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Title: Influence of Lifestyle Redesign® on health, social participation, leisure and mobility of older French-Canadians

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Title: Influence of Lifestyle Redesign® on health, social participation, leisure and mobility of older French-Canadians: Results from a pilot study

Abstract

Objective: This pilot study explored the influence of Lifestyle Redesign® on older French-Canadians' health, social participation, leisure and mobility. **Method:** A mixed-method design was used with 16 participants (10 women) aged 65-90 (76.4 ± 7.6 y), 10 without and 6 with disabilities. Health, social participation, leisure and mobility questionnaires were administered before and after the 6-month intervention, as well as 3 and 6 months post-intervention. Semi-directed interviews were also conducted. **Results:** The French Lifestyle Redesign® seemed to have a beneficial effect on participants' mental health ($p=0.02$) and interest in leisure ($p=0.02$) and, in those with disabilities, improved social participation ($p=0.03$) and attitudes toward leisure ($p=0.04$). Participants reported positive effects on their mental health, leisure, mobility and social participation, including on the frequency and quality of their social interactions, and having an occupational schedule fostering better health. **Conclusion:** Lifestyle Redesign® is a culturally promising occupational therapy intervention for community-dwelling older French-Canadians.

Key words: Occupational therap*, Health promot*, Well Elderly, Life Style, Wellness, Quality of Life, Well-being, Aging, Aged, Senior, Community participation, Social integration, Social activity, Social inclusion, Social interaction

Implications for Occupational Therapy Practice

- Lifestyle Redesign® is a weekly 2-hour occupational therapy group intervention given over a 6-month period and designed to promote meaningful and healthy activities.
- According to older French-Canadians, Lifestyle Redesign® improved their knowledge about health, social participation, leisure and mobility, which in turn improved their well-being.
- Lifestyle Redesign® helped older French-Canadians to face challenges and participate more frequently in leisure and social activities, optimize their relationships, and go to new places.

1 **Introduction**

2 To address population aging (World Health Organization, 2015), health professionals, including
3 occupational therapists, need to engage in effective interventions. The intervention called Lifestyle
4 Redesign® (Clark et al., 2012) empowers older adults to regularly perform healthy and fulfilling
5 activities. This preventive occupational therapy intervention involves weekly 2-hour group sessions
6 and monthly 1-hour individual meetings over a period of six to nine months.

7 Lifestyle Redesign® has been shown to benefit health and be cost-effective (Lévesque et al., In
8 revision). Specifically, two randomized controlled trials (RCT) with 361 and 460 older Americans
9 showed positive effects on bodily pain, vitality, social and mental functioning, and life satisfaction
10 (Clark et al., 1997; 2001; 2012), 90% maintained after 6 months (Clark et al., 2001). Healthcare costs
11 were lower for participants (US\$967) than for individuals without intervention (US\$3,334) or with
12 social activities (US\$1,726), but this was not statistically significant (Hay et al., 2002).

13 Quantitative studies on adapted versions of Lifestyle Redesign® reported mixed effects. One
14 RCT conducted by the original team showed that a translated and adapted Mandarin version and the
15 original intervention maintained health in older Chinese (n=12) and English-speaking (n=29) adults
16 (Jackson et al., 2000). Older Chinese participating in social activities (n=35) experienced a decline
17 but the difference between the groups was not significant. Another study of a 4-month version
18 involving frail older adults found positive trends in role functioning, pain and general health in the
19 experimental group (n=12) similar to the control group (n=12; Horowitz & Chang, 2004). Third, the
20 Lifestyle Matters Programme conducted with 28 older adults in the North of England showed trends
21 toward improvement in health (Mountain et al., 2008) but the winter may have influenced the results.
22 Another RCT involving seniors who had had a stroke found a trend toward greater improvements in
23 mental health, bodily pain, physical functioning and emotional role but no significant difference
24 between the experimental (n=39) and control (n=47) groups (Lund et al., 2012).

25 Two studies on adaptations considered social participation. One pre-experimental study with the
26 Life of Wellness program found an increase in monthly social or community activities (from 56 to
27 66%) for middle and upper class older adults living in seniors' apartments (n=39; Matuska et al.,
28 2003). Finally, in a quasi-experimental study of a 4-month Swedish version, the intervention group
29 showed significant improvements in vitality (p=0.01) and mental health (p=0.03) but not in other
30 domains (p=0.16 to 0.83) or participation (p=0.07; Johansson & Bjorklund, 2016). No difference was
31 observed between the experimental (n=22) and control (n=18) groups, which were not fully matched.
32 In summary, despite a lack of power, positive trends in health and social participation were observed
33 in older adults receiving one of these adaptations of Lifestyle Redesign®. To improve the crafting of
34 preventive occupational therapy interventions, further research is needed on these programs.

35 As Lifestyle Redesign® could be relevant for practice in Quebec (Lévesque et al., in revision), a
36 French-Canadian version was developed. This version was translated by a professional French-
37 Canadian translator and validated by 14 experts. The concepts and themes mostly applied to the
38 French-Canadian culture and context but adaptations were required concerning the healthcare system
39 and demographic studies. The publication of the manual is in process. The influence of the French-
40 Canadian version on the health and social participation of older adults is however unknown,
41 including those with significant communication and mobility disabilities. Moreover, to our
42 knowledge, no study has considered the influence of Lifestyle Redesign® or its adapted versions on
43 older adults' leisure and life-space mobility, two outcomes especially important for older adults.
44 Defined as the extent of spatial latitude experienced by a person (May et al., 1985), life-space
45 mobility has been associated with obesity (Bouchard et al., 2007), physical disability (Guralnik et al.,
46 2000), quality of life (Beswick et al., 2008), mortality (Clausen et al., 2007) and health care costs
47 (Liu-Ambrose et al., 2008). Before its implementation, it is essential to know more about the effects
48 of the French-Canadian Lifestyle Redesign® on older adults. Moreover, an in-depth understanding

49 of the experience of French-Canadian older adults with and without disabilities, those primarily
50 concerned by the intervention, is of particular importance for occupational therapists who consider
51 clients' perceptions when working on improving or maintaining these outcomes. To address this gap
52 in the literature, this first pilot study thus aimed to explore the influence of the French-Canadian
53 Lifestyle Redesign® on older adults' health, social participation, leisure and mobility.

