

Perceived Constraints to Leisure Time Physical Activity Participation of Students with Hearing Impairment

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In this study, perceived constraints to participation in leisure time physical activities (LTPA) of students with hearing impairment in Hong Kong were identified. The impacts of gender, age, and cause of disability (acquired or congenital) on these perceptions also were examined. A total of 149 students with severe or profound hearing impairment completed questionnaires. Findings from the study indicated that an “uneasy feeling” about the attitude of people in the mainstream society towards people with disabilities was the most important constraint of the LTPA participation, and lack of accessible information also was an important constraint. Other constraints such as physical discomfort, lack physical coordination, lack of drive, interpersonal constraints, and facility constraints were perceived to be not so important by the students. Younger, rather than older teenage students tended to have more difficulties in accessing sporting facilities. Gender interacted with cause of disability to influence the perceived importance of physical discomfort as a constraining factor of LTPA participation.

KEY WORDS: *Barriers, Constraints, Deaf, Hearing Impairment, Hong Kong, Leisure Time Physical Activities, Sport*

Research has demonstrated that regular participation in leisure time physical activities (LTPA) such as sport, exercise, and physical recreation has physical and psychological benefits. These benefits are particularly important for persons with disabilities (Beaton, 2003;

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Maltais & Bar-Or, 2003; Sutherland & Andersen, 2001). Participation in sport and physical recreational activities by people with physical disabilities and sensory impairment also has been shown to contribute to increased social effectiveness and sense of control in their lives and enhance social integration (Blinde & Taub, 1999).

Despite the general awareness of the important benefits of physical activity, the rate of participation in LTPA by people with disabilities is low (Fu, 1996; Kosma, Cardinal, & Rintala, 2002; Sherrill & Williams, 1996). For example, Longmuir and Bar-Or's (1994) study of Canadian youth with sensory impairment or physical disabilities discovered that 29% of their study participants led sedentary lifestyles. A Hong Kong study of individuals with disabilities found that 44% of the study participants did not take part in LTPA at all (Fu).

Persons with hearing impairment constitute a very high proportion of the population with disabilities. People who have varying degrees of hearing loss comprised the largest disability group in the United States, with 10% of the population reporting a significant bilateral loss that affects speech comprehension (Oliva & Simonsen, 2000). In Hong Kong, the official estimates suggested that about 6% of the Hong Kong population had hearing impairment, but the non-government deaf organization estimation of hearing impairment was about 9%. The low official estimation of the extent of hearing impairment could imply an under-estimation of the need for service provision (Tam & Tsui, 2000). At present, there is very little understanding of the constraints to LTPA participation among people with sensory impairment in Hong Kong. To promote an active leisure lifestyle amongst individuals with disabilities, it is necessary to understand the factors that constrain their participation in LTPA.

Leisure Constraints

Perception of constraints to leisure could inhibit people's leisure interests, limit full involvement (Henderson, Stalnaker, & Taylor,

1988; Jackson, 1991; Jackson & Henderson, 1995; Tsai & Coleman, 1999), and reduce people's enjoyment in leisure (e.g., Harrington & Dawson, 1995). The hierarchical model (Crawford, Jackson, & Godbey, 1991) and the integrated models of leisure constraints (Henderson & Bialeschki, 1993; Jackson, Crawford, & Godbey, 1993) were developed in the 1990s to facilitate systematic examination of how leisure constraints influence individuals' leisure preferences and participation. The hierarchical model of leisure constraints introduces the idea that different kinds of constraints are experienced and negotiated in a given order (Crawford et al.). According to the hierarchical model, the first level of constraints to be faced is intrapersonal constraints (e.g., lack of skills, perceived social attitudes) that inhibit individuals' leisure preferences. After the intrapersonal constraints have been overcome, individuals may be faced with interpersonal constraints (e.g., lack of partner) and structural constraints (e.g., lack of information and facilities) that intervene between their leisure preference and leisure participation. After the resolution of these intervening constraints, leisure participation will result. On the other hand, the integrated models of leisure constraints argue that negotiation of leisure constraints is not systematically ordered as proposed in the hierarchical model (Henderson & Bialeschki; Jackson et al., 1993). For example, the expectation of encountering intrapersonal constraints to participating in an activity, when assessed as being difficult to negotiate, may suppress the desire to participate in that activity (Henderson & Bialeschki).

