vaguely ask about something like “whether the attitude of your friends towards you is a barrier or facilitator in your daily life?” Examples of these assessments include The Measure of the Quality of the Environment (MQE; Fougeyrollas et al., 2008) and Craig Hospital Inventory of Environmental Factors (CHIEF; Harrison-Felix, 2001), which are designed for both people with or without disability.

While these measures can assess the overall influence of the attitudes from others on PWPD’s social participation, the specific stigmatizing attitudes encountered by PWPD and the corresponding impact on their participation have not be studied. Some obvious examples are the stare from the public due to the visibility of the physical/mobility disability; and “public kindness”, such as uninvited help from the public which is sometimes perceived by PWPD as stigmatizing or embarrassing (Cahill & Eggleston, 1988). This is an important missing link to be addressed.

**Architectural barrier**

Architectural barrier is another environmental factor in the ICF system (Schneidert et al., 2003), and broadly defined as whether the natural or built environment is physically
accessible. A building is considered physically inaccessible if there is only stairs without ramps at the entrance. Vash and Crewe (2004) suggested that accessibility is the prime environmental mastery issue for PWPD. Like stigma, qualitative studies in PWPD explicitly pointed out that inaccessible environments cause great impact on life because it is seriously frustrating that they cannot go anywhere they want, or when they arrive places that are actually inaccessible (Gray, 2003; Meyers, Anderson, Miller, Shipp, & Hoenig, 2002; Putnam et al., 2003; Rimmer et al., 2004). These qualitative evidences clearly show that architectural barriers not only influence the “doing” of (Steinfeld & Danford, 1999), but also the sense of having autonomy and control in the “enfranchisement” component of social participation among PWPD. Thus, architectural barriers would affect BOTH the objective and subjective components of social participation, and also mental wellbeing (Steinfeld & Danford, 1999).

For quantitative analyses, by using existing measures like MQE (Fougeyrollas et al., 2008) and CHIEF (Harrison-Felix, 2001), the perceived extent of physical accessibility is measured globally in a similar way as in measuring attitude. Some assessments, like the Facilitators and Barriers Survey/Mobility (FABS/M; Gray, 2008) and the Community Health Environment Checklist (CHEC; Stark, 2007), have been recently developed for measuring the detailed features of the physical environment, such as the presence and quantity of relevant facilities. However, most of them require detailed field-inspection; and are too long and complicated to be self-completed by participants.

It is conceptualized that higher physical inaccessibility leads to lower participation. However, equivocal findings have been found in past studies, that the more the physical barriers have been encountered, the higher the social participation is. It is considered as counter-intuitive; but it could be logical that only when PWPD participates more in the community can they “discover” more architectural barrier. Moreover, those measures usually talked about situations of the community you are living in, but it was possible that PWPD
have gradually adapted to the architectural barriers in their community by changing their lifestyles and means of social participation. For instance, Mary lives in Hong Kong Island but chooses to go shopping at a mall at Mong Kok since it is more barrier-free. Therefore, the previous conceptualization could mostly capture the theoretical, but not necessarily the whole picture in reality.

The presence or absence of architectural barriers cannot be readily changed by PWPD themselves, but PWPD still “have to” participates in the society. As what discussed above, it implies that those architectural barriers could be important stressors for PWPD. I aim at proposing and testing a new conceptualization here --- what would affect your participation is the anticipated troubles you may encounter at circumstances of architectural barriers, which may not really localized at the actual barriers in the community you are living in, nor whether you have really carried out that particular activity. Anticipated architectural barriers could be important stressors which determine their social participation. It is how stressful they would get if they encounter or even just anticipate the circumstances related to physical inaccessibility that would really affect the intention to participate in society. In this way, he would probably report lower participation.