54 **Method**

55 *Study Design and Participants:* This pilot study used a mixed-method concurrent triangulation
56 design (Creswell & Plano Clark, 2017) including a pre-experimental component [pre-test (T₁), post-
57 test (T₂) and follow-ups (T₃ and T₄)] and an exploratory descriptive qualitative clinical study (Miller
58 & Crabtree, 2003) with a sample of 16 community-dwelling older adults with and without disability.
59 A sample size of 16 participants allowed detection of a standardized difference of 0.75 or greater
60 between two means according to paired bilateral *t* tests based on a significance level of 5% and
61 power of 80% (Machin, Campbell, Tan, & Tan, 2009). This difference was sufficient in a study that
62 explored the influence of another intervention on leisure (Levasseur et al., 2016) and life-space
63 mobility (Pigeon, Boulianne & Levasseur, submitted). This sample size also allowed in-depth
64 exploration and data saturation. Eligibility criteria were: 1) aged 65 and over, 2) no or mild (group 1)
65 or moderate or severe (group 2) loss of autonomy, 3) normal cognitive functions, 4) living in a
66 conventional or residential home for semi-independent seniors, and 5) French-speaking. Participants
67 were recruited from a previous study of people attending a day hospital and day center in a Health
68 and Social Services Centre (HSSC) in Quebec (Canada), and from people living in a residence. The
69 Research Ethics Committee of the Eastern Townships HSSC approved the study (2015-488).

70 *Data Collection Procedures:* Participants were recruited until the predetermined sample size
71 (n=16+3, anticipating possible attrition) was reached. All participants signed an informed consent
72 form and were met individually at home by a research assistant or occupational therapy student

73 specially trained to administer the questionnaires. An experienced research assistant conducted the
74 qualitative interviews. At T₁, one sociodemographic and eight outcome questionnaires, four reported
75 here and others elsewhere (Trépanier et al., submitted), were administered in approximately 120
76 minutes. Following the six-month intervention period, participants answered the same outcome
77 questionnaires (T₂) and, about one month later, had a face-to-face semi-structured individual
78 interview lasting about 90 minutes. All interviews were digitally audiotaped, transcribed and verified
79 with respect to the wording used by participants. After the first few interviews, two authors (MB and
80 ML) discussed and adjusted the questions for subsequent interviews. Finally, three (T₃) and six (T₄)
81 months after the end of the intervention, participants answered the same questionnaires again.

82 *Intervention:* In the present study, the French-Canadian Lifestyle Redesign® intervention was led by
83 an occupational therapist (OT) who took the University of Southern California 6-hour online
84 introductory training course. The OT was supervised on a weekly basis by an academic OT
85 specializing in health promotion and clinical research who was familiar with the intervention (very
86 involved in the translation). With this supervision, the OT received regular feedback on her role and
87 the intervention. Weekly 2-hour group sessions were held over a six-month period between August
88 2015 and March 2016. These sessions were based on 12 modules (e.g. occupation, health and aging;
89 transportation and occupation) from the 2nd edition of the Lifestyle Redesign® Manual and involved
90 didactic presentations, peer exchanges, reflective exercises, direct experience and personal
91 exploration (Carlson et al., 1998). Every month, one group outing was targeted and individual
92 meetings with the OT were planned. These meetings aimed to help participants integrate the group
93 session content and engage in personalized meaningful activities. In the group of participants with
94 moderate or severe loss of autonomy, the OT was assisted by one or two volunteers.

95 *Outcome Variables and Tools:* Data on health, social participation, leisure and life-space mobility
96 were collected with four questionnaires. The 36-item Short Form Health Survey (SF-36; Ware,

97 Kosinski, & Dewey, 2000) comprises 36 items covering eight domains related to physical and mental
98 health. Widely used in research, including previous Lifestyle Redesign® studies, the SF-36 has good
99 psychometric properties. Indeed, the questionnaire presents good internal consistency (Cronbach's α
100 from 0.83 to 0.93 for the eight domains, and 0.94 and 0.89 for the physical and mental components,
101 respectively; Gandek et al., 2004) and test–retest reliability, even for testing after 6 months
102 [correlation coefficients from 0.60 to 0.90, except for bodily pain (0.43); Ware, 2000]. The SF-36 is
103 also sensitive to change (Gatchel et al., 1999), with a difference of 5 points in scale scores being
104 clinically significant (Ware et al., 1993) and is widely used in research, including previous Lifestyle
105 Redesign® studies. The Social Participation Scale estimates the frequency of participation in 10
106 community activities. It has good internal consistency (Chronbach $\alpha = 0.85$ to 0,91; Richard,
107 Gauvin, Gosselin, & Laforest, 2009). The Leisure Profile assesses involvement in leisure activities,
108 attitudes toward leisure, and difficulties that might influence leisure activities. It has acceptable
109 interrater (kappa 0.21–0.80) and test-retest (0.41–0.60) reliability (Dutil et al., 2007). The Life-Space
110 Assessment (LSA) measures life-space mobility and, more specifically, the range, independence, and
111 frequency of movement over the preceding four weeks (Baker, Bodner, & Allman, 2003). The LSA
112 presents excellent test-retest reliability (ICC = 0.87) and moderate to substantial concordance for 18
113 out of 20 items ($\kappa = 0.47$ –0.73; Auger et al., 2009). It has good construct validity with observed
114 physical performance and self-reported function (95% CI = 0.82–0.97) and good sensitivity to
115 change (Baker et al., 2003). Finally, a semi-structured interview guide (Appendix 1) validated by 5
116 qualitative research experts and pretested was used to explore the effect of Lifestyle Redesign®.
117 *Data Analysis:* To foster transferability (Laperrière, 1997), the participants' sociodemographic
118 characteristics and outcomes were analyzed using descriptive statistics. Scores were compared with
119 the Friedman test followed by the Wilcoxon signed rank test for all participants and, in an
120 exploratory manner, each group separately. Because of the exploratory nature of this study and the

121 influence of seasonal variations on Quebecers' health, social participation, leisure and mobility,
122 changes at any of the post-intervention measurement times with a p value < 0.05 were considered to
123 be potentially attributable to the intervention. Interview transcripts underwent thematic content
124 analysis using mix extraction grids (Miles et al., 2014). The data analysis involved: 1) verbal data
125 collection; 2) reading of data; 3) division of data into units of sense; 4) organization and
126 reformulation of original data in the disciplinary terminology (see below); and 5) synthesis of results.
127 Themes that emerged from the interview content were organized and renamed according to the
128 Human Development Model–Disability Creation Process (HDM-DCP; Figure 1), a model of human
129 development and disability (Fougeyrollas, 2010). The HDM-DCP illustrates interactions between
130 intrinsic personal factors, extrinsic environmental factors, and participation. To foster credibility,
131 reliability and confirmability (Laperrière, 1997), the co-author co-coded one third of the data that had
132 first been exhaustively analyzed by a specially-trained research assistant. The first author also closely
133 supervised the analysis adjusted until consensus was reached regarding the participants' perceptions
134 of the intervention. Additional memos including thoughts, questions and discussions of the research
135 team were used. For parsimony with respect to the quantitative results, themes presented in this
136 paper focus on health, social participation, leisure and mobility. Although the majority were
137 supported by many participants, because of limited space, only one quotation per theme was given as
138 an example. The results below first describe the participants, operationalization of the intervention
139 and general appreciation of *Lifestyle Redesign*®. Then, for each variable, the quantitative results are
140 presented for all participants, followed by each group separately. Finally, the qualitative results are
141 detailed. Analyses were conducted using SPSS (v18) or NVivo (v10).

