Perceptions of arthritis flares in the context of physical activity from a social cognitive theory perspective.

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Abstract

Higher levels of self-regulatory efficacy (SRE) appear to be helpful to those individuals with arthritis attempting to continue to be regularly physically active during an arthritis flare. Arthritis flares are presumed to represent a greater challenge to being physically active than usual arthritis symptoms but within-participant comparisons of pain intensity and SRE when considering flare status (flare vs no flare) have not been examined. While SRE has been compared between those who meet recommended levels of moderate to vigorous physical activity (MVPA) during an arthritis flare, persistence with MVPA has not been examined in arthritis. Finally, pain acceptance has been associated with differential levels of MVPA in arthritis but has not been examined in the circumstances of a flare and persistence with MVPA. Thus, 4 objectives were advanced. Primary objective one was to explore within-participant comparisons of pain intensity and SRE during a flare or usual symptoms. Primary objective two was to compare those meeting and not meeting MVPA guidelines in terms of their persistence and SRE. Secondary objective one was to explore whether persistence with MVPA in a flare could be predicted by pain acceptance and SRE, and secondary objective two was to examine psychosocial variables ability to predict MVPA volume prospectively over 4 weeks. To pursue these objectives, 53 adults with arthritis were recruited to complete an online survey with potential follow-up questions completed online four weeks later. Concerning objective one, participants reported SRE to overcome arthritis barriers (SRE-AB) and to schedule/plan MVPA (SRE-SP) in two contexts; in a flare and in the absence of a flare. Pain intensity was reported in the same flare contexts. 2 x 2 ANOVAs were conducted comparing both SRE measures and pain between those that met MVPA guidelines or not, and within-participants in a flare or usual symptoms. A MANOVA was
conducted between MVPA groups on SRE and persistence to satisfy primary objective two. Secondary objective one was examined using a hierarchical multiple regression (HMR) with pain acceptance and SRE-SP predicting persistence. A second HMR was conducted attempting to predict MVPA at time 2 (T2) using SRE and persistence. Results of the 2 x 2 ANOVAs were that SRE (AB and SP) and pain intensity were significantly different within-groups \((p < .001)\) such that SRE was lower and pain was higher in a flare than not in a flare. Only SRE-SP was different between MVPA groups \((p < .05)\). The MANOVA identified only SRE-SP in a flare as significantly different between MVPA groups \((p < .05)\). Pain acceptance did predict persistence in block 1 of the HMR \((p < .01)\) but when SRE-SP was added, SRE-SP was the only significant predictor \((p < .001)\). Results of the second HMR indicated that of all the psychosocial variables entered, only SRE-SP in a flare significantly predicted T2 MVPA \((p < .01)\). Findings suggest that, as active individuals with arthritis feel less efficacious to be active and higher pain intensity during a flare, a flare does indeed represent an increased challenge to MVPA adherence. Interestingly, pain intensity did not differ between MVPA groups while SRE-SP did, supporting that greater SRE beliefs are required in challenging circumstances. Pain acceptance did initially predict persistence until SRE-SP was added to the model. SRE may have consumed the variance in the model not because of pain acceptance’s inability to predict but rather due to the high correspondence between SRE and persistence measures. Finally, SRE-SP predicted MVPA volume prospectively, further supporting the utility of high SRE when attempting to adhere to MVPA during the increased challenge posed by an arthritis flare.
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1. Introduction

Arthritis is an incurable chronic disease often characterized by pain, stiffness, and swelling, particularly of the joints (Public Health Agency of Canada [PHAC], 2010). These chronic symptoms can eventually result in loss of mobility and function and even lead to permanent disability. Despite there being no cure for arthritis, self-management strategies such as exercise can help maintain function, reduce pain and prevent disability (Hootman, Helmick & Schappert, 2002). Arthritis affects Canadians of all ages, including children, but is most prevalent among adults aged 45 – 64 years. This burgeoning demographic is growing quickly and represents a potential burden to already high health care costs related to arthritis (PHAC, 2010).

The annual financial burden of arthritis to health care in Canada is $6.4 billion in direct and indirect costs (PHAC, 2010). The use of physical activity (PA) to self-manage arthritis is substantially more cost-effective than that of individualized health care and yields comparable benefits (Fisher et al., 2011). However, as with the general population, many individuals with arthritis are not sufficiently active to receive health and disease management benefits (PHAC, 2010). This corresponds to a weekly volume of less than 150 minutes of moderate to vigorous physical activity (referred to as “moderate-plus” physical activity or MVPA). It may not be surprising that people with arthritis struggle to meet PHAC guidelines considering they must contend with disease-specific barriers to PA (Gyurcsik et al., 2009) in addition to those barriers to activity shared by the general population.

It was at one time intuitively appealing to assume that the disease-specific barrier of pain suffered by people with arthritis was a primary cause of physical inactivity. However, Focht,
Ewing, Gauvin, and Rejeski, (2002) studied pain intensity among exercisers with arthritis and found that pain intensity did not differ between days participants engaged in physical activity and days they did not. However, the pain reported in this study was not of severe intensity. Thus, the authors recommended that physical activity be examined under more challenging conditions such as an arthritis flare.

Arthritis flares are a phenomenon unique to the arthritis population and even unique between individuals with arthritis. The unpredictable nature of flares has made it difficult to define the term, though the following working definition has been put forward: *a flare is any worsening of disease activity that would, if persistent, in most cases lead to initiation or change of therapy; and a flare represents a cluster of symptoms of sufficient duration and intensity to require initiation, change, or increase in therapy* (Bingham III et al., 2009). Although pain is often used as a covariate in arthritis research, pain is not the only symptom in a flare as indicated by the preceding definition. The spike in symptoms represented by a flare may represent a significant barrier to maintaining PA habits and has been studied with regard to psychosocial factors that may encourage adherence to PA (Gyurcsik, Brawley, Spink & Sessford, 2012). The present study will be the first, however, to examine psychosocial beliefs regarding PA among the same individuals when they experience both being in a flare and their “normal” arthritis symptoms (i.e., absence of a flare).

The focus of this study is on adherence to PA for those individuals with arthritis who are active, where “active” is a range from regular participation of one to two times weekly to being active almost every day of the week. These individuals differ from those initiating regular activity and those who are completely sedentary in regard to variables that may encourage the active individuals’ behaviour to wax and wane as opposed to those trying to start or have no
interest in starting physical activity. Examination of active individuals necessitates a focus on important factors such as preventing lapses in their adherence and differentiating between those who meet or do not meet the recommendations for weekly physical activity volume for individuals with arthritis (PHAC, 2010). Lapses are a presumed to be part of the variability observed in reports of PA adherence. Identification of the reasons for lapses is not important for detecting a lapse, however the reasons for lapses may have self-management implications for people with arthritis. For example, if a person has flare symptomatology (pain, fatigue, swelling, etc.) they may not adhere to regular PA because they do not have self-management skills to deal with symptom-provoked lapses. While there are many routes by which the variability in adherence might be examined for active people with arthritis, one promising direction that focuses on motivational variables has been the examination of psychosocial influences that influence adherence to PA (Gyurcsik, Brawley, Spink, Glazebrook & Anderson, 2011). For this reason, it is important to understand the psychological variables that may encourage persistence with, and adherence to, PA in active people with arthritis.

Adherence to PA among individuals with arthritis has been examined focusing on the agentic component (self-efficacy) of Social Cognitive Theory (SCT) (Bandura, 1986, 1997). While this line of research has been useful in predicting adherence for those individuals with arthritis who engage in activity, it does not include the symptomatic factors that might be challenges to adherence such as severe pain. One such psychological individual difference factor that has focused on pain symptoms is pain acceptance (McCracken & Vowles, 2006; McCracken, Vowles, & Eccleston, 2004). Pain acceptance concerns individuals’ beliefs about participating in valued daily activities despite pain experienced during those activities. SCT and pain acceptance offer the opportunity to examine the challenges to exercising to manage arthritis
from different perspectives. SCT offers the perspective that personal agency influences the extent to which individuals are motivated to persist with valued activities despite challenges or barriers to engage in PA. Pain acceptance offers the perspective of whether individual differences in people’s willingness to experience pain during a valued activity influence the extent to which they adhere to their activity regardless of related pain.

**SCT and PA in arthritis.** In addition to the barriers to PA experienced by the general population, such as scheduling and planning, individuals with arthritis experience unique disease-related barriers. These include symptom/disease-related barriers such as flares, stiffness, fatigue, and pain. It has been demonstrated that despite the frequent reporting of pain as a barrier to PA for people with arthritis, pain intensity does not differ between exercise days and non-exercise days (Focht et al., 2002). By contrast, self-regulatory efficacy (SRE), an activity-specific belief from SCT (Bandura, 1986, 1997), has been able to successfully predict PA behaviour in individuals with arthritis (Marks & Allegrante, 2005).