Although the classification of constraints as either intrapersonal, interpersonal, or structural provides a parsimonious framework for explaining individuals' leisure decision-making processes, categorizing constraint items into the three discrete categories is not always straightforward. For example, perceived time constraints may be an intrapersonal constraint when it reflects a low priority assigned to LTPA compared with other sedentary leisure (perhaps due to a lack of interest in LTPA),

whereas a genuine lack of time may be classified as a structural constraint. Tsai and Coleman's (1999) study of Chinese immigrants showed that leisure constraints could not be effectively allocated into discrete categories of intrapersonal constraints (constraints inhibiting leisure preference) and intervening constraints (constraints hindering leisure participation) as proposed in the hierarchical model.

Furthermore, the use of high-order-construct approach of the hierarchical model may mask the varying levels of perceived importance and influences of different types of constraints within the intrapersonal, interpersonal, and structural constraints on leisure participation. For example, in Pennington-Gray, Thapa, and Holland's (2002) state-wide study of constraints to parks and public land visitation, time constraints and information constraints (classified as structural constraints) were the most important constraints of park visits, whereas other kinds of structural constraints such as transportation constraints were reported as least important. In a cross-cultural study of Hong Kong and Australian university students, Tsai (2000) found that, consistent across both cultural groups, time constraints, which was often classified as structural constraint, had a *negative* impact on students' interest in LTPA participation, whereas access constraints, another kind of structural constraint has a *positive* impact on students' participation interest. Clearly, different components of the same constructs of the hierarchical constraint theory may have different levels of importance to people and different influence in the leisure participation processes.

There is also a lack of empirical validation for the theoretical dimensions of the hierarchical model of constraints using confirmatory factor analysis (CFA). Pennington-Gray et al. (2002) conducted a CFA on the constructs of intrapersonal constraints, interpersonal constraints, and structural constraints using structural equation modeling. Although Pennington-Gray et al. concluded that the measurement model fit the data satisfactorily, their Likelihood-Ratio chi-square

statistic (χ^2/df) of 10.7 was much higher than the recommended cut-off ratio of less than five (Schumacker & Lomax, 1996). Moreover, the factor loadings of the indicators were rather low. Of the 17 constraint indicators, the strongest indicator had a loading of .53 and only 3 indicators achieved a factor loading of .45 or above, which could be considered to be fair indicators (Comrey & Lee, 1992), and the rest of the indicators had factor loadings less than .45, including 9 indicators with factor loadings less than .30, which could be considered weak (Comrey & Lee). The high Likelihood-Ratio chi-square statistic and low factor loadings probably suggested that the hypothesized factor structure did not effectively reflect respondents' cognitive profiles associated with constraints to park visits. Possibly, low-order factors such as facility constraints, time constraints, information constraints, and physical constraints could better reflect the cognitive profiles of individuals. More importantly, the consideration of these low order factors is likely to facilitate the development of better negotiation strategies by individuals and practitioners because more *specific* kinds of important constraints can be identified and thus relevant policies (e.g., facilities, transportation) and coping strategies can be developed.

In their review of leisure constraint literature, Jackson and Scott (1999) concluded that there was a stable core of leisure constraints regardless of the nature of the sample. The commonly reported constraints included time commitments, lack of awareness, access problems, costs, lack of facilities and opportunities, and lack of skills and abilities. However, the types of constraint that play significant roles in influencing leisure participation may vary among different social groups. For example, for elderly people, health and injury were the frequently cited barriers (Booth, Bauman, Owen, & Gore, 1997; Lian, Gan, Pin, Wee, & Ye, 1999), whereas difficulties in enjoying the activities and in making time discriminated between active and nonactive cardiac patients (Johnson & Heller, 1998). Wankel's (1985) study of male employees showed that the most frequently cited reasons for their withdrawal

from exercise programs included inconvenient time, loss of interest in the program, injury, and dislike of the rigid schedule.