**Relationship between perceived stigma and architecture**

Both perceived stigma and architectural barrier are two of the mutually exclusive environmental factors in the ICF (Schneidert et al., 2003), but these two factors are in fact highly related with each other. Robinson and Thompson directly indicated that “while many places are stigmatized, thereby stigmatizing, there are no developed theories on how physical places carry stigma” (Robinson & Thompson, 1999, p. 255). Architectural buildings can help eliminating or reinforcing public stigma through the symbolic effects of the design of buildings (Cahill & Eggleston, 1988; Joines, 2009; Robinson & Thompson, 1999; Steinfeld & Danford 1999). For example, the entrance of a bookstore is supposed for welcoming
customers, but an entrance with stairs would give the feeling of unwelcoming for wheelchair users. They may have to be carried by the staff in order to get into the bookstore. Finally this scenario may reinforce the stereotypes that “PWPD is different from us, they always need help from others, and they cannot lead a normal life as what we do”. As a result, it was hypothesized that architectural barrier would play a role in reinforcing or reducing stigma.

**The present study**

In the present study, the mechanisms of how environmental barriers would affect the social participation and psychological adjustment in PWPD in Hong Kong were examined. Specifically, environmental barriers included anticipated architectural barrier and perceived stigma. Anticipated architectural barrier was operationally defined as the anticipated stress due to anticipated physical inaccessibility in architectural buildings in the community environment. Social participation included social engagement (objective social participation) and social enfranchisement (subjective social participation). Psychological adjustment included acceptance of disability and mental wellbeing.

The study also aimed at 1) examining if there was any association between anticipated architectural barrier and perceived stigma; 2) comparing the effects of anticipated architectural barrier and perceived stigma on social participation; and 3) comparing the effects of social engagement and social enfranchisement on psychological adjustment.

However, the present report has only dealt with some preliminary results due to time constraint. Preliminary statistical analyses were conducted on four selected variables, including anticipated architectural barrier, perceived stigma, social enfranchisement, and social wellbeing (a factor of mental wellbeing).

**Research hypothesis**

The present study proposed and tested an integrated model on the relationships between anticipated architectural barrier and social wellbeing among the PWPD via
perceived stigma and social enfranchisement. Figure 1 showed the proposed conceptual model with hypothesized directions of effects.

![Diagram](image)

*Figure 1. The proposed conceptual model.*

Specifically, anticipated architectural barrier would be positively associated with perceived stigma. Perceived stigma would be negatively associated with social enfranchisement. Social enfranchisement would be positively associated with social wellbeing.
Method

Participants

One hundred and forty-three people with physical disability (56.0% male, n = 70) who had a mean age of 37.4 years (SD = 15.2, range = 17-78) were recruited from January to April 2014. Majority of the participants had acquired physical disability (51.9%). Most of the participants were single (71.5%); and 26.2% of them attained secondary 4-5 education.

Details of the demographics were presented in Table 1.

Table 1

Demographics of the participants (N=143).

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (Percentage, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>70 (56.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>55 (44.0%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>M = 37.4; SD = 15.2</td>
</tr>
<tr>
<td><strong>Educational attainment</strong></td>
<td></td>
</tr>
<tr>
<td>Not received education</td>
<td>2 (1.6%)</td>
</tr>
<tr>
<td>Special education</td>
<td>21 (16.7%)</td>
</tr>
<tr>
<td>Primary School</td>
<td>10 (7.9%)</td>
</tr>
<tr>
<td>Secondary 1-3</td>
<td>22 (17.5%)</td>
</tr>
<tr>
<td>Secondary 4-5</td>
<td>33 (26.2%)</td>
</tr>
<tr>
<td>Secondary 6-7</td>
<td>12 (9.5%)</td>
</tr>
<tr>
<td>University or above</td>
<td>18 (14.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>8 (6.3%)</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
</tr>
<tr>
<td>Full-time student</td>
<td>25 (23.6%)</td>
</tr>
</tbody>
</table>
Employed 2 (1.9%)
Full-time job 13 (12.3%)
Part-time job 23 (21.7%)
Full-time homemaker 10 (9.4%)
Out of work and looking for work 33 (31.1%)

Marital status
Married 25 (20.3%)
Single 88 (71.5%)
Cohabited 2 (1.6%)
Divorced 7 (5.7%)
Widowed 1 (0.8%)

Family monthly income
$5,000 or below 39 (33.1%)
$5,001-$10,000 34 (28.8%)
$10,001-$15,000 21 (17.8%)
$15,001-$20,000 7 (5.9%)
$20,001-$30,000 8 (6.8%)
$30,001-$40,000 5 (4.2%)
$40,001-$50,000 3 (2.5%)
$50,000 or more 1 (0.8%)

Nature of the physical disability
Congenital 51 (48.1%)
Acquired 55 (51.9%)

1Numbers may not add up to total sample size due to missing data.