142 **Results**

143 Of the 19 participants assessed at T₁, one had serious health problems preventing participation in the
144 intervention, and one died, leaving 17 older adults who followed the program and were interviewed

145 (Table 1). Thereafter, as one participant (P17) had vision and hearing problems that impeded
146 questionnaire completion, only 16 were reassessed. At baseline, the three non-participants were not
147 different from those who participated, except for being older ($p<0.01$) and having a greater loss of
148 autonomy ($p=0.01$) and inferior life-space mobility ($p=0.047$). Participants were aged 65-90 years
149 [mean \pm standard deviation (M \pm SD): 76.4 \pm 7.6; median \pm semi-interquartile interval (Md \pm Q): 74 \pm 5.8].
150 All were Caucasian, the majority were women ($n=10$; 62.5%), owners ($n=5$; 31.3%) or tenants ($n=7$;
151 43.8%) of their dwelling, and nearly half lived alone ($n=7$; 43.8%). Half had 12 or more years of
152 schooling ($n=8$; 50%), most had a family income under CAN\$40,000 ($n=12$; 75%) and rated their
153 health as good ($n=12$; 75%; Table 1). Two groups as homogenous as possible were created, one with
154 seven participants with disabilities and one with 10 without disabilities. Five participants with
155 disabilities lived in the same residence where the group meetings were held. Older adults participated
156 in about 25 group meetings with the OT (M \pm SD: 24.3 \pm 2.2; Md \pm Q: 25 \pm 1.5), which amounted to 90%
157 or more of the number of sessions, and went on 4 or 5 outings (e.g. restaurant, market or museum).
158 Reasons for missing group meetings were mainly being ill, working or having an appointment. The
159 participants had 5 to 11 individual meetings with the OT (M \pm SD: 6.1 \pm 0.6; Md \pm Q: 6 \pm 0).

160 Participants reported mostly positive effects from the program, sometimes no effect, but rarely
161 negative effects on their personal and environmental factors, and social participation (Figure 2). The
162 program fostered participants' knowledge about health, social participation, leisure and mobility.
163 This knowledge aroused the participants and, depending on their personal factors and with a safer
164 and mobilized environment, encouraged their efforts to take action (Figure 2). With regard to
165 personal factors, participants reported that the French-Canadian Lifestyle Redesign® modified their
166 vision of themselves and others, and empowered them. This vision and empowerment bilaterally
167 influenced the participants' willingness to act, which in turn also similarly modified their health and
168 relationship skills (Figure 2). In terms of interaction between personal and environmental factors, by

169 facing challenges and taking action, participants reported that they improved their social
170 participation, leisure and mobility. Social participation improvement included increasing their health
171 habits, activities in the community or with others, social interactions both within and outside the
172 Lifestyle Redesign®, and, when simultaneously interacting with others, mobility (Figure 2).

173 *Health:* Before and after comparisons showed that, for both group as a whole, the participants' health
174 had not changed but the mental component increased between T₃ and T₄ (Table 2). Surprisingly,
175 physical role decreased between T₂ and T₃, indicating that older adults' physical health affects time,
176 accomplishment and difficulties in daily activities. Although not significant, emotional role, absence
177 of pain, social functioning and mental health scores showed a tendency to increase. According to
178 group results, a decrease was observed in the physical component (T₂ Md±Q: 29.1±3 vs T₃: 25.7±4,
179 p=0.046), functioning (T₂: 7.5±8.1 vs T₃: 2.5±6.3 and T₄: 0±3.8, p=0.03 and 0.04) and role (T₂:
180 75±19.5 vs T₃: 31.3±26.6, p=0.04) but an improvement in pain (T₃: 46±12.4 vs T₄: 56±13.8, p=0.03)
181 in older adults with disabilities. In older adults without disability, the mental component (T₃: 54.5±5
182 vs T₄: 57.8±4.3, p=0.04) and general health (T₁: 84.5±10.9 vs T₄: 87±15.4, p=0.048) increased.

183 The majority of participants reported better mental health (Figure 2): "*I feel better, less*
184 *depressed...*" (P12). or "*[The program] makes me want to enjoy life again.*" (P10). Reduction of
185 symptoms (e.g. stiffness) was reported by participants (Figure 2). One older man with disabilities
186 explained that, during the group: "*My legs hurt but it was okay. [...] If something interested me and I*
187 *liked it enough, I didn't feel the pain.*" (P11). In older adults without disability, positive health effects
188 were mainly perceived as being due to better health habits, such as increased physical activity.

189 *Social Participation:* Considering all participants, social participation did not change significantly
190 after the intervention (Table 2) but increased for older adults with disabilities (T₁: 2.5±7.5 vs T₂:
191 7±11.9, p=0.03). Although not significant, a tendency toward improvement was also observed in
192 older adults without disabilities (T₁: 21±9 vs T₂: 26±7.4, T₃: 27±7.4 and T₄: 28.5±6.5; p=0.14 to

