

Older adults, physical activity and the internet: Exploring their behaviours, beliefs and opinions

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Abstract

Despite the numerous health benefits, population physical activity (PA) levels are low and decline with age. As the population grows older, with some major implications in terms of public health cost, innovative interventions to promote PA in older adults are of major interest. The Internet holds potential for delivering effective PA interventions and older adults are the largest-growing group of Internet users. Therefore, the main purpose of this study was to explore the older adults' behaviours, beliefs and opinions about PA and Internet. At baseline, 75 older adults participated in the two stages of the study: (1) an assessment of their behaviours and beliefs about PA and web-based PA promotion; and (2) the experimentation of a single session of home-exercising followed by an interview regarding their opinion on this session. Results exposed that a minority of the participants were regularly active according to the stage of change for PA. Depending on their knowledge of PA, participants mainly perceived social and health aspects as barriers or motivators for their practice of PA. Senior adults considered home-exercising delivered via the Internet sufficiently relevant, acceptable, original, appreciated and reproducible only if it goes along with a reinforced social support and a community-centred PA promotion.

Key words: Physical activity promotion, Internet, web-based intervention, older adults, home-exercising

1 Introduction

1.1 Physical (in)activity

Physical activity (PA), practiced on a regular basis, results in long-term benefits in health-related aspects. Accumulating at least 150 minutes of moderate intensity PA each week dramatically reduces the risk of numerous chronic diseases such as several types of cancer, diabetes, cardiovascular disease, osteoporosis, and even depression (Warburton, Nicol, & Bredin, 2006). The need for PA does not end as people age, with evidence indicating that PA offers great opportunities to extend active and independent life expectancies, reduce disability and improve quality of life (Vogel et al., 2009). Despite this overwhelming evidence, physical inactivity could be considered as a considerable and growing global health burden as in 2008, more than 5.3 million of the 57 million deaths worldwide could be attributed to inactivity (Lee et al., 2012). With age, people in the Western countries meet less and less the public health recommendation for PA (Nelson et al., 2007). In Belgium, people older than 60 years will represent more than a third of the entire population in 2050, with some major implications in terms of public health cost (Lannoy & Lipszyc, 2000). Physical activity (PA), practiced on a regular basis, results in long-term benefits in health-related aspects. Accumulating at least 150 minutes of moderate intensity PA each week dramatically reduces the risk of numerous chronic diseases such as several types

of cancer, diabetes, cardiovascular disease, osteoporosis, and even depression (Warburton, Nicol, & Bredin, 2006). The need for PA does not end as people age, with evidence indicating that PA offers great opportunities to extend active and independent life expectancies, reduce disability and improve quality of life (Vogel et al., 2009). Despite this overwhelming evidence, physical inactivity could be considered as a considerable and growing global health burden: in 2008, more than 5.3 million of the 57 million deaths worldwide could be attributed to inactivity (Lee et al., 2012). With age, people in the Western countries meet less and less the public health recommendations for PA (Nelson et al., 2007). In Belgium, people older than 60 years will represent more than a third of the entire population in 2050, with some major implications in terms of public health cost (Lannoy & Lipszyc, 2000).

1.2 Physical activity promotion

The development of effective interventions to promote PA among the senior population is a public health challenge that still must be addressed in our communities. Research has shown that interventions targeting PA behaviours of older adults can be effective (Jancey et al., 2008; King, 2001), even if innovative strategies must be carried on in the near future to reach a large number of seniors at the lowest cost to society. Indeed, elderly people encounter a wide range of barriers to attend supervised group-based interventions such as the lack of transportation facilities, lack of opportunities for sports or leisure activities in their neighbourhood, or social embarrassment (Moschny, Platen, Klaassen-Mielke, Trampisch, & Hinrichs, 2011; Schutzer & Graves, 2004).