Studies by Gyurcsik and colleagues (Gyurcsik et al., 2009) used SRE to overcome arthritis barriers along with pain intensity (covariate) to predict PA and found that SRE accounted for significant variance in PA. Focht et al (2002) have suggested that conditions of severe arthritis pain intensity may generate a different response to PA participation. Specifically, they suggested that a more rigorous test of whether pain intensity predicts PA among individuals with arthritis would require that a more challenging disease – related barrier should be studied. This suggestion led Gyurcsik et al. (2012) to investigate flares and their potential influence on PA.
Using SCT as a theoretical backdrop, Gyurcsik et al. (2012) examined individuals with arthritis who were exercising at different levels and were challenged by a flare. Those who met public health guidelines recommended for this chronically diseased population (PHAC, 2010) had higher SRE to overcome arthritis barriers and to schedule/plan PA than those who did not meet the guidelines. This difference was evident despite the fact that both groups experienced pain of equal severity during the flare. While this study offered valuable initial evidence about exercise adherence during an arthritis flare, it also raised related questions. For example, do SRE for barriers and for scheduling/planning for PA differ within the same individuals with arthritis when the pain intensity experience differs (i.e., flare versus no flare)? Also, are there intermediary social-cognitive processes at work relative to adherence to PA that function in concert with greater SRE and together, might predict individuals’ greater adherence during a flare?

One such process variable associated with adherence is that of persistence behaviour (i.e., level of effort, time spent, differential strategies used and frequency of attempts to pursue a goal). Examining whether pain acceptance and SRE predict anticipated persistence during a flare may offer more detailed information about the pursuit of adherence that links SRE to physical activity in this chronic disease population. SRE may encourage persistence despite challenges individuals face and persistence, in turn, may encourage adherence through the effort, attention, differential use of strategies and time taken to pursue the adherence goal. Indeed, Bandura (1997) has argued that efficacy encourages this process but few studies in the exercise domain have examined persistence (exceptions: Jung & Brawley, 2010; 2011).
Pain acceptance and PA in arthritis. In concert with SCT, a symptom-related individual difference variable called pain acceptance will be used to examine persistence. Gyurcsik et al. (2011) used pain acceptance and SCT to examine PA adherence in women with arthritis. These investigators used the variable of pain acceptance (i.e., a focus on a symptom-related variable and being willing to act despite pain) to categorize individuals with either more or less acceptance of pain and willingness to perform valued activities despite pain. It was found that SRE to overcome barriers was a key variable that discriminated higher and lower pain acceptance groups. Further, individuals with higher pain acceptance engaged in more PA than those with lower pain acceptance. The individuals who were higher in pain acceptance and had greater SRE performed more physical activity among exercising individuals with arthritis.

To summarise, the study of adherence to exercise as a self-management strategy for people with arthritis is a worthwhile pursuit in part due to favourable effects on health outcomes and due to its cost effectiveness. The study of exercise adherence in the context of a flare is valuable in that a flare is believed to be an extremely challenging barrier to adherence that few researchers have studied. It would be prudent, therefore, to examine perceptions of pain intensity during a flare compared with pain intensity in the absence of a flare (usual arthritis pain) to determine if there is evidence to support the notion that flare pain is indeed perceived as significantly more intense. A related issue is whether individuals’ confidence to schedule/plan exercise and overcome barriers to exercise differ in the presence and absence of an arthritis flare. Such differences may have a bearing on a flare’s presumed status as an intensely challenging barrier to exercise. Specifically, if flares are more challenging, then the self-regulatory efficacy to overcome this barrier as well as to plan exercise should be less than when arthritis symptoms are not exacerbated.
Previous work on flares has demonstrated that those who meet PHAC guidelines have demonstrated differences in various social-cognitive variables (e.g., SRE) from those whose activity levels fall below the guideline (Gyurcsik et al., 2012). While it is important to determine if these results are replicable, it is also important to determine if these variables are related to anticipated persistence. As emphasized by Bandura (1997), Maddux and Gosselin (2003), and others, self-efficacy encourages persistence with actions toward desired goals in the face of obstacles and challenges. Persistence with physical activity, particularly in the face of a flare, has not been examined in the arthritis and exercise literature. Thus, a first step would be to examine physical activity level group differences in persistence. A second step would be to explore whether persistence can be predicted by social-cognitions used previously as predictors of physical activity (i.e., SRE and pain acceptance). If detected, such relationships could enlarge our knowledge of theoretically valuable information concerning physical activity and arthritis. Finally, a third novel utilisation of persistence would be, together with previously-used social-cognitive variables, to prospectively predict physical activity (i.e., exercise volume given its relation to PHAC guidelines).

1.1 Objectives and hypotheses

Primary objective one concerned the perception of a flare as a challenge to PA beyond that of the usual or everyday pain symptoms that participants with arthritis have expressed in previous research. To investigate this, individuals’ SRE (to overcome barriers and to schedule/plan PA) beliefs and pain perceptions in the context of a flare will be compared to the same individuals’ SRE beliefs and perceived pain in the context of no flare (i.e., usual disease symptoms). The perception of pain in both flare and no flare conditions will also be compared
between the different levels of activity to investigate if either PA group experience more or less pain as a function of being or not being in a flare. Likewise, SRE beliefs in both flare and no flare conditions will be compared between the different activity level groups. It was hypothesized that both SRE to overcome arthritis barriers and to schedule/plan PA will be lower in the context of a flare. Due to a lack of prior research, no hypothesis was put forth regarding differing levels of flare-related pain experienced by those who met/did not meet PHAC recommendations for PA or regarding the interaction between activity level groups and flare status.

Primary objective two concerned a comparison between those individuals who met the PHAC activity guidelines for individuals with arthritis and those who did not on SRE-SP and anticipated persistence. It was hypothesized that those meeting PHAC recommendations will be more efficacious and display higher levels of anticipatory persistence with PA.

Secondary objective one concerned the prediction of anticipated persistence. Although pain acceptance and SRE have been used previously to predict actual PA behaviour (Gyurcsik et al., 2011), the related variable of anticipated persistence with PA despite a challenge has not been predicted. Based on SCT, it was hypothesized that SRE would predict persistence. Given that higher levels of pain acceptance have been associated with higher volume of MVPA, it was hypothesized that pain acceptance would also predict persistence.

Secondary objective two concerned how well SCT variables (SRE, persistence) predicted actual PA behaviour four weeks in the future. In order to avoid overestimating the contribution of psychological predictors of PA among active individuals, it is suggested that past PA behaviour be taken into account as a covariate (see Weinstein, 2007). Two obtain the relation
between psychological factors and physical activity alone, and then to take into account past physical activity, two regression models were examined. First, it was hypothesized that SRE and persistence would predict time 2 PA. Second, it was hypothesized that when past PA behaviour was included in the model, it would significantly predict future behaviour and psychological variables would not contribute significant additional variance. The rationale for the latter hypothesis follows from Weinstein’s (2007) suggestion to account for past behaviour when using psychological factors to predict future behaviour. This is in order to estimate the relative predictive ability of the psychological factors and avoid overestimating their effect in studying the prediction of future behaviour among individuals with experience in performing the criterion behaviour. The results of both models provide a sense of whether there is a contribution and how much (if any) there was overestimation of the psychological effect.

Finally, two exploratory analyses were conducted. First, the comparison between PHAC groups in primary objective two was considered with a person’s flare status at time 1 (T1; in a flare versus not) as a covariate. This was in order to examine whether participants’ responses to measures differed depending on whether they were in a flare or not at T1. Second, pain acceptance scores were examined between PHAC groups and those who were currently in a flare or not in a flare at T1. Results of this analysis may provide insight as to whether differential levels of pain acceptance are characteristic of each PA group, and whether pain acceptance scores differ depending on flare circumstance at T1. Due to the exploratory nature of these analyses, no hypotheses were advanced.

2. Method

2.1 Participants and Design
The primary study design was observational and cross-sectional with primary measures observed at Time 1 (T1). However, an aspect of secondary interest required a prospective design. Time 2 (T2) prospective measures were collected four weeks after the T1 measures. Participants (N=53) were predominantly female (n=49), with residence in either the United States (n=31) or Canada (n=20). The mean age of participants was 51.24 ± 11.73 years. All participants reported having experienced a flare in the last 6 months and engaging in MVPA for at least 15 minutes at a time for at least 2 days per week over the last 6 months. All participants also responded that they intended to follow through on their plans to do moderate-plus physical activity in the coming 4 weeks.

2.2 Measures

Demographics. Participants reported their age, gender, and country of residence at Time 1 (T1). Participants also reported when they last experienced a flare, and whether they were in a flare at the time they answered the survey.