Contact Theory and Attitude Development

For people with disabilities, the historic and present patterns of individual and institutional discriminations against them could place additional constraints on their participation in leisure. In the past, people with disabilities were often seen as objects of ridicule, objects of pity, menaces, and burdens of charity (Wolfensberger, 1972). A number of studies showed that negative social attitudes of people in mainstream society towards people with disabilities is one of the most significant obstacles faced by these individuals when they attempted to participate in community recreation programs (Bedini, 2000; Dunn, 1994; Kwok & Ng, 1991). This negative attitude could be partly attributed to the lack of understanding and appreciation of the abilities and difficulties of persons with disabilities by people in the mainstream society. To some extent, the deficit in understanding and respect may result from a lack of social contact and interaction between people with disabilities and people in the mainstream (Devine, 2004). Some researchers have reasoned that it is not the limitations of the individual, but a lack of social acceptance and inclusive context that handicaps people with disabilities (e.g., Bedini & Henderson, 1994; Devine & Dattilo, 2000; Higgins, 1992). They argued that these socially constructed barriers were more limiting than physical or programmatic barriers.

Contact theory provides a useful framework for expanding our understanding of the antecedents of the favorable and unfavorable conditions for leisure participation of minority groups (Devine & Wilhite, 1999). As posited in contact theory, contact and social interaction between different community groups under favorable conditions are likely to improve attitudes towards each other, which in turn could help to build friendships (Allport, 1954).

Favorable conditions include mutual benefits, equal status rather than helping relationships, and frequent contacts characterized by cooperative efforts and personal interaction (Allport; Tripp, French, & Sherrill, 1995). Thus both the quantity and quality of contact between the groups are important for the development of positive attitudes. The significance of these favorable conditions was demonstrated by Wilhite, Mushett, Goldenberg, and Trader's (1997) study that sought to change students' attitudes towards individuals with disabilities through the running of a Paralympic Day in school. Wilhite and colleagues found a lack of positive attitudinal change of students after the event and many of the students did not want to participate in Paralympic Day again. They attributed these disappointing outcomes to the lack of frequent and long-lasting contact between students with and without disabilities, and their lack of opportunities to become acquainted with each other before the program.

In addition to contact quality and quantity, the context of the contact might also have an impact on individuals' leisure experience and perception of constraints. For example, in Devine and Wilhite's (2000) qualitative study of youth with and without disabilities, respondents described the context (i.e., activity) in which they were friends as being more informal (e.g., gathering at friends' home), social, learning, or appreciative in nature, whereas contexts that were more competitive and physically active yielded negative meanings of disability. On the other hand, Blinde and McClung (1997) argued that participation in inclusive sport activities that were properly structured offered the opportunity to challenge disability myths by displaying abilities. It is possible that the effectiveness of the contact context in fostering positive attitudes also depends on the capability of individuals with disabilities to compete in equal terms (Devine & Wilhite) and on the effort each group needed to make to accommodate each other without compromising the intrinsic enjoyment.

Factors Influencing LTPA Participation

In addition to social-attitudinal barriers, an array of intrapersonal, social, and structural constraints on participation in LTPA have been identified in the studies of people with disabilities. These included lack of energy, poor sport skills, not having time, poor health, costs, lack of transportation, unavailability of facilities or programs, and preferences for other leisure activities. For example, Rimmer, Rubin, and Braddock's (2000) study of perceived constraints to LTPA participation among African American women with physical disabilities showed that cost of programs, lack of energy, and lack of transportation were important constraints. Fu's (1996) study indicated that the most important reason for non-participation in LTPA among people with disabilities in Hong Kong was tiredness, followed by lack of time, poor health, lack of programs, and lack of facilities. Other studies have found that not having a companion with whom to share the experience, lack of time, and lack of specific skills were the most commonly reported constraints by people with disabilities (Ferrara, Dattilo, & Dattilo, 1994; Sherrill & Williams, 1996). More recently, Sit, Lindner, and Sherrill (2002) found that an interest in other non-physical leisure activity was a dominant reason for non-involvement in physical activity among children with disabilities in Hong Kong. It is uncertain whether these differing findings were the result of different cultural and environmental influences or the use of samples with different types or levels of disabilities.

A number of researchers have pointed out the need to take into account factors such as the type of disability, onset of disability, and gender when studying persons with disability (Lieberman & Stuart, 2002; Pensgaard & Sorensen, 2002). Longmuir and Bar-Or's (2000) study of Canadian youth with different types of disabilities examined the influence of age, gender, and disability type on young people's perceived limitation in physical activity par-

ticipation. They found a significant influence of disability type on perceived participation limitation but no significant influence of gender or age. However, the interaction of these factors had not been examined in the study. As well, the age of onset of the disability or whether it is congenital or acquired also may have important implication to individuals' leisure participation. For example, people who lose their functions such as hearing after birth might experience constraints in different ways as compared to those with congenital disabilities. Children who experienced an acquired hearing loss have to make additional effort to adapt and learn to communicate with the hearing world and to deal with the negative change and emotional frustrations of the hearing loss (Scheetz, 2004). Investigation of how age, gender, disability type, and age of onset *interact* to influence leisure behaviors is expected to provide additional insights into the significance of different constraints in inhibiting LTPA participation.