1.3 Internet, seniors and physical activity

The Internet holds the potential to circumvent those barriers in producing changes in PA, even if change in long-term PA remains unclear (Davies, Spence, Vandelanotte, Caperchione, & Mummery, 2012). Recent studies have shown that web-based interventions to promote PA exposed promising effects (van den Berg, Schoones, & Vliet Vlieland, 2007), with at least as many positive outcomes as non-web-based interventions. Despite the regular scepticism about the use of internet by senior adults, those 65 and older are currently the fastest-growing group of Internet users (Jones & Fox, 2009). Web-based interventions are recommended to include examples of exercises that senior participants could do safely on their own, at home, and with minimum equipment (Kahn et al., 2002). The participation rates for those home-based interventions are comparable to those for group-based interventions (van der Bij, Laurant, & Wensing, 2002). Nevertheless, concerns persist about the implementation of web-based interventions in older adults because qualitative information concerning the acceptability and opinions of home-based interventions delivered through the Internet are frequently missing in large scale quantitative studies (van den Berg et al., 2007).

1.4 Purpose of the paper

The purpose of the present study was twofold. First, we aimed at describing the

behaviours and beliefs of older adults about PA and web-based PA promotion. After having experienced a single session of home-exercising on the Internet, we then aimed at exploring the opinion of the elderly about the relevance and acceptability of this type of intervention.

2 Methods

2.1 Design of the study

This study could be considered as a mixed method of research, using qualitative and quantitative approaches for different phases of the study. All senior adults were solicited to participate voluntarily in the study at a one-day meeting (the “annual senior citizen celebration”) dedicated to the elderly and organized by the local authorities of a Belgian French-speaking municipality. This semi-rural municipality was chosen for its typicality regarding its demographics (number of inhabitants, age pyramid), the co-existence of urban and rural areas, its size (34 km²) and density of population (361 inhabitants per km²) that is very close to the Belgian mean (360 inhabitants per km²). An official agreement regarding this study design was signed between the researchers and the local authorities before this meeting. After consenting to participate in the research, all voluntary older adults who attended this meeting were included in our study protocol.

2.2. Data collection

The data collection phase was divided into two distinct and successive stages. The first stage took place at the one-day meeting. The second stage was completed within the two weeks that followed the meeting.

In the first stage, the participants completed a short questionnaire about their behaviours and beliefs about PA and web-based PA promotion. This questionnaire, specifically developed for this study, was composed of (1) five demographic questions (age, gender, body mass index, health problems not specific to PA, Internet access); (2) four closed-ended questions assessing the readiness of the participants to be more physically active, according to stages of change model for PA (Marcus & Forsyth, 2003); (3) three open-ended questions about the barriers to exercise, motivations to exercise, and factors that would encourage seniors to be physically active in their municipality; (4) ten questions on a four-point Likert scale (ranging from "not at all important" to "extremely important") about items that could be included in a PA promotion website dedicated to older adults, according to a recent literature review (Brouwer et al., 2011).

After the first stage, the participants who had regular access to the Internet were asked to trial a single session of home-exercising during the week following the meeting. This approximately one-hour session, available in an illustrated slide-show format on a specific website created by the researchers (www.bougerplus.be), was developed by a group of three physical educators familiar with senior PA promotion. The session was made up of a light cardio-respiratory, muscular and articular warmup; a combination of strength, flexibility and balance training; and a light cool-down based on relaxation. Specific care was taken to provide an exercising session that senior participants could carry out safely on their own, at home, and with minimum

equipment (e.g. a gymnastic mat, a chair, a broomstick and two bottles of water). In the second stage, the participants who completed the previous stage were interviewed by phone within two weeks after the one-day meeting. A structured interview was used in order to ensure that answers could be reliably aggregated and that further comparisons could be made with sufficient confidence. Five closed-ended questions about the relevance, acceptability, originality, appreciation and motivation to carry out home-exercising delivered via the Internet were designed on a ten-point scale (i.e., “On a ten-point scale, how would you rate the originality of this homeexercising session?”). Each answer on this scale needed to be further explained by the participants in a second open-ended question (e.g. “Could you explain in a few words why you have chosen this level?”). Moreover, suggestions of adaptations for this activity were asked to the participants.