193 0.51). Several participants reported having increased their activities in the community or with others
194 (Figure 2); as one participant explained: “*We take more time [...] We go to the restaurant, visit*
195 *people, act like good neighbors.*” (P10). Others resumed previous activities or started new ones, like
196 this participant after an individual session: “*It induced me to find volunteer work that I like.*” (P9).
197 Although the program encouraged participants to act (Figure 2): “*I do more things now because I*
198 *order myself to do something. Before the program, I just sat here, in my armchair, waiting for time to*
199 *go by.*” (P12), being more active did not always transform into changes in activities. Some
200 participants faced participation challenges and others struggled with perseverance, experimenting or
201 searching for meaningful activities. Nevertheless, meeting people, benefiting from exchanges with
202 others, and contributing to the group were among the important contributions of the program (Figure
203 2): “*I get a lot out of being with others and being able to chat.*” (P4). It also helped to optimize
204 interpersonal relationships: “*[The program] made me want to be more open, to socialize.*” (P13).
205 *Leisure:* Pre- and post-intervention comparisons showed that participants’ leisure did not change,
206 except for an increase in interest between T₁ and T₂ (Table 2). Frequency of activities decreased
207 between T₂ and both T₃ and T₄, as did the desire to modify leisure practice between T₂ and T₄.
208 Impairments increased between T₁ and T₂ but decreased between T₂ and T₄ (Table 2). Finally, there
209 were fewer physical environment obstacles at both T₁ and T₂ than T₄ but social environment
210 obstacles decreased between T₁ and both T₃ and T₄. Results per group also revealed an increase in
211 interest (T₁: 23±1.8 vs T₂: 25±1.4, p=0.02) but decrease in frequency of activities (T₂: 21.5±2.1 vs
212 T₃: 19±1.3, p=0.03) in older adults without disability. The desire to modify practice also decreased
213 for this group (T₁: 17.1±1.3 vs T₄: 15±1.1, p=0.01; T₂: 17.5±1.7 vs T₃: 15.5±1.4 and T₄, p=0.049 and
214 0.01). Impairments in older adults without disability also changed over time (T₂: 6±3 vs T₁: 3±2.6,
215 T₃: 2.5±2.1 and T₄: 2±2.4, p=0.02, 0.02 and 0.03). In older adults with disabilities, positive attitudes
216 toward leisure increased after the intervention (T₁: 12.5±1.4 vs T₃: 15.5±1.5, p=0.04).

217 Although some participants reported no change in leisure, others planned to do more or actually
218 increased the frequency of, for example, physical exercise such as walking regularly (Figure 2): “*I*
219 *started doing it again. I walk for an hour or hour-and-a-half every morning and sometimes in the*
220 *afternoon.*” (P5). Although not all maintained, participants resumed or modified previous leisure
221 activities or tried new ones, including more intellectual stimulation or physical exercise: “[*The*
222 *occupational therapist] showed us proprioception so I do balance exercises.*” (P3). Participants
223 reported changes in meditation (Figure 2): “*I started exploring it. It feels good, relaxing.*” (P6).
224 *Mobility:* Life-space mobility decreased between T₁ and T₂, i.e. in wintertime, and increased again
225 between T₂ and T₄ (Table 2). Maximum space mobility with any type of assistance did not change
226 after the intervention, except for without human or any assistance, which decreased between T₂ and
227 respectively T₁ and T₄. A decrease followed by an increase in life-space mobility was also observed
228 in older adults without disability (T₂: 73±8.3 vs T₁: 83±7.3 and T₄: 82±6.3, p=0.01 and 0.02).

229 Because of the program, participants reported increased mobility (Figure 2) e.g.: “[*The program*]
230 *got me out of my room.*” (P17). Several participants visited new places : “*There are places where*
231 *I’ve never been and where I would never have gone either. [...] I hadn’t been out to eat since my*
232 *stroke [...] I went back to the pub twice after [the program] with my children.*” (P11). Nevertheless,
233 for several participants travel did not differ after the program, especially if they drove their own car.
234 **Discussion:** This pilot study explored the influence of the French Lifestyle Redesign® on French-
235 Canadian older adults’ health, social participation, leisure and mobility. In summary, this version
236 seemed to have a beneficial effect on participants’ mental health and interest in leisure and, in those
237 with disabilities, improved social participation and attitudes toward leisure. Participants reported
238 positive effects on their health, leisure, mobility and social participation, and on the frequency and
239 quality of their contacts. Discrepancies might be explained by: 1) outcomes differently measured and
240 defined by participants, or 2) difficulties in accurately perceiving change (Rocke & Lachman, 2008).

241 Contrary to the original version (Clark et al., 2001; Clark et al., 1997; Clark et al., 2012) and as
242 with previously adapted versions of Lifestyle Redesign® (Horowitz & Chang, 2004; Jackson et al.,
243 2000; Johansson & Bjorklund, 2016; Lund et al., 2012; Matuska et al., 2003; Mountain et al., 2008),
244 the absence of further significant results might be due to the small sample size. In the present study,
245 power based on social participation between T₁ and both T₂ and T₄ was 35.5 and 10.5%,
246 respectively. Moreover, although a shorter version of the Lifestyle Redesign was found to be feasible
247 with high functioning participants (Cassidy et al., 2017), 6 months is a minimal period for this type
248 of intervention, which might partly explain the limited changes. The present sample was Caucasian
249 and educated, and the majority of participants had a high income and good health, and had been
250 exposed to public health messages concerning the importance of life habits, which might also
251 contribute to the limited changes. In another qualitative study, however, only a few participants
252 reported that Lifestyle Redesign® had not impacted them appreciably (Blanchard, 2010).

253 Although facing similar challenges in terms of disability prevention and life expectancies
254 (*Organisation de coopération et de développement économiques*, 2018), the experience of French-
255 Canadian older adults might also reflect differences in culture, health habits or the environment. For
256 example, in working class neighborhoods, the fundamental values are: 1) the great importance given
257 to daily life and immediate pleasures, destiny and resourcefulness, 2) the utilitarian merit assigned to
258 education and scientific knowledge, 3) the focus on concrete knowledge as well as interpersonal and
259 affective relationships, and 4) the importance attached to one's group and neighborhood, coupled
260 with a mistrust of people from other social backgrounds (Lacourse, 2011). According to popular
261 culture, the body and health are tools whose use is maximized by accepting that they will deteriorate,
262 while the wealthy want to preserve them for as long as possible and, in accordance with Lifestyle
263 Redesign®, practice moderation. Lifestyle habits are perceived by the less affluent as a way to make
264 life easier and little emphasis is placed on prevention (Lacourse, 2011). Differing on many health

265 lifestyle outcomes, inhabitants of eastern Canada have been classified as being the most healthy
266 compared to the most unhealthy in the southern U.S. (Krueger, Bhaloo & Vaillancourt Rosenau,
267 2009). In addition, the government has safety-net policies, including for home care [*Ministère de la*
268 *santé et des services sociaux* (MSSS), 2003] and aging at home (*Ministère de la famille et des aînés*
269 *& Ministère de la santé et des services sociaux*, 2012), Act respecting health services and social
270 services, and Autonomy Insurance Act (MSSS, 2013). These policies are implemented partly
271 through publicly-funded HSSCs, which are responsible for providing frontline healthcare to people
272 in their territory, including homecare for older adults. Similar to the American Medicare and
273 Medicaid programs (Richmond & Fein, 2005), the Canadian healthcare system is mainly financed
274 through tax revenues. HSSCs coordinate various services for older adults, taking into account their
275 specific situation, their needs, and their physical and social environment. In partnership with
276 community organizations and social economy enterprises, HSSC programs provide a wide range of
277 services and activities, which might sometimes limit mutual aid between citizens who rely on
278 government assistance. Finally, winter weather conditions might also have affected the current
279 results. While summers in Quebec are comfortable and wet with daily high temperature above 66°F,
280 winters are cold and snowy with 32°F (Weather Spark, 2018), which makes travel more difficult.