Physical activity. Physical activity volume was reported in terms of both average weekly frequency (number of days) and average per session duration (number of minutes) over the last 6 months at T1 and over the last 4 weeks at T2. Frequency and duration of moderate physical activity and of vigorous physical activity were collected separately. Frequency and duration of each of moderate and vigorous activity were multiplied together to obtain volume of activity, before summing these volumes to obtain a weekly volume of MVPA. Reporting MVPA as a weekly volume in minutes is correspondent to PHAC guidelines set out for people with arthritis (PHAC, 2010). Participants were provided with definitions for both moderate and vigorous physical activity as a reference from which to judge their own activity. Moderate PA was defined as “...making your heart beat faster. You are able to talk but not sing while doing moderate..."
activities. On a scale from 0 to 10, where sitting is 0 and the highest level of effort possible is 10, moderate activity is a 5 or 6." The definition provided for vigorous activity was "...making your heart beat really fast and causes you to breathe really quickly. You would only be able to say a few words before having to stop to catch your breath. On a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10, vigorous activity is a 7 or 8." This measure is a modified version of the validated measure, the Godin Leisure Time Exercise Questionnaire (GLTEQ; Godin & Shepard, 1985). In contrast to the GLTEQ which is designed to calculate metabolic equivalents from PA volume, this study measured PA volume because people do not have perceptions and beliefs about metabolic equivalents but they do have beliefs about the behaviour of PA. Additionally, the GLTEQ includes mild exercise which is more difficult to recall, and is not correspondent with PHAC guidelines that informed this study’s research questions. Thus, the PA measure in the present study did not consider mild exercise.

**Intention to do physical activity.** Participants were asked to answer yes or no to one item as to whether they plan to do moderate to vigorous physical activity for at least 15 minutes at a time in the next 4 weeks. They then rated their intention to follow through on their plans to do moderate to vigorous activity on a scale of 0 (Definitely will not intend) to 8 (Definitely will intend). As intention was only used as a means of correctly identifying those participants who agree to participate in the prospective aspect of the study, it was not used for further analysis. For example, if participants did not intend to engage in physical activity in the coming 4 weeks, their responses would not be germane to the research questions concerning prospective exercise.

**Self-regulatory efficacy to overcome arthritis barriers.** Four barriers identified as relevant to persons with arthritis engaging in physical activity were included on the self-regulatory efficacy to overcome arthritis barriers (SRE-AB) scale (Brittain, Gyurcsik, McElroy,
& Hillard, 2011; Gyurcsik et al., 2009; 2011). These were pain, stiffness, swelling, tiredness, and an open-ended barrier for participants to fill in if they wish. SRE-AB values were calculated as the mean of the confidence items only for those barriers that participants did expect to encounter in the coming 4 weeks. To derive those relevant barriers for each participant, individuals responded to the following questions in step-wise fashion.

The questions asked in step one were; “Will (barrier) be a barrier to you doing your planned physical activity in the next 4 weeks?”; the frequency with which the specified barrier was expected to present itself over the next 4 weeks, and “How much will (barrier) limit you from doing your planned activity?” (scale of 1 [will not limit my activity] to 9 [will fully limit my activity]). These questions elicited barriers that were most relevant to participants and it was these elicited barriers that were the target items for the following efficacy responses.

Finally, in the second step, participants were asked “How confident are you in your abilities to cope with this barrier and be active as planned?” (scale of 0 – not at all confident, to 10 – completely confident). All questions were asked in two contexts: “if you do NOT have a flare”, and “if you DO have a flare”. Thus, two SRE-AB scores for each person were elicited – one in a flare (SRE-ABf) and one not in a flare (SRE-ABnf). Recall that all participants needed to have experienced a flare to be included in the study. Thus, their responses relative to what they expected to encounter were based upon their past experience with flares and exercise. This protocol was used to make the disease-related barriers most salient because people’s symptom experience with flares differs between individuals. Given that the number of items per scale differed for individuals, no internal consistency values were possible.

**Self-regulatory efficacy to schedule/plan.** Participants responded to 9 items regarding their confidence in their abilities to schedule and plan moderate-plus physical activity over the
coming 4 weeks. Example items were “stick with the times you have planned to be active each week” and “take time for yourself and be physically active as planned regardless of your other commitments”. As recommended by Bandura (1997), self-regulatory efficacy to schedule/plan (SRE-SP) was assessed using a 0 (not at all confident) to 10 (completely confident) response scale. The items on this scale have been used in prior research to examine both asymptomatic and symptomatic adults (e.g., DuCharme & Brawley, 1995; Gyurcsik, Spink, Priebe, Anderson, & Brawley, 2010; Woodgate, Brawley, & Weston, 2005). All items were asked with respect to the two contexts: “if you do NOT have a flare”, and “if you DO have a flare”. The mean of all 9 items in each context was used to provide an individual’s SRE-SP score in a flare (SRE-SPf) and not in a flare (SRE-SPnf). The internal consistency values for each scale were Cronbach’s alpha of .98 and .95 respectively for the sample.

Overall pain. Arthritis pain was rated on a 4-item scale. Each item represented pain under different circumstances: on a typical day, during a flare, when not in a flare, and at the present moment. Responses were recorded on a 0 (no pain) to 10 (extreme pain) pain intensity scale. This scale has been used in arthritis research (Gyurcsik et al., 2009; 2011) and corresponds with recommendations for assessing pain intensity (Hadjistavropoulos et al., 2007). Three different pain scores were elicited using this measure. First, an average of all four items provided an overall pain score, second, the 3 items that were not under flare circumstances were also averaged to provide a usual pain (no flare) score. Third, the single flare pain item was used as a flare pain score. Cronbach’s alphas for overall pain and no-flare pain were .85 (4 items) and .84 (3 items) respectively.

Persistence. The measure of persistence with being active as planned should a flare occur in the next 4 weeks was modified from a scale used in prior research (Jung & Brawley, 2010,
2011). It consists of 4 items, asking the participant to rate the time, effort, persistence, and attention they are willing to invest in being active as planned during a flare on a scale of 1 (*little to none*) to 9 (*as much as it takes*). A mean score was calculated and used in analyses. Internal consistency for this scale was .95.

**Pain acceptance.** The 20-item Chronic Pain Acceptance Questionnaire (CPAQ) was used to assess pain acceptance (CPAQ; McCracken et al., 2004). Items state thoughts regarding arthritis pain and participants responded to each item on a scale of 0 (*Never true*) to 6 (*Always true*). Two subscales are summed together to produce the total pain acceptance score. These subscales are activities engagement and pain willingness. The activities engagement subscale assesses the degree to which participants engage in life activities despite the pain they experience e.g., “I am getting on with the business of living no matter what my level of arthritis pain is…”.

The pain willingness subscale measures how willing participants are to experience pain without feeling that they must try to control it. An example item is “I would gladly sacrifice important things in my life to control this arthritis pain better …”. Internal consistency scores for each of total pain acceptance, activities engagement subscale, and pain willingness subscale were .90, .89, and .80 respectively. Depending on the research question, pain acceptance as an overall score could be used or the subscales could be used. Each will be specified in subsequent sections with its appropriate analysis. This measure has been used previously in arthritis and physical activity research (Gyurcsik et al., 2011).

### 2.3 Procedures

Participants (N=53) were recruited via convenience sampling through an online survey (i.e., FluidSurveys Version 4.0). The recruitment notice (Appendix C) was posted online at the
websites for the Arthritis Society, Saskatoon Health Region’s LiveWell program, Silvertimes, and the Active Living Coalition for Older Adults. The notice was also posted to various online support groups and Facebook groups for arthritis and chronic disease after obtaining permission to post it from site moderators. The notice contained a direct link to the T1 survey; prefaced by inclusion criteria and the consent form (Appendix B). Inclusion criteria required that participants: (a) be adults between 18 and 70 years of age, (b) have doctor-diagnosed arthritis, (c) have been engaged in structured exercise at least 2 days per week for at least 15 minutes at a time over the last 6 months on average, (d) intend to maintain their engagement in at least 15 minutes of PA over the next 4 weeks, and (e) have experienced an arthritis flare in the past 6 months. A flare was defined for participants as follows: “When we use the term ‘flare’, we are referring to those ‘bad days’ of worse/increased symptoms beyond your usual symptoms. Please keep in mind that the ‘bad day’ symptoms are not always the same for every person with arthritis. A flare may also be a series of more than one consecutive ‘bad day’ and can last for varying amounts of time.” This definition was displayed for reference throughout the survey near relevant questions regarding flares.