2.3. Data analysis

Using qualitative and quantitative approaches, this mixed method of research required the establishment of a common ground by which the data from both approaches could be reliable and exist in forms that allowed their combined analysis (Lieber, 2009). Participants were first identified by codes, from P1 to P75. The next step consisted in the transformation of the qualitative data coming from the open-ended questions of the interviews and the questionnaires into dimensions that could be integrated with other data from the closed-ended questions. This data reduction was performed through a process of coding, which involved assigning units of meaning (categories) to data that could be displayed or organized to allow further analysis (Miles & Huberman, 1994). For those open-ended questions, reliability of coding analysis was conducted on 20% of the sample with Cohen’s Kappa values of over 0.85 (intra-rater) or over 0.80 (inter-rater), suggesting excellent overall agreement (Miles & Huberman, 1994). Closed-ended questions were analyzed using descriptive statistics whereas differences between variables were assessed by Chi-square test for categorical dependent variables (i.e., stages of change for PA, Internet access, gender and health problems). Spearman’s rank correlations (coefficient ρ) were also performed to study the relations between variables. For all tests, a P-value ≤ 0.05 was considered statistically significant. All statistical analyses were computed with Statistica 10.1 software (Statsoft Corp., France) for Windows®.

3. Results

3.1. Demographics

Seventy-five older adults (M=73.75 years, SD =5.77 years) took part in the study by completing the initial questionnaire. The sample of participants was predominantly composed of women (n=48, 64%) and mean body mass index (BMI) was respectively 25.3 (SD =3.8) and 24.5 (SD =4.1) kg/m² for men and women. A significant number of participants (n=41, 55%) reported health problems such as arthritic conditions (n=20), cardiovascular problems (n=11), osteoporosis (n=7) or diabetes (n=3). Besides, 31 participants (41%) declared having regular access to the Internet (at least once a week). No significant correlations were observed amongst demographic variables, except between age and Internet access ($\rho=0.251$, $P < 0.01$).

3.2. Behaviours and beliefs about (web-based) PA promotion

With reference to the five stages of change for PA, a minority of the participants could be considered as regularly active for the last six months (action stage ; n=11, 14%) or for longer than six months (maintenance stage; n=25, 33%). The remaining participants were irregularly active (preparation stage; n=16, 21%), sedentary with some intention to be physically active within the next six months (contemplation stage; n=13, 17%) or sedentary without intention to be physically active (precontemplation stage; n=11, 14%). Additional statistical analyses exposed significant differences between gender for stages of change for PA ($P < 0.05$), the women being less active than the men. Participants without reported health issues were also significantly more active than participants suffering from health problems ($P < 0.05$). Finally, a significant (negative) correlation was found between BMI and the stages of change for PA ($\rho = -0.158$, $P < 0.05$).

Table 1

Perceived barriers, motivations and factors that encourage seniors to be physically active in their municipality (N = 75)

Category	Sub-category	n	%
Barriers	Health problems	38	18.63
	Ageing	32	15.69
	Other hobbies	30	14.71
	Laziness	26	12.75
	Solitude	22	10.78
	Lack of time	22	10.78
	Lack of PA facilities	19	9.31
	Lack of knowledge about PA	15	7.35
Motivations	Good health	49	25.55
	Social prompts (friends)	42	21.99
	Pleasure	31	16.23
	Outdoor activities enjoyment	25	13.09
	Social prompts (family)	22	11.52
	Sleeping quality	14	7.33
	Weight loss	8	4.19
Factors that encourage	PA local information dedicated to seniors	38	27.14
	Local PA sessions in groups	30	21.43
	Tailored advice by physical educators	24	17.14
	Walking groups	23	16.42
	Increased PA local facilities	18	12.85
	Improved neighbourhood safety	7	5.00

Note. n = number of citations per item; % = percentage of citation per item in each category

The perceived barriers, motivations and factors that encourage seniors to be physically active in their municipality are exposed in Table 1. By adding the number of items cited by each participant in those three categories of answer, a significant (negative) correlation was found between the number of barriers provided and the stage of change for PA ($\rho = -0.192$, $P < 0.05$). Inversely, a significant (positive) correlation was observed between the number of motivators to engage in PA provided and the stage of change for PA ($\rho = 0.158$, $P < 0.05$). Gender-based comparison exposed that women provided significantly more social motivators (friends, family) for their PA engagement than men ($P < 0.05$). No significant relation was found between factors that would encourage seniors to be physically active in their municipality and the other variables.