Research Needs and Problems

In spite of the fact that individuals with hearing impairments constitute a very high proportion of the population with disabilities, persons with hearing impairment are under-researched (Pensgaard & Sorensen, 2002; Reid & Prupas, 1998). The "hidden" nature of hearing impairment and the higher physical mobility of people with hearing impairment probably reduces people's concern for them in comparison with people with other disabilities as they might be seen as having low support needs and thus given low priority in sport development and research. However, their use of different modes of communication, such as sign language, can present considerable barriers to their participation in leisure activities that require substantial verbal communication. Nevertheless, they are probably less constrained in sports activities than in other leisure activities because of less reliance on verbal communication in sport. Rather, it is the physical action, motor skills, and body lan-

guage that are more essential in sport engagement. Oliva and Simonsen's (2000) study of students with hearing impairment who were included in mainstream schools participated almost exclusively in sports and they were rarely involved in other kinds of extracurricular activities. The majority of these students remarked that they felt lonely, constrained, and frustrated with other extracurricular activities as they often had unsatisfactory experiences. It appears that in sport participation, hearing impairment is less likely to affect individuals' participation satisfaction as they are able to perform and enjoy the physical action on equal terms and status as their non-impaired counterparts.

At present, little is known about the reasons for the low level of participation in LTPA by young people with hearing impairment in Hong Kong despite their unrestricted physical mobility (Hong Kong Sports Development Board, personal communication, July 2003). The present study sought to identify the important constraints associated with participation in LTPA as perceived by students with severe or profound hearing impairment. The impacts of gender, age, and cause of disability on individuals' perception of constraints to LTPA also were examined.

Method

Participants

The study participants were recruited by convenience sampling from the estimated 605 students attending four special schools in Hong Kong that mainly cater to children and youth with profound or severe hearing impairment (Hong Kong Health and Welfare Bureau, 1999) with a small proportion having only moderate hearing impairment. The students in these schools generally had difficulties fitting into mainstream schools. Some of them also had learning difficulties, intellectual disabilities, and/or behavioral problems. Students who had intellectual disabilities and/or physical (orthopedic) disabilities were not included in the sample. Research assistants, with the as-

sistance of the teachers, went to all the classes to solicit voluntary participation in the study. A total of 149 students with severe (hearing loss of 71 to 90 dB) or profound (hearing loss of greater than 90 dB) hearing impairment completed questionnaires in class.

Of the 149 study participants, 53.7% were male and 46.3% were female. The ages of the participants ranged from 12 to 20 years. Of the participants, 37.6% were born with hearing impairment and 62.4% acquired the condition as a result of injuries or illnesses. The loss of hearing of the latter students began between 1 and 9 years of age ($M = 5.18$, $SD = 1.78$). Most of the students relied on lip reading or local sign language to communicate, but some were able to communicate orally in simple sentences.

Questionnaire Development

The questionnaires included questions on the perceived constraints to participation in LTPA, demographic information, and student number, which was used to obtain history of hearing impairment from school records. Constraint items were developed from reports of previous studies of exercise and sport participation constraints (Fu, 1996; Myers & Roth, 1997) in conjunction with the findings from a group interview. Five students with moderate hearing impairment (rather than severe impairment) were selected for the interview to reserve those with severe impairment for the main study. The interview was conducted using local sign language. In the interview, open-ended questions were used to collect the data. The study participants were asked whether they had participated in LTPA in the past year. Those who had participated were asked to state the kind of difficulties or constraints that limited their enjoyment and other aspects of participation. Those who had not participated were asked to state their reasons for their nonparticipation. Study participants also were asked to suggest the factors that might influence their peers who had severe hearing impairment in LTPA participation. The inter-

viewer ensured that all participants had an opportunity to present their feelings and beliefs. Signed responses were interpreted by the interviewer and recorded in long hand notes. The interview notes were presented to the participants at the end of the interview to confirm that the notes represented participants' feelings and opinions. Subsequently, the interview notes were content analyzed to identify the salient constraints that influenced students' participation in LTPA. Based on the constraints identified from this analysis as well as those from Fu's and Myers and Roth's studies, a trial questionnaire comprising 27 constraints items was developed. A five-point Likert-type scale was used to gauge the responses, with 1 = very unimportant, 2 = not important, 3 = important, 4 = very important, and 5 = extremely important.