**Demographics.** Demographics information of the respondents was obtained, including gender, age, educational attainment, marital status, and family monthly income. Information of the physical disability were also obtained, including name of the diagnosis, extent of mobility limitation, nature of disability, and assistive devices used.

**Functional status.** It was composed of a measure on the activities of daily living (ADL) called Barthel Index (Leung, Chan, & Shah, 2007), and 3 items from the Lawton Instrumental Activity of Daily Living Scale Hong Kong Version (Tong, 1999). The 10-item Barthel Index (Leung, Chan, & Shah, 2007) was used to assess ten areas in the individual’s performance in activities of daily living. The ten areas included feeding, bathing, grooming, dressing, fecal incontinence, urinary incontinence, toilet use, transfer, walking, and climbing stairs. The Lawton Instrumental Activity of Daily Living Scale Hong Kong Version (Tong, 1999) assessed the individual’s instrumental activity of daily living (IADL) abilities which helped determine if he/she can live independently in the community. Three items relevant to activities in society were selected for the current purpose, namely telephone use, using transport, and going shopping. Composite score were computed. The higher the score, the higher the level of functional dependence. The internal consistency (Cronbach’s alpha) of the scale in the present study was .90.

**Anticipated architectural barrier.** It was composed of the Access subscale of the Physical Disability Stress Scale (Furlong & Connor, 2007), 7 items from the subscale of Physical Function and Access to Environment and Technology of the Disabled Related Stress Scale (Rhode et al., 2012), and 4 self-constructed items on transportation. The composite measure was used to measure how upsetting or stressful PWPD would expect if they anticipated the encounter of different circumstances related to physical inaccessibility due to architectural barrier in daily life. Each item was rated on a 5-point Likert scale, from 1 (*not at all*) to 5 (*highly*). Participants were asked if they have encountered such circumstance within
the week before (indicated by “yes” or “no”). A sample item was “how stressful you would you get if you have been told a place is accessible, but find it isn’t accessible?” The higher the score, the higher the anticipated architectural barrier. The internal consistency (Cronbach’s alpha) of the composite scale in the present study was .69, which was only marginally acceptable. SPSS results suggested that deleting item no.9 could boost the internal consistency to .9. Therefore this item was excluded from the final composite scale; and the new internal consistency was .95 (Cronbach’s alpha). There were three subscales, including access, transport, and physical function. The internal consistency (Cronbach’s alpha) of each subscale was .81, .81, and .92 respectively.

**Perceived Stigma.** To the knowledge of the research of the present study, there are no established perceived stigma scales specifically designed for people with physical disability. The 7 self-constructed items on perceptions of stigma from Brown (2010) were used. The items were specifically constructed for assessing perceptions of stigma among people with physical disability by converging ideas generated from focus groups. Each item was rated on a 5-point Likert scale, from 1 (**never**) to 5 (**always**). A sample item is “People stare at you because of your physical limitation”. The higher the score, the higher the perceived stigma. The internal consistency (Cronbach’s alpha) of the scale in the present study was .92.

**Social Enfranchisement.** The 19-item Participation Enfranchisement Scale was used to measure social enfranchisement, i.e. the subjective perceptions of social participation (Heinemann et al., 2011) on a 4-point scale from 1 (**true**) to 4 (**false**). The scale measures the overall subjective sense of participation in society without being tied to any particular domain of social engagement. A sample item is “I feel that I am a part of my community”. The higher the score, the better the social enfranchisement. The internal consistency (Cronbach’s alpha) of the scale in the present study was .94. There were three factors, namely perceived choice and control, contributing to one's community, and feeling valued. The internal consistency
(Cronbach’s alpha) of each factor was .91, .85, and .77 respectively.