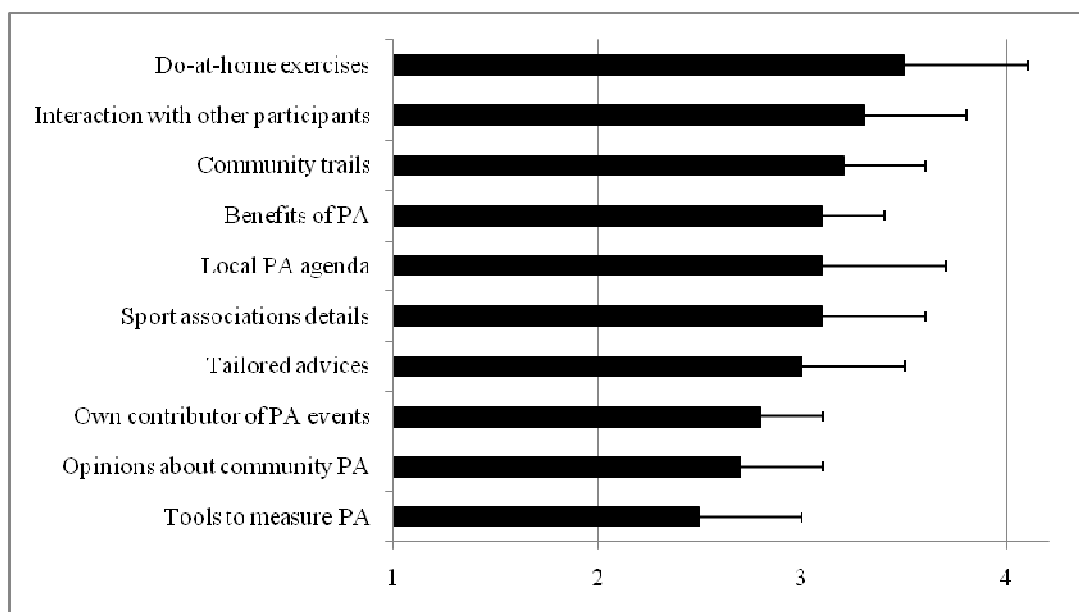


Figure 1. Participants' level of agreement about web-based components of PA promotion for seniors (ranging from "1: not at all important" to "4: extremely important")

The ratings of participants about web-based components of PA promotion are shown in Figure 1. By adding the mean rating of each participant for all web-based components, we observed a correlation between the mean rating of the age of the participants ($\rho = -0.256$, $P < 0.01$), as well as a significant difference ($P < 0.05$) between those who had regular access to the Internet (mean rating = 3.09 ± 0.57) and those who had no access to the Internet (mean rating = 2.71 ± 0.43). Moreover, the number of motivators for engagement in PA provided was correlated with the rating of the web-based components ($\rho = 0.238$, $P < 0.01$). No other significant relation was found between the rating of the web-based components and the other variables.

3.3. Opinion about home-exercising

Results from the interviews, subsequent to a single session of home-exercising, are

summarized in Table 2. Each topic of the interview is followed by the three main categories of open answers that were proposed by the participants. Only the 31 participants (M=67.17 years, SD =6.15 years) with regular access to the internet (at least once a week) were interviewed.

In addition, participants were requested to propose some suggestions of adaptations for sessions of home-exercising delivered to seniors via the Internet. Mainly, participants highlighted a reinforcement of social interactions for programmes of home-exercising: *“I would be more motivated to engage regularly in home-exercising if a regular and direct contact with a coach was established,”* (P12); *“A regular and direct contact with other participants would encourage me to stay engaged in home-exercising,”* (P34). Moreover, participants explained that those social contacts should be principally community-centred: *“Practicing with participants from my neighbourhood would be more motivating and enjoyable,”* (P56); *“Group activities that would complement home-exercising sessions must take place at a walking distance from my home,”* (P4).

Table 2
Relevance, acceptability, originality, appreciation and motivation to carry out home-exercising delivered to seniors via the Internet (ranging from 1 to 10)

Question topics	n	M	SD
Relevance of home-exercising		7.43	1.14
“Nice complement to group sessions of PA”	11		
“Appropriate to stay active during wintertime”	8		
“Not easy to move in front of a computer”	7		
Acceptability of home-exercising		7.17	1.71
“Well adapted to a senior population”	12		
“Can do it alone easily”	10		
“Not adapted for people with mobility disabilities”	6		
Originality of home-exercising		6.52	0.88
“Discover new and easy exercises to stay active”	11		
“Rather familiar exercises”	11		
“Complete what I have learned before”	7		