Fifteen youths with moderate hearing impairment were recruited to participate in a pilot study to comment on the clarity and relevance of the constraint items and the questionnaire design. Feedback from the participants showed that the set of constraint items were comprehensive and easy to understand.

Test-retest reliability of the constraint items was examined by administering the questionnaire to 35 young people who did not have a disability twice with a 7-day interval. Youth without disabilities were used for the test because the researchers were unable to recruit adequate number of students with moderate hearing impairment for the test, and the limited number of students with severe impairment were to be retained for the main study. The correlations between the item scores of each item for the initial and the subsequent administrations ranged between .69 and .97, indicating acceptable test-retest reliabilities for the items. However, this test-retest reliability should be interpreted with caution because individuals without hearing impairment instead of those with impairment were used for the test. Internal consistency of the scale was estimated by calculating Cronbach's alpha. The obtained alpha coefficient was .87, which suggested that the set of items as a whole

could be considered to be a reliable scale (Nunnally & Bernstein, 1994).

Measurement Model of Constraint Factors

The classification of LTPA constraint factors was based on the review of the disability literature as well as Tsai and Coleman's (1999) study of leisure constraints of Chinese immigrants and Myers and Roth's (1997) study of exercise barriers of young adults. Perceived constraints to participation in LTPA were conceptualized as composed of eight constraint factors:

1. lack of drive, which represented a lack of interest and motivation in LTPA;
2. interpersonal constraint, which reflected a lack of interpersonal support to one's participation in LTPA;
3. facility constraint which represented a lack of appropriate sporting and exercise facilities;
4. physical discomfort which referred to the physiological discomfort from engaging in the physical activities;
5. other priorities which represented the competing interest and responsibilities such as social activities and school work that competed with LTPA participation for the limited time resources;
6. social attitude constraint which is related to a feeling of uneasiness with the attitude of people in the mainstream society;
7. information constraint which reflected a lack of accessible information as to how and where to participate; and
8. lack of physical coordination which reflected a weak physical coordination ability (see Table 1).

The construct validity of the perceived constraints was tested by applying a confirmatory factor analysis using the LISREL 8.5 statistical package. Model modification procedures were performed on the initial measurement

Table 1.
Perceived Constraints of Students with Hearing Impairment

Constraint Factors	N	Mean	SD
Social attitude constraint	149	3.48 _a	1.23
Information constraint	149	3.11 _b	1.23
Physical discomfort	149	2.86 _c	0.89
Other priorities	149	2.71 _{cd}	1.12
Lack physical coordination	149	2.62 _{de}	1.15
Lack of drive	149	2.56 _{de}	0.93
Interpersonal constraint	149	2.48 _e	0.78
Facility constraint	149	2.47 _e	1.02

Significant differences in importance level of constraint factors are indicated by subscripts. Means that do not share the subscripts differ at $p < .05$ in General Linear Model Pairwise Comparison.

model of perceived constraints and a more parsimonious model was derived. Values of the Goodness-of-Fit indices ($GFI = .90$, $NFI = .80$, $CFI = .93$, and $RMSEA = .04$) showed that the modified constraint factor model was tenable. The item weightings of the factors ranged from .46 to .93. The model contained 17 constraint items that loaded onto five factors: lack of drive (feel boring, lazy, busy, lack time), interpersonal constraint (friends do not participate, family do not encourage, family restrictions, don't like to exercise alone), facility constraint (lack appropriate facilities, locations inconvenient, lack activity venues), physical discomfort (feel hot and sweaty, feel unenergetic, sore muscles, make one fatigue), other priorities (school, social life). Three items—social attitude constraint, information constraint, and lack physical coordination, were treated as single-item factors (Table 2).

Analysis

Simple factor scores of each constraint factor for individual respondents were calculated by averaging the levels of importance of items in the respective factors. Differences between

the levels of importance of the eight constraint factors (relative importance of the constraint factors as perceived by the students) were assessed using general linear model analysis-repeated measure. A three way ANOVA was used to detect any sources of variation in the levels of constraints that were associated with various background factors—gender, age group, and cause of disability.