Ninety-nine people responded to the T1 survey, of which, 59 people completed the survey. Ten people were excluded by the survey program for not meeting our minimum MVPA criteria. This was assessed by a simple question of how many days per week the participant engaged in at least 15 minutes of MVPA, whereby an answer of 1 or less would terminate the survey. One was excluded due to not having experienced a flare in the past 6 months and another was excluded because they reported having no intention of being physically active in the coming 4 weeks. Sixteen began the survey and exited almost immediately, while 12 attempted the survey but did not complete it. Despite the aforementioned check of MVPA volume, a further 6 people
were excluded from analysis because their total self-reported MVPA volume was less than was outlined by inclusion criteria, leaving a final sample of N=53 for analysis at T1.

It should be noted that T1 recruitment was much more difficult than expected. Postings with the Arthritis Society website, their Facebook page, and the University of Saskatchewan yielded only 6 complete responses after nearly 2 months of recruitment. It was decided that “flare” may not be the language used by the lay person with arthritis and recruitment materials used an expanded definition also referring to “bad days” of arthritis symptoms. A database of over 50 potential chat groups (LiveJournal, Yahoo, Facebook, Arthritis Foundation, etc.) to post the study notice was split up between five researchers who checked the various databases on a periodic basis and posted study notices several times as needed to maintain visibility and the invitation to participate in the study.

At the end of the T1 survey, participants were asked to leave their email address if they wished to be contacted in 4 weeks to complete our T2 survey. Of the 53 participants from T1, fifty provided their email addresses and 35 responded to the T2 survey. Of these 35, six exited the survey almost immediately and 4 attempted the survey but did not complete it leaving 25 completed surveys. Of these, two were excluded based on the participants’ T1 data having been excluded for not meeting PA requirements for inclusion. The resultant sample size at T2 was N=23. Only those participants who completed both surveys were included in prospective analyses.

The prediction of T2 MVPA using three variables in a hierarchical multiple regression model required that 60 participants be recruited. This is based on Tabachnick and Fidell’s (1996)
recommendation of at least 20 subjects per independent variable. Recruitment efforts were therefore focused on obtaining as many participants as possible.

2.4 Analytical Plan

Primary analyses were performed to attempt to establish whether a flare is perceived by participants to be more intense in terms of pain, and whether social cognitions reflected the challenge represented by increased symptomatology. To this end, a mixed model analysis of variance with repeated measures (ANOVAR) was run on the dependent variable of pain where PA group was the between-subjects comparison and pain during a flare versus usual pain (absence of a flare) was the within-subjects comparison. Separate mixed model ANOVARs were conducted for each of SRE-SP and SRE-AB in both flare contexts. To investigate primary objective two, whether individuals with arthritis who meet PHAC guidelines differ in their social cognitions from those not meeting guidelines, a multivariate analysis of variance (MANOVA) was conducted with physical activity group as the independent variable and SRE-SPf, SRE-SPnf, and persistence as the dependent variables. The two SRE estimates (flare and no flare) were included based on SRE-SP’s demonstrated relation to PA during an arthritis flare as opposed to SRE-AB (Cary, Sessford, Gyurcsik, Brawley, & Spink, 2012). Persistence was selected given its identified role in the self-regulation of adherence (Bandura, 1997; Jung & Brawley, 2010) in the asymptomatic adult population. It has not yet been examined during arthritis flares.

To pursue secondary objectives, hierarchical multiple regressions (HMR) were conducted. The first HMR concerned persistence in a flare and a model including the variables of pain acceptance and SRE-SPf as predictors. The selection of SRE-SPf as a predictor and exclusion of SRE-ABf was due in part to: (a) low power as a result of a small sample size and (b)
past research demonstrating that SRE-SP was the sole predictor of PA volume in a model which included SRE-AB (Cary et al., 2012). The second HMR, based upon the agency aspect of social-cognitive theory, examined whether SRE-SPf plus persistence prospectively predicted T2 PA. Finally, in a third HMR, Weinstein’s (2007) recommendation for avoiding overestimates of social-cognitive effects was followed. In this HMR, the covariate of past behaviour was also included with social-cognitive variables in the prediction of T2 PA. Thus, T1 PA was included in the prediction model along with SRE-SPf and persistence to predict T2 PA.

The actual experience of being in a flare at the time of responding to measures was also explored. At T1, in order to investigate whether those individuals who were in a flare differed from individuals who were not in a flare when they responded to measures examined in primary objective two, a multivariate analysis of covariance (MANCOVA) was conducted. Additionally, to explore whether pain acceptance differed between PA groups and people answering while in a flare or not, a 2 x 2 between groups ANOVA was conducted.

2.5 Data Cleaning Procedures and Normality Checks

Analyses were performed using IBM SPSS Statistics version 19.0.0. All data were exported from participants’ responses on FluidSurveys version 4.0 - S5 (2012) and checked for missing data and normality as per the following procedures.

Missing data. There were no instances of responses to entire scales being absent but mean replacement (Tabachnik & Fidell, 2007) was used in the case of a missing item from a scale. To complete the scale, the mean of the completed items was inserted as the value for the missing item for the participant in question, maximising the use of data from a small sample.
Normality. If a violation of assumptions of normality occurs during analysis of variance or regression, the data will be checked for skewness and kurtosis (Tabachnik & Fidell, 2007) and transformed as necessary.

3. Results

3.1 Demographics

Demographic information (see Tables 1 & 2) indicated that the sample was primarily female (n=49), with a mean age of 51 years. Nineteen participants were actually experiencing a flare at the time of answering the survey at T1. When grouped into PA groups according to PHAC (2010) guidelines, 32 participants were sufficiently physically active (S-PA group $M=320.47\pm162.382$) and 21 participants were insufficiently physically active (I-PA, $M=81.07\pm31.390$ minutes). A high degree of variability in PA measures is not unusual in reporting of PA volume. Physical activity volume (MVPA) for each group and age were compared using an ANOVA. Physical activity volume was confirmed to be significantly different ($p<.001$) while age was not different.

3.2 Checks on Statistical Assumptions

Statistical assumptions concerning normality were examined and there were no violations evident in the tests of assumptions in the ANOVA or ANOVAR procedures (i.e., homogeneity of variance; sphericity of covariance). Skewness and kurtosis values were not problematic. Multicollinearity was not a concern in the regression analyses.

3.3 Primary objective one

The primary objective of the study was to investigate possible differences between PA groups on SRE and pain intensity when individuals were either in or not in a flare. Specifically, individuals’ SRE beliefs and pain perceptions in the context of a flare were compared to the
same individuals’ SRE beliefs and perceived pain in the context of no flare. The perceptions of pain were also compared between the different levels of activity (i.e., PHAC). Mixed-model ANOVARs were performed for this objective.

**Pain intensity.** A 2 by 2 mixed-model ANOVAR was performed where PA group (S-PA vs I-PA) was the between-subjects factor and pain intensity (flare pain vs usual pain) was the within-subjects factor. Only the within-subjects factor yielded a significant difference, whereby pain intensity was greater during a flare than usual pain intensity, $F(1,51)=241.385, p<.001, d=1.15$ (see Table 3 & Appendix Table 2 for means). To provide a reference for pain intensity, White et al. (2012) identified numeric VAS scores of 40 and higher (out of 100) as moderate-severe pain. Pain means reported in this study for flare and no flare conditions respectively were $7.66 \pm 1.79$ and $4.05 \pm 1.95$ on a scale of 0 – 10 indicating that flare pain does correspond with a severe level of pain and was worse than pain when not in a flare. There was no significant interaction detected.

**Self-regulatory efficacy.** Because only those participants who reported expecting to encounter arthritis barriers were included in analysis of SRE-AB, the resultant sample size for analyses of SRE-AB was $n=31$ (of which, $n=15$ met PHAC guidelines, $n=16$ did not). Two 2 by 2 mixed-model ANOVARs were performed, each with PA group as the between-subjects factor. The within-subjects factor for each was flare vs no flare and the dependent variables were SRE-SP for the first ANOVAR and SRE-AB for the second. The ANOVAR examining SRE-SP yielded significant differences in both the between $F(1,51)=5.456, p<.05, d=0.66$ and within-subjects factors $F(1,51)=57.022, p<.001, d=1.39$, whereby SRE-SP was lower for those in the lower PA group and lower in the flare condition. For the ANOVAR examining SRE-AB, only a significant within-subjects difference was found $F(1,29)=25.135, p<.001, d=1.29$, such that
SRE-AB was lower in the flare context (for report of the mean values for within-group and between-group comparisons, see Tables 3 & 4). There was no significant interaction detected for either SRE-SP or SRE-AB ANOVARs.

3.4 Primary Objective Two

**Social cognitions.** The second primary objective was to determine whether S-PA and I-PA groups differed in their social cognitions (i.e., SRE-SPf, SRE-SPnf, and persistence). A between groups MANOVA was conducted to examine these differences. The overall MANOVA was non-significant $F(3,49)=2.045, \ p>.05 \ [p \ exact = .120]$. However, Bock (1975) suggests that protected $F$-tests may be overly conservative in the case of exploratory analysis. He suggests the consideration of post-hoc ANOVAs in situations (i.e., a trend) when the protected $F$-test is non-significant in order to avoid overlooking undetected differences which may be masked by other non-contributing variables to the multivariate effect examined by the protected test. Follow-up ANOVAs revealed that the only statistically significant between-groups difference was that SRE-SPf was greater for the S-PA group $F(1,51)=5.30, \ p<.05, \ d=.64$ (see Table 4 for means).