281 *Health:* Contrary to the lack of changes in health found in the present study, previous studies on the
282 original Lifestyle Redesign® showed that it prevented or slowed a decline in health in the
283 experimental compared to the control group (Clark et al., 1997; 2001; 2012). Moreover, secondary
284 analyses of the second RCT showed that higher activity frequency was associated with fewer
285 depressive symptoms via enhanced social connections (Juang et al., 2017). Such mediating
286 mechanisms and the qualitative results from the present study point to the complexity of the effects
287 of the intervention on health. For example, the decreased physical role, i.e. the impact of physical
288 health on time, accomplishment and difficulties in regular daily activities, might be attributable to the

289 participants' greater awareness of their impairments. Notably, physical role and vitality were
290 especially influenced by the intervention in the first Lifestyle Redesign® study (Clark et al., 1997).
291 *Social Participation:* In line with two previous studies (Johansson & Bjorklund, 2016; Matuska et
292 al., 2003), an adapted Lifestyle Redesign® version tends to increase social participation. According
293 to the participants in the current study and second RCT (Blanchard, 2010), the intervention fostered
294 not only social activities and interactions but also personal and environmental factors that are
295 prerequisites to social participation, such as relationship skills and a social network. These benefits
296 were multifaceted and diverse, and especially in social support and healthy activity. Other
297 interventions can foster social participation in older adults (Raymond et al., 2013), including those
298 with disabilities (Levasseur et al., 2016). Nevertheless, maintaining, experimenting with or searching
299 for activities often requires personalized assistance (Leblanc et al., submitted).

300 *Leisure:* Further assistance might also be needed to modify and maintain leisure activities. Older
301 adults are not always physically and emotionally able to do social and leisure activities (Levasseur et
302 al., 2016). Adapting leisure activities to older adults' capacities often requires the expertise of an
303 occupational therapist and recreologist. Other studies found increased frequency of leisure activities
304 (Chang et al., 2015; Kao & Chang, 2017), including in older adults with disabilities (Desrosiers et
305 al., 2007; Levasseur et al., 2016). As for social participation, interventions on leisure activities are
306 currently not sufficiently targeted in Quebec community occupational therapy practice (Turcotte et
307 al., 2015). Education focusing on the meaning of activities for the person (Dattilo, 2016; Keibler,
308 2001; Lee & Payne, 2016) and awareness (Dattilo, 2015, 2016; Keibler, 2001; Mitchell et al., 2014;
309 Mundy, 1998) appears effective to increase leisure (Carbonneau et al., 2011; Kao & Chang, 2017).

310 *Mobility:* Because mobility is especially influenced by the weather, changes in mobility over time
311 might be due to the winter and, for some participants, living in residence. They nevertheless reported
312 an increase in their mobility, which sometimes involved changes in the perceptions of the network,

313 such as a family member or health assistant, who had concerns about them travelling. Such concerns
314 and help from the Lifestyle Redesign® to overcome challenges in public transportation were also
315 observed previously (Blanchard, 2010). Similar to these results, personalized assistance improved
316 older adults' travel habits and increased the places visited and the ability to travel alone (Pigeon et
317 al., submitted), which was found to be restricted during aging (Yen et al., 2009).

318 *Participants with Disabilities:* The influence differed according to the participants' characteristics,
319 such as medical conditions. In those with disabilities, the decrease in the physical component,
320 functioning and role, and increase in impairments may be due to coping with serious health problems
321 and disabilities while increasing activities. Such challenges were previously reported with the
322 original Lifestyle Redesign (Blanchard, 2010), adaptations (Horowitz & Chang, 2004; Lund et al.,
323 2012) and other interventions (Levasseur et al., 2016). It is important to adapt the program to the
324 group's specific needs (Clark et al., 2015), especially for those with disabilities and, as discussed by
325 Blanchard (2010), in accordance with the participants' beliefs, values, and predispositions.

326 *End of the Intervention:* Because the follow-up was only 6 months after the intervention and
327 measurements were influenced by the weather, it is difficult to judge the sustainability of the
328 changes. Nonetheless, when interviewed one month after the intervention, participants reported that
329 they missed the group, which negatively impacted their morale. Those with disabilities needed the
330 assistance of the intervention to maintain some benefits, such as getting out. Consequently, it is
331 important to prepare participants who need social interactions and assistance for the end of the
332 intervention and allocate the necessary resources to maintain the benefits, as was found in another
333 intervention with older adults with disabilities (Levasseur et al., submitted). Future studies need to
334 document facilitators and challenges to the intervention as well as the sustainability of changes.

335 *Study Strengths and Limitations:* Conducted with partners from different fields of expertise, this is
336 the first rigorous, mixed-method study of Lifestyle Redesign® with French-Canadian older adults.

337 The combination of deductive and inductive processes made it possible to provide nuanced
338 explanations, in the participants' own words, of how the intervention affected them that were not
339 necessarily measured by questionnaires. The plurality of data sources allowed triangulation of the
340 data, and foster good internal validity (Laperrière, 1997). Social desirability was minimized by
341 undetailed explanation of the research objectives and reassuring participants that there were no right
342 or wrong answers. Study limitations included the small sample size and lack of control group.

343 **Conclusion:** Lifestyle Redesign® is a promising occupational therapy intervention for older
344 community-dwelling French-Canadians that seemed, as reported by participants, to have a beneficial
345 effect on participants' mental health and interest in leisure and, in those with disabilities, improved
346 social participation and attitudes toward leisure. This intervention has the potential to offer
347 occupational therapists an innovative and rigorous intervention to promote meaningful and healthy
348 activities among French-Canadian older adults. In line with strategies to address an aging global
349 population, Lifestyle Redesign® can lead to new opportunities for older adults to adopt healthy
350 habits and enhance the social component of their lives. This intervention can also optimize how the
351 needs of older adults are met, including the use of personal and environmental resources.

352 As they are under-evaluated, further research is needed on innovative interventions fostering
353 community integration and optimization of resources. In addition, more studies on the French-
354 Canadian Lifestyle Redesign® using larger samples and experimental designs are required. It would
355 also be interesting to explore facilitators and challenges to the intervention and its implementation.