Social Wellbeing. It was measured by the Social Wellbeing subscale of the Mental Health Continuum-Short Form (Keyes, 2009). It consisted of 5 items which measured the five dimensions of Keyes' (1998) model of social wellbeing. Items were rated on a 6-point Likert scale from 1 (never) to 6 (everyday) to indicate how often you have experienced that feeling during the past month. The higher the score, the better the social wellbeing. The internal consistency (Cronbach’s alpha) of the social wellbeing subscale in the present study was .87.

Procedure

The study was approved by the Survey and Behavioral Research Ethics Committee of the Chinese University of Hong Kong. From January to April 2012, invitation was sent to local non-governmental organizations (NGOs) serving people with disabilities to participate in the present study. Ten NGOs agreed to participate in the study and assist in participant recruitment and data collection. Adults with physical disability (individuals with multiple disabilities such as intellectual or sensory disabilities, or co-morbid conditions, in addition to physical disabilities were also included) were invited to complete a self-report questionnaire.

The questionnaire included items on demographic characteristics, anticipated architectural barrier, perceived stigma, social enfranchisement, and social wellbeing. It was administered in Chinese. The scales were translated from English to Chinese for the present study. The cover letter, consent form, and questionnaire, together with a self-addressed stamped envelope, were distributed to the potential participants via the NGOs. On-site data collection sessions were administered by the two student helpers from the Department of Psychology, CUHK. Participation was voluntary and participants could withdraw from the study at any time. Their personal information was kept strictly confidential, with the signed consent form being separated immediately from the anonymous questionnaire upon receipt
and only the investigators involved in the present study had access to the data collected.

**Statistical analysis**

Preliminary analyses were done by SPSS 16.0. Descriptive statistics such as means and standard deviations were calculated. Reliability analyses were conducted to assess if each scale reached a satisfactory level of .7 or above using Cronbach’s alpha.

Pearson correlational analysis was conducted among the four main variables of interest (anticipated architectural barrier, perceived stigma, social enfranchisement, and social wellbeing) to test if they were significantly correlated with each other. To examine whether the demographic characteristics were significantly associated with the main variables, Pearson correlational analysis was conducted on age of participants; and independent samples t-tests and one-way analysis of variance (ANOVA) followed by post-hoc comparisons with Bonferroni correction were conducted for gender, educational attainment, employment status, marital status, and nature of disability with the main variables.

As to the model testing, the measurement model was tested firstly. It examined the goodness of fit of the pattern of observed variables for the latent constructs in the model as depicted by the measurement model without indication of the directions of effects. After that, structural equation modeling (SEM) was conducted to examine the overall fit of the proposed structural equation model to the observed variance/covariance matrices of the data using the maximum likelihood method. In SEM, directionality of the relationships among the constructs was hypothesized prior to testing. It was conducted using EQS 6.1 for Windows.

Four set of multiple regressions with ordinary least squares (OLS) estimations were conducted. For the three regression models on social enfranchisement, each factor of social enfranchisement was the dependent variable in each model, with both anticipated architectural barrier and perceived stigma entered in Block 1 as the independent variables. It was to compare the significance of anticipated architectural barrier and perceived stigma as
being associated with each factor of social enfranchisement. For the regression model on social wellbeing, social wellbeing was the dependent variable with the three factors of social enfranchisement entered in Block 1 as the independent variables. It was conducted to compare the significance of the three factors of social enfranchisement as being associated with each factor of mental wellbeing.
Preliminary Results

Preliminary analysis

The correlations of the four main variables (anticipated architectural barrier, perceived stigma, social enfranchisement, and social wellbeing) and the corresponding factors/parcels, including the mean and standard deviation, were presented in Table 2. Anticipated architectural barrier was significantly and positively correlated with perceived stigma ($r = .49$), and negatively correlated with social enfranchisement ($r = -.31$). It was not significantly correlated with social wellbeing. Perceived stigma was significantly and negatively correlated with social enfranchisement ($r = -.33$) and social wellbeing ($r = -.34$). Social enfranchisement was significantly and positively correlated with social wellbeing ($r = .53$). All the above significant correlations were at $p < .01$.