3.5 Secondary Objectives

Hierarchical multiple regressions (HMRs) were performed to determine the ability of psychological variables to predict persistence and Time 2 MVPA. Given the small sample size for the study, the regression models examined were underpowered (Green, 1991). Cohen (1992) suggests that in cases when power is limited, researchers need to consider limiting the number of predictors in a regression equation (also see Green, 1991). For this reason, and because previous research suggested select social cognitive variables were stronger correlates of PA, they were
purposely included in predictive models (Cohen, Cohen, Aiken, & West, 2002). Specific
mention of the decision-making for the data-analysis is made in each section as necessary.

**Persistence.** Correlations of variables included in this analysis can be found in Appendix
Table 5. The activities engagement subscale of the Chronic Pain Acceptance Questionnaire
(CPAQ) was entered into the regression because it was correlated most highly with persistence
compared to the pain willingness subscale or the aggregate pain acceptance score and because
the number of predictors needed to be constrained based on the small sample size and limitation
of power to detect effects with more predictors (Cohen, 1992). Thus, activities engagement and
SRE-SPf were entered into the regression to predict the dependent variable of persistence. In
block one, activities engagement was entered, followed by SRE-SPf in the second block. The
conceptual rationale for entry was as follows. Activities engagement (initial predictor) is a trait
measure which may exert a global influence on persistence, while SRE-SPf (second predictor) is
a state measure which may predict the more specific response to persistence in the proximal
future. Initially, activities engagement accounted for 16% of the variance in persistence ($p<.01$).
However, when SRE-SPf was added to the model, it was the only significant predictor ($R^2_{adj}=.48,$
$p<.001$, see Table 5). As SRE-SPf increased, so did persistence.

**Time 2 MVPA.** In the first block of the HMR predicting T2 MVPA, SRE-SPf was
entered based on the findings of Cary et al. (2012), which identified it as a better predictor of
MVPA volume than SRE-AB. The second block contained persistence because it was a
previously unexamined variable and its entry as second predictor follows the “least is last”
suggestion for entering variables into a regression model (Cohen et al., 2002). The only
significant predictor was SRE-SPf, which accounted for 23% of the variance ($p<.01$) in T2
MVPA (see Table 6). However, considering the suggestions of Weinstein (2007) relative to
overestimation of social-cognitive effects, a second model was conducted with T1 MVPA as a covariate entered into block one. In this case, T1 MVPA was the only significant predictor, accounting for 78% of the variance \( (p<.001) \) in T2 MVPA (see Table 7 for betas).

### 3.6 Exploratory analyses

Recall that exploratory analysis sought to examine whether a person’s flare status (in a flare or not) at T1 had any bearing on the differences between PA groups on social cognitions. As well, differences between PA groups on pain acceptance were examined in the context of those in a flare versus not.

**Social cognitions.** To explore the bearing participants’ flare status at T1 may have had on the results of the analysis in primary objective two, a MANCOVA was conducted. Flare status at T1 was entered as the covariate, the independent variable was PA group, and the dependent variables included SRE-SPf, SRE-SPnf, and persistence. The covariate effect was non-significant, \( F(4,48)=.52, \ p>.05 \), as was the overall MANCOVA, \( F(4, 48)=1.81, \ p>.05, \ d=0.61 \). Considering Bock’s recommendation about overlooking valuable exploratory information in the face of protected F-tests, ANCOVAs were conducted. The only significant difference was that SRE-SPf was greater for those in the S-PA group than the counterpart I-PA group \( F(1,50)=51.84, \ p<.05, \ d=0.61 \) (for group means, please refer to Table 4).

**Pain acceptance.** A 2 x 2 between groups ANOVA was conducted to examine whether overall pain acceptance differed between PA groups and people who were experiencing a flare versus not experiencing a flare at T1. There were no significant differences observed.

### 4. Discussion

This study included a number of firsts in the arthritis and physical activity literature. Firstly, within-participant differences in SRE and pain intensity were observed in the comparison
of exercising with usual arthritis symptoms versus exercising with an arthritis flare. Secondly, anticipated persistence had not previously been studied relative to physical activity among individuals with arthritis. It was examined in three ways: (a) as a group difference between those that met or did not meet physical activity guidelines for individuals with arthritis (PHAC, 2010), (b) as a predictor of physical activity volume (MVPA), and (c) as a criterion variable predicted by other social cognitive predictors (pain acceptance and SRE) previously used to examine adherence in this population.

Relative to the first contribution to the arthritis and physical activity literature, recall that Focht et al. (2002) recommended studying a greater disease-related challenge to physical activity (PA) than that of usual arthritis pain. This led other researchers (Gyurcsik et al., 2012) to examine PA during an arthritis flare, as it was assumed to be the greater challenge to being physically active. While it is logical to presume that an arthritis flare, or “bad day” of symptoms, should represent a greater challenge to PA adherence, this had not been tested empirically. Therefore, primary objective one of the present study was to conduct within-subject comparisons of pain intensity, SRE to schedule/plan PA (SRE-SP) and to overcome arthritis barriers (SRE-AB) in two different symptom contexts (flare versus no flare). Results of these comparisons indicated that pain intensity was significantly higher during a flare than usual arthritis pain and both SRE-SP and SRE-AB were lower. Taken together, these results support the notion that flares are perceived as more pain-intense for symptoms, and more challenging than when experiencing usual arthritis symptoms. Because the three pain items averaged to represent the no-flare pain score included pain “at the present moment” and 19 individuals reported being in a flare at T1, there is the possibility of this item including flare pain in the no-flare score for those participants. However, despite the possibility of the no-flare scores being elevated in persons in a
flare at T1, flare pain was still significantly higher than no-flare pain. This is the first work demonstrating differences in the same individuals’ confidence to adhere to physical activity for different intensities of pain-related symptoms. The previously mentioned work on PA and flares by Gyurcsik and colleagues (2012) compared SRE scores between individuals who met/did not meet PA guidelines (PHAC, 2010).

Between groups comparisons of SRE-SP, AB, and pain intensity were also conducted between PA groups. While SRE-SP was significantly higher for those meeting PHAC guidelines, SRE-AB was not significantly different. This may suggest that for individuals who are regularly active, albeit at varying levels, SRE-SP is more important in distinguishing those that engage in higher volume of PA. It also concerns the scheduling/planning people have to act upon to achieve their frequency and minutes of PA. SRE-AB, on the other hand, is important to those engaging in regular PA at any level despite arthritis barriers but has less direct relation to frequency and minutes of PA. For SRE-AB, I may be confident in overcoming barriers regardless of my MVPA volume. Methodologically, it may also be relevant that because some participants reported not expecting to encounter barriers in the coming 4 weeks, their SRE-AB scores were not included resulting in a smaller sample and lower power for SRE-AB analysis.

Pain intensity was not different between PA groups, which is consistent with pain intensity not being predictive of PA volume.

Whereas persistence is an important process variable in Social Cognitive Theory (SCT), it has gone unexamined thus far in arthritis literature. Primary objective two of the present study was to replicate the Gyurcsik et al. (2012) comparison of SRE between individuals meeting/not meeting PA guidelines and also include persistence as a dependent variable. This post-hoc comparison detected a significant between-group difference for SRE-SP in a flare with a medium
effect size of $d=.64$ . This finding would have been ignored had Bock’s (1975) advice not been followed about how to treat non-significant omnibus tests in preliminary research.

Recall Focht and colleagues’ (2002) findings that usual arthritis pain was manageable when adhering to PA and that the present findings indicate that a flare appears to be a greater challenge than usual symptoms. In turn, exercising when in a flare would require stronger SRE beliefs (Bandura, 1986) in order for individuals with arthritis to be adherent. This may explain why SRE-SP in a flare was found to be different between groups while SRE-SP for exercise when not in a flare revealed no significant between PA group differences.