Appreciation of home-exercising		7.85	1.35
“It feels good to get a move on”	13		
“Did not feel able to do this before”	9		
“Better when practicing in pairs”	6		
Motivation to carry out home-exercising		6.96	1.19
“Because it will help me to stay healthy”	11		
“Less motivated to practice PA alone”	10		
“If it is completed by regular contact to a coach”	7		

Note: n = number of citations; M = mean; SD = standard deviation

Some others put forward the need for a tailored monitoring of their PA:

“Regarding my mobility disabilities, I would be more confident in practicing exercises that are adapted to my handicap with a coach,” (P68). Participants also mentioned that they would sometimes forget to do their exercising if they do not receive some reminders: *“I would probably forget to exercise if I do not receive a reminder by phone for example,”* (P48). Finally, participants explained that the access to homebased exercises delivered by Internet must remain free of charge: *“I think that this service must remain free to seniors because a lot of us have a small pension and would not devote our money in priority to that,”* (P74).

4 Discussion

The present study was firstly designed to describe the behaviours and beliefs of older adults about PA and web-based PA promotion. The results indicated that a minority of the participants could be considered as regularly active according to the stage of change for PA. Those statements are particularly of concern because the stage of change for PA is positively associated with PA and physical function (Riebe et al., 2005). Moreover, people tend to overestimate their perceived PA level, and consider themselves active for a PA participation under the recommended levels (Shephard, 2003). Informing older adults about the recommendations for PA could therefore help them to understand what frequency, duration, intensity of PA should be performed. The proportion of seniors who were at the maintenance or action stages for PA in this study was almost equivalent to those previously observed in the French-speaking part of Belgium, but with younger participants (Eeckhout, Francaux, & Philippot, 2012). As observed in the results, women, people who encountered more health problems, or candidates with a higher BMI were more susceptible to adopt a sedentary lifestyle (Martin, Bowen, Dunbar-Jacob, & Perri, 2000). This typical profile of less active people should particularly attract the attention of PA promotion professionals because they are those who provide the most barriers to PA participation. In accordance with

existing literature, these barriers are mainly related to health or social aspects (Moschny et al., 2011). Participants also mentioned that they felt too old to practice PA, or that PA is only for younger people. We can also hypothesize that, regularly, participants mix up concepts of PA and sport. Sport is seen as too difficult and unreachable for older adults who consider themselves no longer fit or skilled enough to do it. Sport is also often associated with competition and brings some fear or distrust, such as the fear of falling that is often present among older adults (Lamb, Jorstad-Stein, Hauer, & Becker, 2005). Better information about the different dimensions of PA could help the seniors to understand, by example, that household activities can also lead to positive effects for their health (Sallis et al., 2006). Lack of knowledge about PA is also quite concerning since the belief in the health benefits derived from regular PA seems helpful in motivating initial involvement in an exercise programme (Schutzer & Graves, 2004). The main motivators for participation in PA, alongside the need to maintain good health, were related to social prompts. Besides the support of family and friends, a survey about PA preference from Booth, Bauman, Owen, and Gore (1997) underlined that more than 50% of older adults are looking for advice from a health professional. Those health professionals could be first represented by the family physician. Older adults visit the latter at least once a year. Nevertheless, research findings have indicated that physicians do not regularly counsel their patients about PA (Balde, Figueras, Hawking, & Miller, 2003). Physical therapists could also play a role in PA promotion, but they are often limited to secondary and tertiary prevention (Mouton, Mugnier, Demoulin & Cloes, in press). Primary prevention could be managed, within a multidisciplinary approach integrating other health professionals (Helmink et al., 2010), by physical educators specialized in the supervision of senior adults. Those PA professionals, mastering knowledge about PA promotion, could be considered a cornerstone for the construction of primary prevention in active living communities (Sallis et al., 2006). Municipality factors that were cited by participants in this study are mainly manageable by those professionals. They are able to put together the local information about PA dedicated to seniors, teach PA group sessions and administer tailored advice to participants, or even stimulate the creation of walking groups in the communities. Besides, in cooperation with local authorities, PA professionals could provide the expertise to better exploit or adapt the available and convenient resources for PA.