Table 2

*Correlation Matrix of the Variables (Listwise N=95).*

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anticipated architectural barrier</td>
<td>3.08</td>
<td>1.16</td>
<td>-</td>
<td>.04**</td>
<td>.08**</td>
<td>.40**</td>
<td>.49**</td>
<td>.40**</td>
<td>.40**</td>
<td>.31**</td>
<td>- .39**</td>
<td>- .15</td>
<td>- .24*</td>
<td>- .15</td>
<td>- .10</td>
<td>- .18</td>
</tr>
<tr>
<td>2. AAB - access</td>
<td>2.89</td>
<td>1.19</td>
<td>-</td>
<td>.80**</td>
<td>.83**</td>
<td>.39**</td>
<td>.37**</td>
<td>.38**</td>
<td>.35**</td>
<td>- .31**</td>
<td>- .37**</td>
<td>- .16</td>
<td>- .24*</td>
<td>- .14</td>
<td>- .08</td>
<td>- .10</td>
</tr>
<tr>
<td>3. AAB - transport</td>
<td>3.25</td>
<td>1.26</td>
<td>-</td>
<td>.90**</td>
<td>.32**</td>
<td>.30**</td>
<td>.51**</td>
<td>.44**</td>
<td>.32**</td>
<td>- .32**</td>
<td>- .30**</td>
<td>- .16</td>
<td>- .24*</td>
<td>- .19</td>
<td>- .17</td>
<td>- .12*</td>
</tr>
<tr>
<td>4. AAB - physical function</td>
<td>3.11</td>
<td>1.23</td>
<td>-</td>
<td>.40**</td>
<td>.50**</td>
<td>.30**</td>
<td>.28**</td>
<td>.37**</td>
<td>- .12</td>
<td>- .22*</td>
<td>- .12</td>
<td>- .08</td>
<td>- .16</td>
<td>- .07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Perceived stigma</td>
<td>2.58</td>
<td>0.95</td>
<td>-</td>
<td>.95**</td>
<td>.50**</td>
<td>.88**</td>
<td>.32**</td>
<td>- .28**</td>
<td>- .28**</td>
<td>- .32**</td>
<td>- .34**</td>
<td>- .34**</td>
<td>- .32**</td>
<td>- .26**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Perceived stigma-parcel A</td>
<td>2.02</td>
<td>1.02</td>
<td>-</td>
<td>.80**</td>
<td>.75**</td>
<td>.34**</td>
<td>.29**</td>
<td>- .32**</td>
<td>- .31**</td>
<td>- .34**</td>
<td>- .34**</td>
<td>- .32**</td>
<td>- .26**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Perceived stigma-parcel B</td>
<td>2.03</td>
<td>1.00</td>
<td>-</td>
<td>.71**</td>
<td>.32**</td>
<td>.33**</td>
<td>.23*</td>
<td>- .26*</td>
<td>- .25*</td>
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<td>- .12</td>
<td>- .16</td>
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<td>9. Social enfranchisement</td>
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<td>.91**</td>
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<td>3.22</td>
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<td>-</td>
<td>.72**</td>
<td>.59**</td>
<td>.44**</td>
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<td>11. SE - contribute to society</td>
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<td>-</td>
<td>- .72**</td>
<td>.54**</td>
<td>.49**</td>
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<td>12. SE - feeling valued</td>
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<td>-</td>
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<td>.42**</td>
<td>.44**</td>
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<td>13. Social wellbeing</td>
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<td>- .04**</td>
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<td>3.09</td>
<td>1.42</td>
<td>-</td>
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<td>.81**</td>
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<td>15. Social wellbeing-parcel B</td>
<td>3.20</td>
<td>1.41</td>
<td>-</td>
<td>- .77**</td>
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<td>16. Social wellbeing-parcel C</td>
<td>3.06</td>
<td>1.75</td>
<td>-</td>
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</tbody>
</table>

Note: AAB = anticipated architectural barrier; SE = social enfranchisement.