Given the recommendation by Cohen (1992) that effect size is an important consideration, effect sizes were calculated. Bearing in mind the multivariate analysis of variance (MANOVA) was of low power, it is of note that effects were in the expected direction and effects for non-significant group differences were medium (SRE-SP no flare) and small (persistence) (Cohen, 1992) (see Table 4). Note that SRE-SP for exercise when not in a flare was approaching significance and may have reached significance with greater power, corresponding with Gyurcsik et al.’s findings. The persistence measure did not assess participants’ anticipated persistence with meeting PHAC guidelines for PA, but assessed anticipated persistence with their own planned activity volume. That persistence was no different between PHAC groups does not undermine the utility of persistence in physical activity. In this case, it means that individuals were persistent with the volume of PA they planned to do regardless of whether that volume corresponded with PHAC guidelines. Despite the present study’s focus on meeting PA guidelines, this focus is not intended to suggest that PA levels below the guidelines are devoid of benefits. Rather, the guidelines represent a level of PA associated with optimal health and disease-management benefits for individuals with arthritis.
According to SCT, engaging in and sustaining motivated behaviour is facilitated by higher SRE leading to increased levels of persistence toward the behaviour. Thus, secondary objective one was to test whether SRE-SP was predictive of persistence as this has not been studied in the arthritis and PA literature. SRE-AB was not utilised as an additional predictor due to the small sample, associated low power, and previous research. Specifically, work by Cary et al. (2012) on exercising individuals with arthritis demonstrated that when using both SRE measures (SP and AB), to predict actual PA behaviour with sufficient power, only SRE-SP was significant.

The question of whether pain acceptance (i.e., a general and stable variable) might also contribute to predicting persistence was examined in light of promising work linking pain acceptance and SRE in arthritis (Gyurcsik, Brawley, Spink, Glazebrook, & Anderson, 2011). It was hypothesized that both pain acceptance and SRE-SP would predict persistence. Although results of hierarchical multiple regression (HMR) analysis indicated that pain acceptance predicted persistence, SRE-SP became the sole significant predictor when added to the model. That SRE-SP consumed most of the variance predicted by the regression model may not be surprising due to the higher correspondence between SRE-SP and persistence measures. These measures each referred to the upcoming four weeks and flare circumstances specifically, while pain acceptance is more of a global measure with no specific flare context or time frame in the measure. This was the first evidence demonstrating that SRE-SP does predict persistence with PA for people with arthritis during a flare.

Secondary objective two involved prediction of actual PA volume four weeks after baseline using SCT variables as predictors. Upon completing this analysis, SRE-SP in flare circumstances was identified as the only significant predictor. Following recommendations of
Weinstein (2007) to guard against the overestimation of social-cognitive predictors, this analysis was conducted again with T1 PA volume as a covariate. When included as a covariate, T1 PA volume was the sole significant predictor of T2 PA volume. This does not mean that SRE is irrelevant to predicting future PA volume but that it does not account for any significant amount of additional variance beyond that accounted for by past behaviour. While this analysis is more conservative in regard to estimating the contribution of social-cognitions to the model, it is preferred to over-estimating the effect.

The mean score for SRE (0-10 scale) in a flare was 5 so it is possible that people were relatively confident to maintain their level of PA. Very few ($n = 5$) participants switched activity level groups from T1 to T2. A paired t-test confirmed that the mean volume of MVPA did not differ over the same period (see appendix A). Despite some participants meeting the PHAC guidelines and others not, people were able to maintain their level of PA. Considering that the sample was required to be regularly active for study participation, it follows that they would be relatively confident to maintain the level of activity that they reported over the past 6 months for the 4 week study period.

Exploratory objectives included examining what bearing participants’ flare status (flare versus no flare) may have had on between PA group differences for: (a) social cognitive variables and (b) pain acceptance. Results of post-hoc testing (cf. Bock, 1975) following a non-significant MANCOVA indicated SRE-SPf was the only significantly different variable between groups. This suggests that participants’ being in a flare at T1 had little bearing on their responses to SRE-SP and persistence measures. Given these participants were experienced with both their disease and exercise, it is probable that those individuals in a flare can recall how they feel “normally” and are not inflating their scores given their current experience of flare symptoms.
The exploratory analysis of pain acceptance indicated that participants’ pain acceptance did not differ as a function of PA level or flare status at T1. It is worth mentioning that the pain acceptance measure is not phrased relative to meeting PHAC guidelines, but rather to engaging in unspecified valued activities. Thus, similar levels of pain acceptance across PA groups may demonstrate that accepting pain in order to maintain engagement in valued activities (i.e., PA) was at a PA level selected by the participant and may not be relevant to meeting PHAC guidelines.

Limitations

It must be acknowledged that the sample was one of convenience rather than a random sample and this limits generalizability. Other factors regarding the sample should also be considered, including that participants were active and therefore findings cannot be generalized to exercise initiates. Some demographic data such as comorbidities, ethnicity and employment status were not collected, thus their potential bearing on results would be speculative. It may be unlikely in this sample that comorbidities exert a great influence on findings considering that the mean age was 51 years. Until age 64, almost 90% of Canadians report only a single chronic health condition (Health Council of Canada, 2007). Additionally, the online survey protocol seemed unable to capture those who were 70 years and older and active. This was despite the posting of the survey notice by the Active Living Coalition for Older Adults (ALCOA), which targets older active adults and has a reach of 500 members via email and over 12,000 hits per month on their website. This may have implications for a different method of recruitment for active adults with arthritis 70-plus years of age. Finally, the vast majority of the sample were women and though arthritis is more prevalent in women (PHAC, 2010), this means results are not generalizable to men.
Another limitation concerns statistical power. Cohen’ (1992) recommendation of constraining the number of theoretically-based predictors to be entered into regression models (cf., Cohen, 1992) to obtain medium effect sizes was followed. It would be naive to conclude that those entered were the only social cognitive variables that could be examined relative to the prediction of future physical activity. For example, other aspects of the agency component of SCT could reasonably be examined. As well, interactions of the select predictors as well as other SCT variables would be possible with larger sample sizes (e.g., SRE with pain acceptance). Thus, future research on larger sample sizes should be conducted so these relationships can be explored. Finally, analysis of T2 data could reflect selective effects given the dropout of participants from this aspect of the study. Thus, it is appropriate to cautiously interpret these findings given the potential influence of regression to the mean (Campbell & Kenny, 2003).

If future studies were sufficiently powered, it may be of value to explore SRE and pain acceptance predicting persistence and any possible interactions between SRE and acceptance. For instance, if both SRE and pain acceptance are high versus SRE is high and pain acceptance is low would there be differential strength of prediction in the accounted for variance for different groups?

Some readers may be concerned that accelerometry or objective PA measures were not included to assess PA. The first major barrier to their use is the online survey format of this study. Aside from that, there may be some surprise at the variability in MVPA but sizeable variability is present even in objective measures (White et al., 2012). As well, there are dilemmas in both objective and self-report methodologies. While concern is raised about memory for recall, particularly for smaller incidental and less intense bouts (not examined in this study), there is also concern with accelerometers in terms of compliance with wear (Colley et al., 2011).
Accelerometers also may not capture aquatic exercise which is employed in arthritis as a mode of exercise due to the relatively low impact on joints. By contrast recall would capture MVPA about aquatic activity.

Strengths

Strengths of the study include a strong theoretical base as well as novel examinations of persistence and of within-participant flare status differences. To reiterate, persistence had not been studied in the PA and arthritis literature and it was considered from three perspectives in the present study: (a) the PA level group differences in persistence, (b) whether persistence can be predicted by social cognitions used previously as predictors of physical activity (i.e., SRE and pain acceptance), and (c) utilisation of persistence together with previously-used social-cognitive variables to prospectively predict physical activity. Relative to flare status, neither self-efficacy beliefs (to schedule/plan PA and to overcome arthritis barriers), nor pain intensity, had been compared previously within-participants relative to flare presence or absence. The present study was the first to detect differences in these comparisons.

Reactions to flares were found to be more intense in terms of pain intensity and thus represent a greater challenge to SRE for exercise. Findings also support the SCT tenet that higher levels of SRE should be related to higher levels of persistence towards maintaining a motivated behaviour in the face of challenges such as a flare. Future studies should examine potential interactions between SRE and pain acceptance when predicting persistence. Additionally, that pain acceptance was non-significant in predicting persistence when SRE-SP was added may suggest a possible mediation effect which could be pursued in future work.
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Wilkinson, L., & Task Force on Statistical Inference, APA Board of Scientific Affairs.


Table 1.

*Physical activity group demographics*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Sufficiently physically active (n = 32)</th>
<th>Insufficiently physically active (n = 21)</th>
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<tbody>
<tr>
<td>Gender</td>
<td>Frequency</td>
<td>Frequency</td>
</tr>
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<tr>
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<td>Last flare experienced</td>
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<tr>
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*Note.* Sufficiently/insufficiently active as defined by physical activity (PA) recommendations put forth by the Public Health Agency of Canada (≥150 minutes of moderate to vigorous PA/week).
Table 2.

*Physical activity group demographics*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
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<th>Insufficiently physically active (n = 21)</th>
</tr>
</thead>
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<td>Age in years</td>
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<td>$49.24 \pm 14.12$</td>
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<td>Moderate-plus physical activity volume in</td>
<td>$320.47 \pm 162.38$</td>
<td>$81.07 \pm 31.39$</td>
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<tr>
<td>minutes per week – Time 1***</td>
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</table>

*Note.* Sufficiently/insufficiently active as defined by physical activity (PA) recommendations put forth by the Public Health Agency of Canada ($\geq$150 minutes of moderate to vigorous PA/week).