The second goal of the study was to explore the opinion of the elderly on the relevance, acceptability, originality, appreciation and motivation to carry out a session of home-exercising delivered via the Internet. Younger participants who proposed more motivators for their engagement in PA were those who gave the better rating to the web-based components. Those results are in accordance with statistics indicating that baby boomers aged 50 to 64 years are twice as likely as older adults (>64 years) to use the Internet to research information (AARP, 2009). Limited skills in using the Internet and a subsequent lack of motivation could still represent a barrier to the participation of this age group (Mouton & Cloes, 2013). Nevertheless, having lower computer knowledge and skills should not be considered insurmountable barriers for behavioural change (Ammann, Vandelanotte, de Vries, & Mummery, 2013). Computer training for senior adults could therefore be stimulated and incorporated in PA promotion interventions in order to increase their self-efficacy regarding the

Internet. Moreover, tools have also been developed to create more 'senior friendly' websites with several adaptations, such as a larger text size or a single mouse click to access information (NIA, 2009). Some of the best-rated components of a PA promotion website were related to general (i.e., benefits of PA) or local (i.e., community trails, sport associations details) information about PA. It is quite reassuring that even if senior adults lack knowledge about PA, they are looking for an improvement as a prerequisite to their PA participation. Paradoxically, do-at-home exercises and interaction with other participants were the two top-rated components of a PA promotion website. This favourable opinion of older adults about do-at-home exercises delivered via the Internet is important because literature has highlighted that home-based exercising could be as effective as group exercising in improving fitness among older adults (King, Haskell, Taylor, Kraemer, & DeBusk, 1991). Those interventions delivered via the Internet have also the advantage to be less costly to society (Cobiac, Vos, & Barendregt, 2009) and to participants (who incidentally mentioned this in the interviews). On the other hand, interaction with other participants is also requested by older adults, probably because human interaction is a powerful motivator to exercise (Hirvensalo, Lampinen, & Rantanen, 1998). In the near future, we assume that technological developments will allow interacting directly with other participants or a coach in web-based interventions, such as in social exergaming (Brox, Luque, Evertsen, & Hernandez, 2011).

Results from the interviews provide a closer look at factors that motivate older adults to perform do-at-home exercising via the Internet. Globally, scores for relevance, acceptability, originality, appreciation and motivation to carry out homeexercising reached a satisfactory level, ranging from 6.52 (originality) to 7.85 (appreciation). Older adults are actually more prone to using a website on a regular basis than younger ones, who are used to flitting from one website to another (Ammann et al., 2013). Nevertheless, their engagement would be conditioned by a reinforcement of social interactions. In a systematic review among the general population, Brouwer et al. (2011) exposed that peer support or counsellor support resulted in longer visits and more logins on PA websites. Besides, participants highlighted the need for a community-centred PA promotion. This request is highly warranted as environmentally tailored PA websites regularly result in extra intervention effects on PA behaviours (Ferney, Marshall, Eakin, & Owen, 2009; van Stralen, De Vries, Mudde, Bolman, & Lechner, 2009). Next to home-exercising, the inclusion on the website of a database of local opportunities for PA, a calendar of PA events in the community, maps of walking and cycling trails, or online forums providing support in finding a PA mate are widely recommended (Mouton & Cloes, 2013).

The present study was subject to some limitations. First, due to the relatively small sample size, the results should be interpreted carefully. However, the qualitative insight provided by the open-ended questions of the questionnaires and the interviews helped to deepen our understanding. Another limitation relates to the use of a selfreport questionnaire that might have exposed this study to social desirability bias. To overcome this bias, anonymity was strictly respected at each step of the data collection and data analysis. The results of this study are also specific to a Belgian

French-speaking municipality, with its particular socio-demographic characteristics.

5 Conclusion

This study aimed at describing the behaviours and beliefs of older adults regarding PA and web-based PA promotion. A minority of the participants was regularly active according to the stage of change for PA. Physical educators could engage in primary prevention next to senior adults to help them overcome the most common barriers they encounter, such as the lack of social support or the perception of poor health, and convert those into motivators that encourage them to be physically active. According to the participants, this intervention could be completed by a PA promotion website, including general and local information about PA, and some sessions of do-at-home exercises. Finally, home-exercising delivered via the Internet was considered sufficiently relevant, acceptable, original, appreciated and reproducible by participants, but only if it goes hand in hand with a reinforced social support and community-centred PA promotion.

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