*p < .05, **p < .01.

As for the demographic variables, age, educational attainment, employment status, marital status, and did not have significant associations with the four main variables. Independent samples t-test showed that male ($M = 3.60$, $SD = 1.39$) had significantly better social wellbeing than female ($M = 3.00$, $SD = 1.57$), $t(107) = 2.12$, $p < .05$. Independent
samples t-test showed that participants having congenital ($M = 3.21, SD = .62$) physical disability had significantly better social enfranchisement than that having acquired ($M = .2.88, SD = .61$) physical disability; $t (93) = 2.60, p < .05$. One-way ANOVA showed significant difference in anticipated architectural barrier among participants with different family income, $F (6, 99) = 2.43, p < .05$.

**Measurement model**

Testing on the measurement model showed that the observed indicators of the anticipated architectural barrier, perceived stigma, social enfranchisement, and social wellbeing corresponded to the latent constructs in the proposed model with a satisfactory goodness of fit: $\chi^2 = 64.81$, $(df = 48, p = .05)$, $\chi^2/df = 1.3$, CFI = .98, NNFI = .97, RMSEA = .06 (90% CI = .00, .10). The unstandardized and standardized path loadings of the measurement model were presented in Table 3.

**Structural model**

**Goodness of fit.** SEM results showed a satisfactory goodness of fit of the proposed structural model to the data: $\chi^2 = 68.63$, $(df = 51, p = .05)$, $\chi^2/df = 1.35$, CFI = .98, NNFI = .97, RMSEA = .06 (90% CI = .00, .10). The unstandardized and standardized path loadings of the structural model were presented in Table 3. The model explained 29.6% of the variance in perceived stigma, 13.5% of the variance in social enfranchisement, and 36.0% of the variance in social wellbeing. All of the paths were significant at $p < .05$ level; and the standardized path loadings were shown in the structural model in Figure 2.

*Figure 2. Proposed model with the standardized solutions. *$p < .05$*
**Direct effects.** Anticipated architectural barrier was positively associated with perceived stigma ($\beta = -.54, p < .05$). Perceived stigma was negatively associated with social enfranchisement ($\beta = -.37, p < .05$). Social enfranchisement was positively associated with mental wellbeing ($\beta = -.60, p < .05$). All other indirect effects were not significant.

Table 3

*Unstandardized and Standardized Loadings for the Model.*

<table>
<thead>
<tr>
<th>Parameter estimates</th>
<th>Unstandardized $\beta$</th>
<th>Standardized $\beta$</th>
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<tbody>
<tr>
<td><strong>Measurement Model</strong></td>
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<td></td>
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<tr>
<td>Anticipated architectural barrier $\rightarrow$ Access</td>
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<td>Anticipated architectural barrier $\rightarrow$ Transport</td>
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<td>.97</td>
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<tr>
<td>Social enfranchisement $\rightarrow$ Social wellbeing</td>
<td>1.71*</td>
<td>.60</td>
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* $p < .05$. 
Multiple regressions with OLS estimations

Model on perceived choice and control. The model explained 17.6% of the variance in perceived choice and control. Anticipated architectural barrier was significantly associated with perceived choice and control ($\beta = -.36$, $p < .01$); but perceived stigma was not.

Model on contributing to the society. The overall model explained 8.5% of the variance in contributing to the society. Perceived stigma was significantly associated with contributing to the society ($\beta = -.26$, $p < .05$); but anticipated architectural barrier was not.

Model on feeling valued. The overall model explained 11.4% of the variance in feeling valued. Perceived stigma was significantly associated with contributing to the society ($\beta = -.26$, $p < .05$); but anticipated architectural barrier was not.