***$p < .001$***
Table 3.

Within groups comparisons in the context of flare presence and absence

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Flare present $M \pm SD$</th>
<th>Flare absent $M \pm SD$</th>
<th>Effect size Cohen’s D</th>
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</thead>
<tbody>
<tr>
<td>SRE-SP***</td>
<td>5.31 ± 3.46</td>
<td>8.03 ± 2.06</td>
<td>1.39</td>
</tr>
<tr>
<td>SRE-AB***</td>
<td>3.76 ± 2.77</td>
<td>5.97 ± 2.78</td>
<td>1.29</td>
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<tr>
<td>Pain intensity***</td>
<td>7.66 ± 1.79</td>
<td>4.05 ± 1.95</td>
<td>1.15</td>
</tr>
</tbody>
</table>

*Note. SRE-SP = Self-regulatory efficacy to schedule/plan moderate to vigorous physical activity; SRE-AB = Self-regulatory efficacy to overcome arthritis barriers

$^a n=53$. $^b n=31$.  

***$p < .001$
Table 4.

*Time 1 Comparisons for physical activity groups*

<table>
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<th>Dependent Variable</th>
<th>Sufficiently physically active (n = 32)</th>
<th>Insufficiently physically active (n = 21)</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M ± SD</td>
<td>M ± SD</td>
<td>Cohen’s D</td>
</tr>
<tr>
<td>SRE-SPf*</td>
<td>6.16 ± 3.24</td>
<td>4.01 ± 3.45</td>
<td>.65</td>
</tr>
<tr>
<td>SRE-SPnf</td>
<td>8.43 ± 1.71</td>
<td>7.43 ± 2.42</td>
<td>.49</td>
</tr>
<tr>
<td>Persistence</td>
<td>6.90 ± 2.14</td>
<td>6.17 ± 2.95</td>
<td>.29</td>
</tr>
</tbody>
</table>

*Note. Sufficiently/insufficiently active as defined by physical activity (PA) recommendations put forth by the Public Health Agency of Canada (≥150 minutes of moderate to vigorous PA/week). SRE-SPf = Self-regulatory efficacy to schedule/plan MVPA in a flare; SRE-SPnf = Self-regulatory efficacy to schedule/plan MVPA in absence of a flare*

*p < .05*
Table 5.

*Hierarchical multiple regression predicting persistence with planned activity during a flare*

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Adjusted R²</th>
<th>R² Δ</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1**</td>
<td>.162</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activities engagement</td>
<td></td>
<td></td>
<td>.422**</td>
</tr>
<tr>
<td>Step 2***</td>
<td>.483</td>
<td>.325</td>
<td></td>
</tr>
<tr>
<td>Activities engagement</td>
<td></td>
<td></td>
<td>.067</td>
</tr>
<tr>
<td>SRE-SPf</td>
<td></td>
<td></td>
<td>.672***</td>
</tr>
</tbody>
</table>

*Note. SRE-SPf = Self-regulatory efficacy to schedule/plan moderate to vigorous physical activity during a flare.*

**p < .01. ***p < .001.
Table 6.

*Hierarchical multiple regression predicting time 2 MVPA*

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Adjusted $R^2$</th>
<th>$R^2 \Delta$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1*</td>
<td>.231</td>
<td>.266</td>
<td></td>
</tr>
<tr>
<td>SRE-SPf</td>
<td></td>
<td></td>
<td>.516*</td>
</tr>
<tr>
<td>Step 2*</td>
<td>.198</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>SRE-SPf</td>
<td></td>
<td></td>
<td>.578*</td>
</tr>
<tr>
<td>Persistence</td>
<td></td>
<td></td>
<td>-.093</td>
</tr>
</tbody>
</table>

*Note.* SRE-SPf = Self-regulatory efficacy to schedule/plan moderate to vigorous physical activity during a flare. MVPA = moderate to vigorous physical activity volume

*p < .05*
Table 7.

*Hierarchical multiple regression predicting time 2 MVPA with time 1 MVPA as covariate*

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Adjusted $R^2$</th>
<th>$R^2 \Delta$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1***</td>
<td>.793</td>
<td>.802</td>
<td></td>
</tr>
<tr>
<td>Time 1 MVPA</td>
<td></td>
<td></td>
<td>.890***</td>
</tr>
<tr>
<td>Step 2***</td>
<td>.787</td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td>Time 1 MVPA</td>
<td></td>
<td></td>
<td>.855***</td>
</tr>
<tr>
<td>SRE-SPf</td>
<td></td>
<td></td>
<td>.066</td>
</tr>
<tr>
<td>Step 3***</td>
<td>.788</td>
<td>.010</td>
<td></td>
</tr>
<tr>
<td>Time 1 MVPA</td>
<td></td>
<td></td>
<td>.882***</td>
</tr>
</tbody>
</table>
SRE-SPf  
Persistence  

Note. SRE-SPf = Self-regulatory efficacy to schedule/plan moderate to vigorous physical activity during a flare. MVPA = moderate to vigorous physical activity volume.

***p < .001.
Appendix A: Supplementary tables

Appendix Table 1.

*Pain acceptance between those currently in a flare or not at time 1*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Flare present (n = 19)</th>
<th>Flare absent (n = 34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain acceptance</td>
<td>55.26 ± 22.52</td>
<td>67.12 ± 21.04</td>
</tr>
</tbody>
</table>
Appendix Table 2

Descriptive statistics for social cognitive variables

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Sufficiently physically active (n = 32)</th>
<th>Insufficiently physically active (n = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M \pm SD$</td>
<td>$M \pm SD$</td>
</tr>
<tr>
<td>SRE-Abf$^a$</td>
<td>4.37 ± 2.39</td>
<td>4.07 ± 2.94</td>
</tr>
<tr>
<td>SRE-ABnf$^b$</td>
<td>6.30 ± 3.06</td>
<td>5.68 ± 2.41</td>
</tr>
<tr>
<td>Overall pain</td>
<td>4.79 ± 1.78</td>
<td>5.20 ± 1.77</td>
</tr>
<tr>
<td>Usual pain</td>
<td>3.92 ± 2.01</td>
<td>4.25 ± 1.90</td>
</tr>
<tr>
<td>Flare pain</td>
<td>7.41 ± 1.70</td>
<td>8.05 ± 1.88</td>
</tr>
<tr>
<td>Pain acceptance</td>
<td>66.73 ± 21.85</td>
<td>57.00 ± 21.74</td>
</tr>
<tr>
<td>Pain willingness</td>
<td>27.41 ± 10.85</td>
<td>24.76 ± 10.39</td>
</tr>
<tr>
<td>Activities engagement</td>
<td>39.32 ± 14.65</td>
<td>32.24 ± 13.82</td>
</tr>
</tbody>
</table>

Note. Sufficiently/insufficiently active as defined by physical activity (PA) recommendations put forth by the Public Health Agency of Canada (≥150 minutes of moderate to vigorous PA/week).

SRE-Abf = Self-regulatory efficacy to overcome arthritis barriers in a flare; SRE-ABnf = Self-regulatory efficacy to overcome arthritis barriers in absence of a flare.
"n=31, Met PHAC n=15, Did not meet PHAC n=16. "n=32, Met PHAC n=15, Did not meet PHAC n=16.

Appendix Table 3.

*Paired t-tests comparing physical activity volume and self-efficacy at time 1 and time 2*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M ± SD</td>
<td>M ± SD</td>
</tr>
<tr>
<td>MVPA</td>
<td>179.46 ± 155.52</td>
<td>160.76 ± 138.66</td>
</tr>
<tr>
<td>MVPA*</td>
<td>159±29.2</td>
<td>100±62.9</td>
</tr>
<tr>
<td>SRE-SPf*</td>
<td>5.64±3.96</td>
<td>3.76±2.78</td>
</tr>
</tbody>
</table>

*Note.* MVPA=Moderate to vigorous physical activity measured in minutes/week; SRE-SPf = Self-regulatory efficacy to schedule/plan moderate to vigorous physical activity during a flare

"n=5 subjects that switched physical activity groups between time 1 and time 2.
Appendix Table 4.