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Table 1. Characteristics of participants (n=17)

Participant #	Age (years)	Disability ^a	Gender ^b	Type of residence ^c	Living situation ^d	Income ^e	Schooling ^f	Self-rated health ^g	Health conditions ^h	# of group meetings	# of individual meetings
P1	72	2	M	2	1	6	5	1	1	27	5
P2	85	4.5	W	1	1	R	5	1	2,4,6	22	6
P3	71	6	W	1	1	5	3	1	1,4	26	6
P4	90	2	W	2	3	5	5	2	1,3	23	6
P5	80	5.5	M	2	2	5	3	1	6	23	6
P6	73	1	W	1	1	5	4	1	2	23	6
P7	72	9	M	1	2	5	5	2	1,2	27	6
P8	75	7	W	2	1	3	3	2	2,3,4	19	6
P9	68	10.5	W	1	1	2	4	2	2,4,5	25	6
P10	65	20	M	2	2	5	4	2	3,4,5,6	22	6
P11	80	28.5	M	2	2	5	3	3	1,2,3,6	25	6
P12	72	16.5	M	2	1	2	5	4	1,3,4	26	8
P13	68	39.5	W	3	4	5	3	3	5	24	11
P14	88	38.5	W	3	4	2	3	2	1,2,3,4	26	6
P15	84	44	W	3	4	R	3	2	3,5,6	26	6
P16	79	45.5	W	3	4	R	3	3	1,2,6	26	7
P17*	97	42.5	W	3	4	R	3	3	1,2,3,6	23	6

^a Functional Autonomy Measurement System (/87); <5: none; 5-19: slight to moderate; >19: moderate to severe

^b W: woman and M: man

^c (1) owner, (2) tenant, (3) lives in a seniors' residence

^d (1) lives alone, (2) lives with a partner, (3) lives with family member, (4) other

^e (1) ≤CAN\$10,000, (2) CAN\$10,001-15,000, (3) CAN\$15,001-20,000, (4) CAN\$20,001-25,000, (5) CAN\$25,001-40,000, (6) >CAN\$40,000, (R) Refuses to answer or doesn't know

^f (1) none, (2) 1-6 years, (3) 7-11 years, (4) 12-14 years, (5) 15-16 years, (6) >16 years

^g (1) Excellent, (2) good, (3) fair, (4) poor

^h According to the International Classification of Diseases (ICD-10): (1) diseases of the eye and adnexa, (2) diseases of the musculoskeletal system and connective tissue, (3) diseases of the circulatory system, (4) endocrine, nutritional and metabolic diseases, (5) diseases of the nervous system, and (6) other

* Participant who did not complete the questionnaires

Table 2. Comparisons of scores on main variables before and after the intervention (n=16)

Continuous variables	T ₁ Md (Q)*	T ₂ Md (Q)	T ₃ Md (Q)	T ₄ Md (Q)	p value**
Health (SF-36; /100)					
• Physical functioning	57.5 (36.3)	62.5 (38.8)	65 (41.9)	62.5 (43.8)	0.56
• Physical role	78.1 (21.6)	93.8 (23.4)	59.4 (30.5) ^a	87.5 (24.2)	0.05
• Absence of pain	62 (16.3)	61 (18.9)	51 (29.8)	61.5 (14.3)	0.18
• General health	72 (16)	67 (21.9)	57 (22.9)	67 (17.5)	0.48
• Vitality	62.5 (13.3)	59.4 (14.8)	56.3 (18)	62.5 (14.8)	0.69
• Social functioning	87.5 (17.2)	87.5 (23.4)	68.8 (23.4)	87.5 (12.5)	0.62
• Emotional role	100 (15.6)	95.8 (20.8)	100 (15.6)	100 (3.1)	0.33
• Mental health	80 (11.9)	80 (14.4)	77.5 (15.6)	80 (9.4)	0.60
<i>Physical component</i>	41.1 (10.9)	38.1 (11.7)	39.5 (12.4)	40.8 (10.1)	0.51
<i>Mental component</i>	54.7 (5.7)	54.8 (7.6)	53.7 (4.7)	55.9 (4.8) ^b	0.11
Social participation (# of activities/month)	19 (12.3)	22.5 (10.3)	24 (9.6)	24 (11.6)	0.12
Leisure profile					
Involvement					
• Interest (/30)	21 (3.3)	24 (2.3) ^e	23 (3.4)	22.5 (3.8)	0.07
• Frequency of activities (/30)	17 (4.6)	19 (4.6)	18 (3.8) ^a	18 (4.9) ^f	0.05
• Desire to modify					
○ Practice (/30)	17.1 (1.4)	17.5 (2.2)	16.5 (2.9)	15.5 (1.5) ^f	0.049
○ Frequency (/30)	17 (2.3)	18 (1.8)	17 (2)	16 (1.9)	0.61
Attitudes (/34)	26 (2)	25.5 (2.4)	26 (2.8)	25.5 (2.3)	0.97
• Positive (/17)	13 (2)	14 (1)	13 (0.9)	13 (1.4)	0.13
• Negative (/17)	3 (1.5)	4 (2)	4 (1.9)	3 (1.4)	0.19
Difficulties					
• Impairments (/17)	5 (3.3)	7 (4) ^e	4.5 (3.7) ^a	5.5 (4) ^f	0.11
• ... in leisure (/17)	1.5 (2.6)	3.5 (3.9)	2.5 (2.8)	3 (3.3)	0.50
• Physical environment obstacles (/5)	1 (0.5)	1.1 (0.6)	0.6 (1.1)	1.6 (1.3) ^g	0.24
• ... in leisure (/5)	0 (0.5)	1.1 (0.6)	0 (0.6)	1.1 (1.3)	0.48
• Social environment obstacles (/6)	1 (1) ^h	1 (1)	1 (0.9)	1 (0.9)	0.07
• ... in leisure (/6)	0 (0.9)	0 (1)	0 (0.5)	0 (0.9)	0.54
Life-space mobility (LSA; /120)	75 (32.2)	63 (24.5) ^e	74 (27)	77 (27.6) ^f	0.08
• Maximum (/5)	5 (0.5)	4 (0.5)	5 (0.5)	5 (0.5)	0.17
• Assisted (/5)	5 (2.1)	4 (2.3)	5 (1.5)	5 (1.4) ^f	0.09
• Independent (/5)	5 (2.5)	4 (2.5) ^e	5 (2.5)	5 (2.5)	0.045

* Median (semi-interquartile range)

** Friedman test

Differences associated with Wilcoxon signed rank test

^a T₂ differs significantly from T₃

^e T₁ differs significantly from T₂

^b T₃ differs significantly from T₄

^f T₂ differs significantly from T₄

^c T₁ differs significantly from T₂ and T₃

^g T₄ differs significantly from T₁ and T₂

^d T₄ differs significantly from T₂ and T₃

^h T₁ differs significantly from T₃ and T₄

SF-36: 36-item Short Form Health Survey; higher score indicates better health; change of 5 points on total score clinically significant