Model on social wellbeing. The overall model explained 31.9% of the variance in social wellbeing. Contributing to the society ($\beta = .31$, $p < .05$) and feeling valued ($\beta = .25$, $p < .05$) were the only factors significantly associated with social wellbeing.
Discussion

The present study tested integrated model on the relationships between anticipated architectural barrier and social wellbeing via perceived stigma and social enfranchisement among PWPD. It contributed to the literature on stigma and architectural psychology by showing the significant and direct associations between anticipated architectural barrier and perceived stigma. It also contributed to the literature on social participation by showing the significant and direct associations between perceived environmental barriers and social enfranchisement (subjective social participation), and between social enfranchisement and social wellbeing.

While the inaccessibility of architecture has been widely regarded as a significant category of environmental barrier to social participation in reality, there were equivocal findings in the past studies showing an inverse relationship between physical barriers and social participation. The present study proposed and provided empirical evidence of a relatively new conceptualization --- anticipated architectural barrier. It refers to the anticipated troubles (whether or not the troubles would actually occur) you may encounter at circumstances of architectural barriers, which could be important stressors which determine their social participation.

The present findings supported that anticipated architectural barrier was significantly associated with perceived stigma, and perceived choice and control, respectively. Firstly, it supported a direct path that anticipated architectural barrier might play an essential role in eliminating or reinforcing perceived stigma among PWPD. For instance, people would stare at a wheelchair user because of his/her physical limitation (perceived stigma) that he/she may have to be carried up or down stairs (anticipated architectural barrier). Another circumstance could be that his/her physical limitation makes him/her feel different from other people (perceived stigma) because he/she may have difficulty accessing different venues (e.g.
restaurants and shops) within buildings (anticipated architectural barrier) in daily life. Therefore, the process and experiences of interacting with the architectural barrier / inaccessibility, rather than the mere physical presence of the barrier, might be the core of stigmatization via architecture.

Secondly, findings indicated that anticipated architectural barrier would negatively affect one’s level of perceived choice and control --- an important domain of subjective components of social participation. For instance, he/she might have relatively less choices about the activities he/she wants to do because he/she may have difficulty accessing the stores and restaurants, or he/she may need to adjust activities or plans according to the accessibility of the destinations. In this way, he/she may have relatively less control over what he/she does and how he/she spends time. As a result, anticipated architectural barrier would negatively affect the subjective social participation. It was consistent with much of the afore-mentioned qualitative findings as well. However, the insignificant indirect effects of anticipated architectural barrier on overall social enfranchisement in the proposed model suggested perceived stigma was not the possible mediator; and further investigation into the mechanism of how architectural barrier would actually influence social enfranchisement.

The present findings also showed that the two common types of environmental barriers (anticipated architectural barrier and perceived stigma) were negatively influence different domains of subjective social participation in a different way. Findings indicated that both types of environmental barriers need to be reduced in order to have better subjective social participation comprehensively. Model testing supported a direct path from perceived stigma to social enfranchisement as a whole. Nevertheless, when three domains of subjective social participation (perceived choice and control, contributing to the society, and feeling valued) were examined separately, anticipated architectural barrier was only associated with perceive choice and control, and only perceived stigma was associated with contributing to the society
and feeling valued, as shown in regression analyses. Perceived stigma, contributing to the society, and feeling valued are constructs relatively more oriented to the interaction with other members of the society. Moreover, although the direct path from social enfranchisement to social wellbeing was significant in the model, contributing to the society and feeling valued were the only domains of subjective social participation significantly associated with social wellbeing as shown in separate regression analysis. A stigma-free living environment and feeling valued by other members of the society, which symbolizes having warm and trusting interpersonal relationships with others, would essentially help promote the psychosocial wellbeing among PWPD. They would be less lonely and isolated, and they might establish peer support network more easily. In addition, when PWPD think that they could contribute to the society in whatever ways they could might help eliminate the idea that their physical disability is a sign of personal incapability that may hinder them from being a valued member in the society. In this way, they could have better social wellbeing. As for the reason why perceived choice and control was not significantly associated with social wellbeing, it might reflect that some PWPD have gradually adapted to the affected choice and control due to architectural barriers in their community by changing their lifestyles and means of social participation. Therefore, although choice and control was frequently emphasized in qualitative findings that it was extremely important to PWPD’s meaningful life, they may be still able to live a happy social life as time goes by.