Results

Examination of the mean levels of the constraints showed that social attitude constraint

Table 2.
Confirmatory Factor Analysis of Perceived Constraints

Factor Indicator	Factor Loading
Lack of drive	
Feel boring	.70
Lazy	.58
Busy	.67
Lack time	.60
Interpersonal constraint	
Friends do not participate	.47
Family do not encourage	.49
Family restrictions	.48
Don't like to exercise alone	.46
Facility constraint	
Lack appropriate facilities	.50
Locations inconvenient	.47
Lack activity venues	.49
Physical discomfort	
Feel hot and sweaty	.49
Feel unenergetic	.71
Sore muscles	.56
Make one fatigue	.60
Other priorities	
School	.73
Social life	.93
Social attitude	Single item
Lack information	Single item
Lack physical coordination	Single item

was on average perceived to be quite an important constraint to students' LTPA participation, and information constraint also was an important concern (see Table 1). Physical discomfort was not quite important, and all other constraints including other priorities, lack physical coordination, lack of drive, interpersonal constraint, and facility constraint were perceived to be slightly unimportant. Results from the pair-wise comparisons of the mean constraint factors scores showed that social attitude constraint was perceived by the students to be significantly more important than all the other constraints ($p < .05$) (Table 1). The second most important constraint was information constraint, which was significantly more important than the other six constraint factors ($p < .05$), followed by the physical discomfort and the other priority factors. The other four constraint factors—lack physical coordination, lack of drive, interpersonal constraint, and facility constraint—were the least important constraints. There were no significant differences in the perceived importance level between these four factors ($p > .05$).

To determine whether perceived constraints to LTPA participation differed according to age-group (younger teenagers aged 12 to 14; teenagers aged 15 to 17; young adults aged 18 to 20), gender, and cause of impairment (congenital or acquired), a three-way ANOVA was performed on each of the constraint factors. The analyses indicated that there was a significant main effect for age group on the facility constraint factor ($F = 3.41, p < .05$). Post-hoc analysis showed that the age 12 to 14 group perceived a significantly higher level of facility constraint ($M = 2.78, SD = 1.08$) than the age 18 to 20 group ($M = 2.20, SD = 0.94$). No significant main effect was found for any of the other factors.

Only one significant interaction was found, which was for the physical discomfort factor with respect to gender and cause of impairment ($F = 5.88, p < .05$). The analysis showed that males who acquired hearing impairment as a result of illnesses or injury scored higher in the physical discomfort con-

straint than their female counterparts (Male $M = 3.04, SD = .13$, Female $M = 2.70, SD = .14$). Conversely, females who were born with hearing impairment perceived a significantly higher level of physical discomfort constraint than their male counterparts (Female $M = 3.02, SD = .18$, Male $M = 2.60, SD = .17$).

Conclusions and Discussion

Salient LTPA Constraints

An uneasy feeling about the attitude of people in mainstream society towards people with disabilities was an important constraint to the LTPA participation of students with severe or profound hearing impairment. The social psychological constraint was perceived to be the strongest barrier to their participation in LTPA. For young people with hearing impairment, especially those who spend most of their time under segregated conditions in special schools, a lack of social confidence, and thus having an apprehensive feeling about experiencing prejudice by the mainstream society, is understandable. These uneasy feelings may inhibit their interest in sport participation, turn them away from participation, and reduce their enjoyment of the activities. Previous studies have suggested that negative attitudes of people in the mainstream society towards people with disabilities are the most significant obstacle faced by individuals with disabilities who attempt to participate in community recreation programs (Bedini, 2000; Dunn, 1994).

A number of researchers also pointed out that a lack of social acceptance and an absence of inclusive context were more limiting for individuals with disabilities than their physical limitations or programmatic barriers (Bedini & Henderson, 1994; Devine, 2004; Devine & Dattilo, 2000). The apprehension of students with hearing impairment regarding their being accepted by others could flow from the lack of contact and interaction opportunities with the mainstream youth (Bedini, 1996). Apparently, the favorable and necessary conditions for effective contact as posited in the contact theory, that is, frequent contact and long lasting inclu-

sive programs, are lacking in Hong Kong. The weak inclusive ideology in Hong Kong could be demonstrated by the disappointing performance of its inclusive education. In 2000, only 40 of 1,200 primary and secondary schools were willing to offer integrated education for people with hearing impairment (Tam & Tsui, 2000). Students' participation in mainstream activities could mainly be done on an ad hoc basis with no adaptations for their specific needs. These unfavorable conditions could produce negative rather than positive experience and attitude shifts (Murphy, 1990; Tripp et al. 1995). The unsatisfactory outcomes of the Paralympic Day in Wilhite et al.'s (1997) study provides evidence that attitude change does not come automatically with casual and brief contact but requires preparation for the interaction and frequent and long-lasting social contact.