Social participation: Frequency of participation in 10 community activities; higher score indicates greater frequency of social participation; change of 1 point on score for each activity clinically significant

Leisure profile: higher score indicates greater involvement in leisure activities, positive attitude toward leisure, or fewer difficulties

LSA: Life-Space Assessment; higher scores indicate better range, independence, and frequency of movement over the last 4 weeks

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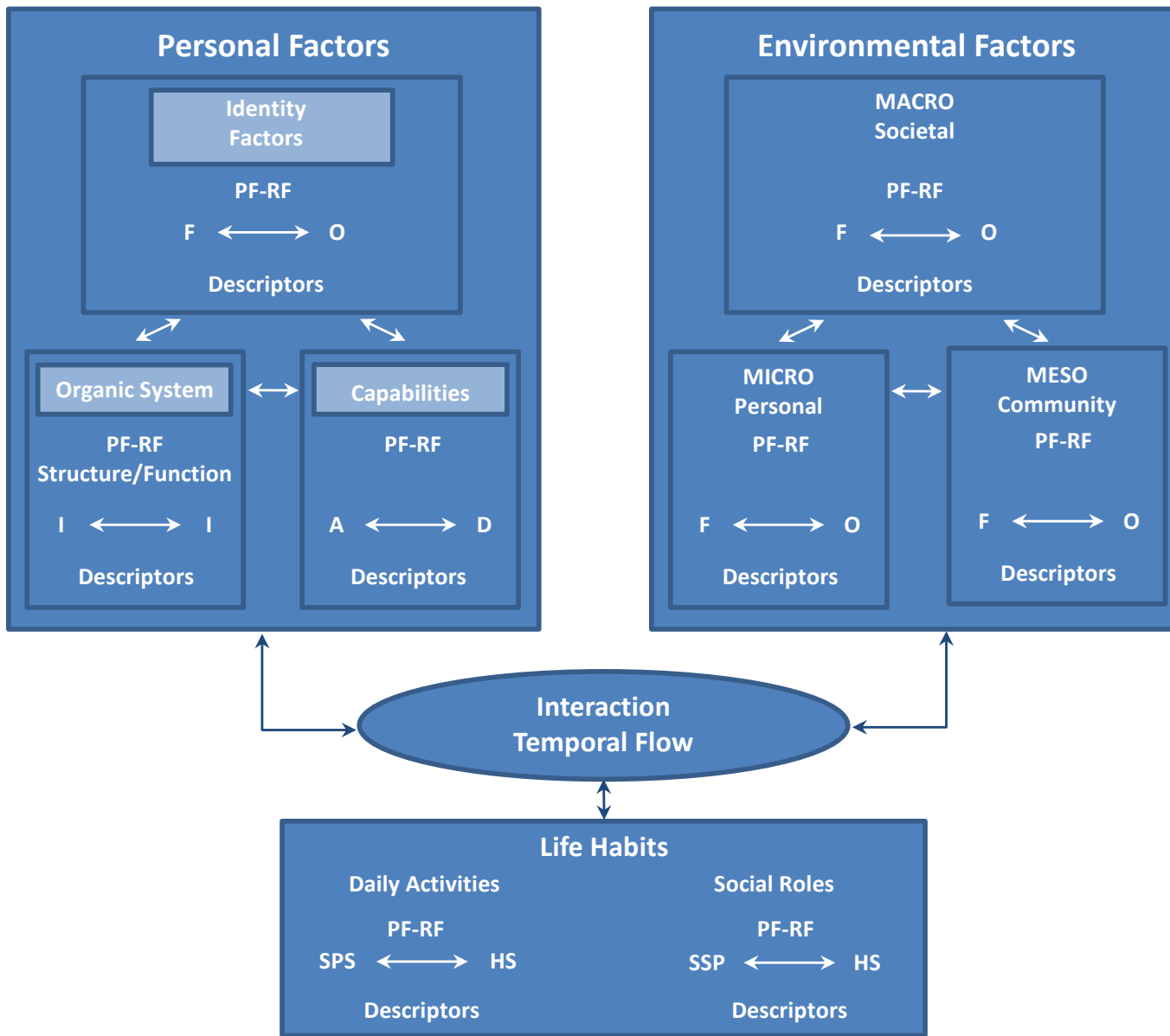
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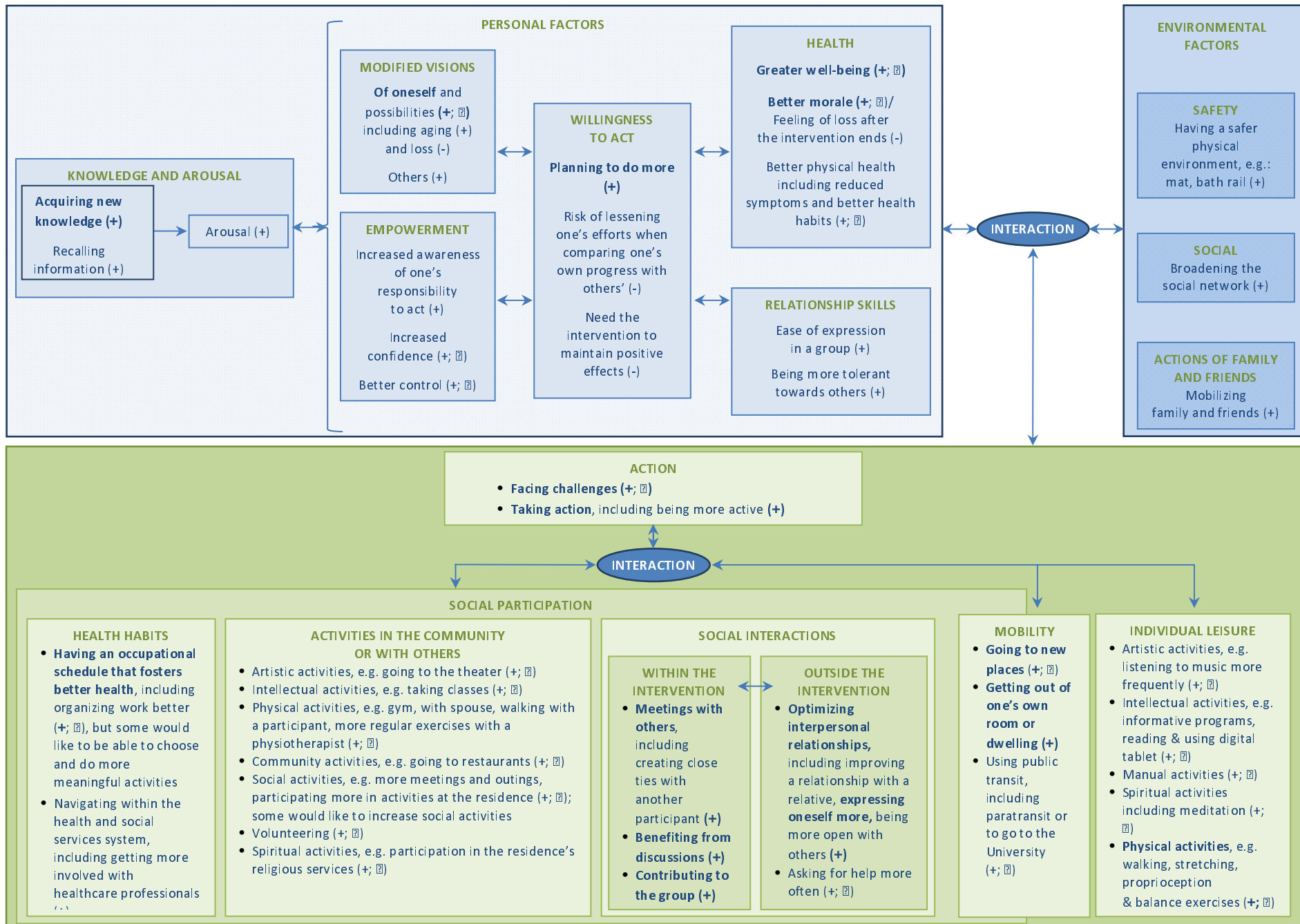
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Legend