In addition, findings showed that participants having congenital physical disability had significantly better social enfranchisement than that having acquired physical disability. Acquired physical disability (e.g. stroke) is generally a sudden and drastic challenge to one’s life, imposing intense stress and burden to the person. They may face great changes in daily life; and it may take considerable duration of time to gradually adapt to the social life. Therefore it may possibly influence social participation.
Suggestions to the government and social service organizations

The present study shed light on a new perspective of stigma reduction through minimizing anticipated architectural barrier. The findings call for putting more resources on stigma reduction programmes in the society in order to enhance the psychosocial wellbeing of PWPD. The study provided empirical evidence of the importance of promoting universal design, an architectural approach to designing products suitable to people with wide range of abilities, because it could minimize physical architectural inaccessibility in society which may in turn reduce anticipated architectural barrier. For instance, modules of universal design should be formally included in the professional training in the school of architecture in the universities, so that the architects-to-be (the students) would have better understanding of the rationale of universal design, and have more opportunities to practice universal design approach during the training period, through course projects and internships to cultivate a mindset of adopting universal design.

Moreover, the present study supported the current societal aim of establishing both a barrier-free environment and a barrier-free soul in society. While the government should definitely continue to work on the building of barrier-free facilities to minimize architectural inaccessibility, the government should actively collaborate with social service organizations to jointly devise more stigma reduction programmes to promote a barrier-free soul in the society. When we have ‘barrier-free souls”, we would accept and care each other. In this way, we would have better sense of belonging to the society and have better and more satisfactory subjective perceptions of living in the community because

The government and social service organizations may organize activities to help form a reliable peer support network and build up a caring atmosphere, so as to promote the sense of being valued by others. We should let them know they are not alone. They could also encourage PWPD to be more confident and to try their best to realize their full potential and
contribute to the society in whatever ways they could and they want to. For example, social workers may organize client-led activities, based on the strength-based approach which emphasizes on PWPD’s self-determination and exploring personal strengths. In addition, intervention programmes which cater the special situations or experiences of people with acquired physical disability are recommended.

**Future Research Directions**

In the present report, preliminary statistical analyses were conducted on four selected variables, namely anticipated architectural barrier, perceived stigma, social enfranchisement, and social wellbeing. Further analyses on the relationships with other variables including social engagement, acceptance of disability, emotional wellbeing, and psychological wellbeing are still undergoing. For example, how would anticipated architectural barrier and perceived stigma influence social engagement (objective participation) and social enfranchisement (subjective participation) differently?

Secondly, the hypothesized indirect effect of anticipated architectural barrier on overall social enfranchisement via perceived stigma was insignificant in the proposed model. Further investigation into the detailed mechanism of how architectural barrier would influence social enfranchisement is recommended.

Finally, investigation into the perspectives of the caregivers of PWPD on architectural barrier and social participation, and the differences between the caregivers’ and PWPD’s perspective, is recommended as well. The negative effects of architectural inaccessibility and stigma would not only act on the people who are stigmatized (e.g. PWPD), but also other people associated with them (e.g. caregivers) through stigma-by-association or affiliated stigma. It would negatively affect the wellbeing of both the caregivers and PWPD because caregiving is dynamic in nature in which PWPD and their caregivers would mutually influence each other, or even show emotional fusion gradually. Many life experiences will be
shared among PWPD and their caregivers. It is therefore essential for us not to ignore the caregivers’ perspectives.

Conclusion

Everyone, especially minority groups, desires to enjoy acceptance and participation in the society. It is hoped that the present study generated important and meaningful empirical findings to the disability and rehabilitation research, thereby enhancing the psychosocial wellbeing among PWPD. The present study provided useful evidences for showing the necessity of building a truly barrier-free Hong Kong.
References