Unlike work in which people compete for gainful profits and advancement, recreation activities provide a less instrumental, less conflicting, and less threatening environment for people to interact with each other. Through the sharing of a common leisure interest and goals, individuals may develop bonds and build relationships with people from different backgrounds (Allport, 1954). For individuals with hearing impairment, sport and physical recreation could provide an ideal medium for inclusive activities because people can interact, communicate, and cooperate to a large extent through physical action, motor skills, and body language. The display and the appreciation of physical skills would often not be reduced because of the difficulties in oral communication between participants. Previous research showed that students with hearing impairment generally had the same fitness level and potential physical ability as hearing students when given equivalent opportunities, although some could have balance problems related to etiology of the hearing impairment (Longmuir, 1998). Thus, deafness might as well be seen as a unique culture with its own language and beliefs like other ethnic minorities, rather than treated as a disability (Longmuir). Neverthe-

less, in Hong Kong, sport programs, training, and events are organized mainly as segregated programs, which provide no opportunity for people with and without hearing (and other) impairments to interact with each other. Sit et al.'s (2002) study of children with disabilities in Hong Kong found that none of their study participants joined any mainstream sports clubs. The lack of inclusive recreation opportunities in Hong Kong, to some extent, reflects its deep-rooted institutional discrimination against its marginalized populations.

Another important constraint to LTPA participation for students with hearing impairment is the lack of accessible information about activity opportunities. Special services such as sign language interpreters and devices such as telecommunication devices for the deaf (TDDs) or assistive listening systems and other adaptations for individuals with hearing impairment are typically unavailable in the mainstream service provision. The lack of appropriate means of communication with people with hearing impairment limits their access to information, which in turn keep them away from opportunities to participate in mainstream active recreation.

Although many of the potential constraints to LTPA participation were, on average, not perceived to be important by students with hearing impairment, it should be noted that given that many of the potential constraints were, on average, only marginally unimportant, a proportion of individuals with hearing impairment could have found the constraints to be important.

The findings of this study showed that an uneasy feeling about the social attitudes, which is a type of intrapersonal constraint, and the lack information, which is a structural constraint, were the most important constraints to LTPA participation as perceived by students with hearing impairment. However, a lack of drive, which is also a type of intrapersonal constraint, and lack of facilities, another kind of structural constraint, were the least important amongst the range of constraints to LTPA participation. Therefore, different kinds of

constraints within the same dimensions of intrapersonal and structural constraints may have a different influence on individuals' leisure participation. To effectively improve our social and leisure policies and to provide equitable opportunities to people with specific needs, it is necessary to consider how different kinds of constraints within these constraints categories operate to influencing individuals' LTPA participation.

Demographic Influences on LTPA

The present findings indicated that, with two exceptions, differences in socio-demographic factors such as different sexes and age groups, and different causes of hearing impairment generally did not influence students' perception of constraints to LTPA participation. Longmuir's (2000) analysis of Canadian students (age 6 to 20 years) with sensory (hearing & visual) impairment and physical disabilities also found no gender and age effects on their perceived limitation in physical activities. The researchers argued that the lack of differences was due to initial low levels of activity. However for the present study, the lack of variations of perceived constraints among students of different gender, age, and cause of disability might suggest that students of the special schools hold rather similar beliefs regarding constraints to participation in LTPA. This lack of variation could be partly attributed to a common and strong socialization process in the special schools.

One exception to the general low socio-demographic influence on students' perceived constraints to participation in LTPA was the impact of age on the perception of facility constraints. The younger teenage students generally perceived greater difficulties in accessing sporting facilities than the young adult students. This perception probably reflects the reality of the lack of independence of younger teenagers. As teenagers grow up, they are likely to become more knowledgeable and resourceful, and thus access to opportunities could then become a lesser problem.