- PF-RF: Protective factor-Risk factor
- F ↔ O: Facilitator ↔ Obstacle
- I ↔ I: Integrity ↔ Impairment
- A ↔ D: Ability ↔ Disability
- SPS ↔ HS: Social Participation Situation ↔ Handicap Situation

Figure 3: Positive, negative or no influence of the French *Lifestyle Redesign*[®]



Legend:
 → One-way influence
 ↔ Two-way influence
 (+) Positive influence of the program as perceived by participants [Themes in **bold** were identified by several participants (n ≥ 8)]
 (-) Negative influence of the Lifestyle Redesign[®] as perceived by participants
 (☐) No influence as perceived by participants

Semi-structured interview guide

Effects of the *Lifestyle Redesign*® program

Introduction

The interview that we will be doing together today concerns your impressions following the *Lifestyle Redesign* program. I am interested in your experience with the program. You know best what you experienced and I would like to know your perceptions of the program. The interview will be taped and transcribed but only the research team will have access to the transcript. The focus of the interview is your experience during the program, and its effects.

Please note that:

- Everything said during the interview will be kept confidential;
- There are no right or wrong answers; only your reality.

During the interview, if my questions aren't clear or if they embarrass you, you can stop me, ask for an explanation or decide not to answer. I will now check that the recorder is working properly.

Are you ready to start?

***Instructions to the interviewer:** Cover the different types of social and leisure activities

- A) **Artistic:** photography/music/singing/painting/watching television/listening to the radio/music, going to the movies/theater.
- B) **Intellectual:** reading newspapers/novels, going to conferences, taking continuing education courses/language courses, doing crosswords/Sudoku/Scrabble, using the computer.
- C) **Manual:** gardening, sewing, knitting, carpentry, cooking.
- D) **Physical:** walking, cycling, swimming, bowling, pool, hockey, boules, horseshoes.
- E) **Social:** visiting family and friends, board games, cards, going to the restaurant, going to the mall, family outings, meetings, dinner with friends, fraternal organization.
- F) **Volunteer:** with a community organization.
- G) **Community:** practising an outdoor pastime, attending a community/recreation center, going to stores/restaurants/cafes/library/cultural center, attending a sports or cultural event, participating in a discussion or support group.

- 1) Tell me about your experience with the program.
 - a. Tell me about the **changes** you have made as a result of the program. [reformulation: How have your activities changed as a result of the program?] (*Cover the different types of activities: artistic, intellectual, manual, physical, social, volunteer, community, as well as the following themes: living space, health including compassion and gratitude, and involvement in meaningful activities including life balance.)
 - How did the program influence your living space (e.g. the places you go to)?
 - How did the program influence how you get around?
 - How did the program affect your health?
 - How did the program affect your relationships?
 - How did the program affect your compassion?
 - How did the program affect your gratitude?
 - How did the program affect your involvement?
 - How did the program challenge you?
 - How did the program influence your feeling of being competent?
 - How did the program influence the meaning of your activities in your eyes?
 - How did the program influence your view of things during difficult times?
 - b. Tell me about the **activities** you did in connection with the program. [reformulation: What activities did you do in connection with the program, with or without the group?] (*Cover the different types of activities: artistic, intellectual, manual, physical, social, volunteer, community.)
 - c. Regarding **leisure activities** you consider important:
 - How did the program affect your ability to do them?
 - How did the program affect the frequency of these activities?
 - d. Regarding **social activities** you consider important:
 - How did the program affect your ability to do them?
 - How did the program affect the frequency of these activities?
 - e. Regarding **activities in the community** you consider important:
 - How did the program affect your ability to do them?
 - How did the program affect the frequency of these activities?

2. What **effects** did the program have on your life? [reformulation: What did you get out of the program?]
 - i. How did the program affect **you personally**?
 - ii. How did the program affect your **participation**?
 - iii. How did the program affect your **limitations**?
 - iv. How did the program affect your **activities**?
 - v. How did the program affect your **relationships**?
 - vi. How did the program affect your **environment** (physical and social)?

3. What did you like about the program? [reformulation: What were the positive aspects of the program?]
 - a. What did you like about the **activities** you did during the program? [reformulation: What were the positive aspects of the activities you did during the program?](** Cover the different types of activities: artistic, intellectual, manual, physical, social, volunteer, community.*)

4. What did you like less about the program? [reformulation: What were the negative aspects of the program?]
 - a. What did you like less about the **activities** you did during the program? [reformulation: What were the negative aspects of the activities you did during the program?]

5. What improvements do you think need to be made to the program?

6. How can your experience with the *Lifestyle Redesign* program help you in the future?

7. Would you recommend the program to others? Explain.

Conclusion

In closing, would you like to add anything else? Do you have any questions?

Thank you very much for meeting with me. We will analyze the interviews in the coming months. If we need more information, can I contact you again? In the meantime, if you have any comments or questions about what we discussed, please write them down and contact me by email (address) or phone at xxx-xxx-xxxx ext. xxxxx.