The perceived importance of physical discomfort in constraining students' LTPA participation depended on both gender and cause of disability. Male students who acquired hearing impairment as a result of illnesses or injuries generally perceived physical discomfort to be a more important constraint in comparison with their female counterparts. One possible explanation of this gender and disability-cause interaction is that, given boys usually like physical activities more than girls (Sit et al., 2002), when boys acquire hearing impairment later in their lives, they may become more sensitive towards the restrictions brought about from the change and be more concerned with the physical discomfort than their female counterparts. On the other hand, for those who were born with hearing impairment, female students perceived physical discomfort as more constraining than their male counterparts. This difference probably reflects the fact that, in comparison with males, females traditionally have lower interest in sport and thus are less tolerant of the associated physical discomfort from playing sport. However, these explanations are speculative and more research has to be conducted to understand the differences.

Limitations and Future Research

One limitation of the present study is that the generalizability of the findings are limited to youth receiving segregated education because the study focused only on students from special schools. Future research that studies young people from both special and integrated schools and those not attending school at all will provide more insight into the factors that impact on the participation of LTPA by young people with hearing impairment. As well, the disability-specific constraint items (e.g., feeling uncomfortable with the social attitude, and access constraints) derived from the group interview in the study were limited. The use of more indicators to measure these constraint dimensions in future research will improve the construct validity. We also need to point out

that this study merely examined the levels of importance of different constraints to LTPA participation and the relative importance of these constraints as perceived by individuals with hearing impairment. However, we did not assess the relationships between these perceived constraints and the level of participation in LTPA nor had we examined how constraints influence leisure choice. Future studies that examine the process through which different kinds of constraints influence the level of participation in LTPA and the making of leisure choice of individuals with hearing impairment will help promote active leisure lifestyles of people with specific needs.

Practical Implications

For students with hearing impairment, an apprehension about negative public attitudes, and a lack of accessible information are important barriers to their participation in LTPA. These barriers reflect entrenched individual and institutional discriminations that people with disabilities face in our society. The government's sport initiative for people with hearing impairment has been less than adequate. In 2002–2003, the Hong Kong Leisure and Cultural Services Department provided only three short sport programs for people with hearing impairment, and each course accommodated only 12–20 participants (Hong Kong Leisure and Culture Services Department, 2002). Similar deep-rooted institutional discrimination is evident in the disappointing performance of inclusive education in Hong Kong. These service deficiencies and the neglect of minority rights are expected to continue as long as the Hong Kong Disability Discrimination Ordinance does not make mandatory or strongly encourage the provision of specific facilities and services for persons with disabilities.

It is largely the attitudes of people in the mainstream rather than deafness per se that determine the leisure opportunities of individual with hearing impairments. There is a need to improve the attitudes of people with and without disabilities towards each other. This

attitude change may be facilitated through an increased provision of well-managed inclusive recreation that provides opportunistic for frequent and on-going interaction for people with and without disabilities. Since Hong Kong has not yet developed a supportive infrastructure for inclusive recreation and education, public education may play an important role in increasing the knowledge and understanding between people with and without hearing impairment and provide them mental preparations to interact effectively. Recreation programmers and leaders also need to understand that positive social outcomes may not happen automatically from recreation participation but require careful planning and effective engineering during the activities. For example, favorable conditions such as mutual benefits, equal status, and matching of abilities, as proposed in the contact theory, should be taken into account to reduce the constraints and to facilitate intrinsic motivation and positive experience of the participants. In circumstances where inclusion is not possible, running special programs/activities and mainstream programs/activities side-by-side at the same venue may increase the contact opportunities between people with and without disabilities. However, the attitude of service and program staff and their ability to facilitate positive experiences are particularly important (Germ & Schleien, 1997). Therefore, more professional training for sport programmers, service staff, and coaches is needed to enhance their attitude, confidence, and ability to serve people with disabilities.

As the main difference between the hearing and non-hearing individuals is the mode of communication, people with hearing impairment might be seen as individuals who use a different language like other ethnic minorities. The learning of sign language should be promoted and made accessible to the schools and mainstream populations. Accessibility of information may also be improved by providing detailed information in print form, especially on the internet. As well, sign language interpreters, TDDs, or assistive listening systems and other adaptations should be made accessi-

ble for individuals with hearing impairment in public recreation settings. In addition, participative decision-making approaches, such as involvement of people with hearing impairment in advisory and management committees, which make decisions that influence their recreation opportunities, should be promoted. A systematic implementation of these strategies is necessary for providing more equitable sporting opportunities for persons with hearing and other disabilities in Hong Kong.

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