*Time 1 means for those that completed both time points and those that did not*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Completed time 1 only (n = 30)</th>
<th>Completed time 1 and 2 (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRE-SPf</td>
<td>5.02 ± 3.37</td>
<td>5.68 ± 3.62</td>
</tr>
<tr>
<td>SRE-SPnf</td>
<td>8.24 ± 1.99</td>
<td>7.77 ± 2.15</td>
</tr>
<tr>
<td>SRE-Abf&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.50 ± 2.82</td>
<td>3.90 ± 2.51</td>
</tr>
<tr>
<td>SRE-ABnf&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.12 ± 2.55</td>
<td>5.88 ± 2.92</td>
</tr>
<tr>
<td>Persistence</td>
<td>6.32 ± 2.53</td>
<td>6.99 ± 2.46</td>
</tr>
<tr>
<td>Overall pain</td>
<td>4.79 ± 1.65</td>
<td>5.16 ± 1.94</td>
</tr>
<tr>
<td>Pain acceptance</td>
<td>64.44 ± 21.46</td>
<td>60.83 ± 23.28</td>
</tr>
<tr>
<td>MVPA</td>
<td>261 ± 180.53</td>
<td>179.46 ± 155.52</td>
</tr>
</tbody>
</table>

*Note.* MVPA = Moderate to vigorous physical activity; SRE-SPf = Self-regulatory efficacy to schedule/plan MVPA in a flare; SRE-SPnf = Self-regulatory efficacy to schedule/plan MVPA in absence of a flare; SRE-Abf = Self-regulatory efficacy to overcome arthritis barriers in a flare; SRE-ABnf = Self-regulatory efficacy to overcome arthritis barriers in absence of a flare.
\(^a n=43, \text{Completed time 1 } n=24, \text{Completed time 1 and 2 } n=19. \) \(^b n=32, \text{Completed time 1 } n=14, \text{Completed time 1 and 2 } n=18\)
Appendix Table 5.

*Correlations between variables predicting persistence*

<table>
<thead>
<tr>
<th>Measure</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Activities engagement</td>
<td>-</td>
<td>.529***</td>
<td>.422**</td>
</tr>
<tr>
<td>2. SRE-SPf</td>
<td>.529***</td>
<td>-</td>
<td>.707***</td>
</tr>
<tr>
<td>3. Persistence</td>
<td>.422**</td>
<td>.707***</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* SRE-SPf = Self-regulatory efficacy to schedule/plan MVPA in a flare

**p < .01, p < .001
Appendix B: Ethics certificate

Behavioural Research Ethics Board (Beh-REB)

Certificate of Approval

PRINCIPAL INVESTIGATOR
Lawrence Breslau

DEPARTMENT
Kinetics

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED
University of Saskatchewan

STUDENT RESEARCHER(S)
James Sexton

FUNDER(S)
CANADIAN INSTITUTES OF HEALTH RESEARCH (CIHR)

COSTARD RESEARCH CHAIRS PROGRAM

TITLE
Examining Persistence to Physical Activity During an Arthritis Flare Using Complementary Therapies

ORIGINAL REVIEW DATE
26-Nov-2011

APPROVAL ON
13-Dec-2011

APPROVAL OF:
Ethics Application

CONSENT PROTOCOL

EXPIRY DATE
12-Dec-2012

Full Board Meeting

Delegated Review

Date of Full Board Meeting:

CERTIFICATION
The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes in your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS
In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: http://www.usask.ca/research/ethics-review/

John Rigby, Chair
University of Saskatchewan
Ottawa-Carleton Research Ethics Board

Please send all correspondence to:
Research Ethics Office
University of Saskatchewan
Box 5009 RPO University, 1602–110 Gymnasium Place
Saskatoon SK S7N 4J5
Telephone (306) 966-2975   Fax (306) 966-2909

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Appendix C: Consent form

Consent Form for Participating in Arthritis Physical Activity Research

You are invited to participate in a research project investigating your feelings about your arthritis and physical activity. Please read this form carefully and feel free to ask any questions you might have.

This study is being conducted by James D. Sessford, through the College of Kinesiology at the University of Saskatchewan, under the supervision of Dr. Larry Brawley, Canada Research Chair; Tier 1, College of Kinesiology, University of Saskatchewan. James Sessford can be contacted at (306) 966-8719.

The purpose of the study is to understand how your thoughts and feelings about your arthritis relate to your experience with physical activity during a flare. As a participant in this study, you will take part in up to 2 surveys at 2 separate time points: once at the start of the study and once again 4 weeks later. These surveys will be completed online at your convenience within dates specified in the survey. The information obtained from this research may help in directing physical activity programs for arthritis in the future to provide more benefit to the participants.

All information collected from participants in this study will be reported in group form in any report, publication, or presentation resulting from this study.

There are no known risks associated with participation in this study. The data will be kept for a period of five years and will be securely stored in a locked office in our research laboratory. When the data is no longer required it will be destroyed. Confidentiality will be respected. No information that discloses your identity will be released or published.

Your participation is voluntary, and you can answer only those questions with which you are comfortable. The information that is shared will be held in strict confidence and discussed only with the research team. You may withdraw from the research project for any reason, at any time. If you withdraw from the research project at any time, any data that you have contributed will be destroyed at your request.

If you have any questions concerning the research project, please feel free to ask at any point; you are also free to contact the researcher at the number provided if you have other questions. This research project has been approved on ethical grounds by the University of Saskatchewan.
Behavioural Research Ethics Board on (insert date). Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office (306-966-2084). Out of town participants may call collect.

Please respond yes or no to the following statement: “I have read and understood the description provided; I have had an opportunity to ask questions and if I had questions, they have been answered. I consent to participate in the research project, understanding that I may withdraw my consent at any time, without any penalty.”

○ Yes

○ No
Appendix D: Recruitment notice

RESEARCH : INTEREST IN EXERCISE STUDY FOR INDIVIDUALS WITH ARTHRITIS

You are invited to indicate your interest in a research project which will examine individuals’ thoughts about their exercise during an arthritis flare. The study has been approved by the Behavioural Research Ethics Board, University of Saskatchewan (Beh#11-318).

Principal Investigators: James Sessford, BSc; College of Kinesiology, Univ. of Saskatchewan and Dr. L. Brawley, Canada Research Chair; College of Kinesiology, Univ. of Saskatchewan The starting date will be approximately January, 2012.

Study Objectives: 1. To identify persistence strategies used by people with arthritis to maintain their planned exercise during a flare. 2. To describe those who are successful and unsuccessful in maintaining their planned exercise during a flare regarding their thoughts and feelings concerning this experience.

Who is Eligible? Active adults with arthritis who have experienced a flare and intend to engage in structured activity over the four-week study period.

Duration and Type of Study: Eligible participants will take part in an online survey at two separate time points, four weeks apart.

Program Safety: There are no known risks associated with the study.

Expressions of Interest about Participation: Interested and eligible individuals can follow this link to the survey and consent form. Additional questions can be directed to James Sessford by telephone at (306) 966-8719. We look forward to your interest.
Appendix E: Measures

Demographics

Please enter your email address so we can email you a link to the second survey in 4 weeks:

Verify email address:

Has a medical doctor told you that you have arthritis? Yes No

Where do you live (check ✓ one)?
- Canada
- United States
- Other country ___________

What is your age: _____ years

What is your gender (check ✓ one)?
- Female
- Male

Using the following definition for an arthritis “flare”, please answer whether you have experienced a flare in the past:

A flare represents a cluster of symptoms of sufficient duration and intensity to require initiation, change or increase in therapy.

Have you experienced a flare as described above? Yes No

When was the last time you experienced a flare?
- I am currently in a flare

- Last week

- Last month

- Last 3 months

- Last 6 months

- Last 12 months

- Over a year ago
Physical Activity measures

Endurance (Moderate and Vigorous) Physical Activity

We would like you to think about 2 types of endurance or resistance exercise that you may or may not plan to do in your free time: (1) Moderate physical activity and (2) Vigorous physical activity.

(1) Moderate Physical Activity:
- Makes your heart beat faster.
- You would be able to talk but not sing while doing moderate activities.
- On a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10, moderate activity is a 5 or 6.

(2) Vigorous Physical Activity:
- Makes your heart beat really fast and causes you to breathe really quickly.
- You would only be able to say a few words before having to stop to catch your breath.
- On a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10, vigorous activity is a 7 or 8.

We are interested in moderate and/or vigorous activity that you plan to do in your free time for at least 15 minutes at a time. We are not interested in activities that you must do, such as walking from the bus stop to your house or being active while at work.

Because arthritis can impact people in different ways, physical activities like walking, swimming, exercise classes, and biking, can be a moderate activity for some people and a vigorous activity for other people.

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The next set of questions ask ONLY about moderate activity

**Moderate Physical Activity**

**Think about the last 6 months.** On average, how many days in each 7-day period (1-week) did you carry out your plans and **actually do moderate physical activity for at least 15 minutes at a time**?

- _____ 0 days in a week
- _____ 1 day in a week
- _____ 2 days in a week
- _____ 3 days in a week
- _____ 4 days in a week
- _____ 5 days in a week
- _____ 6 days in a week
- _____ 7 days in a week

**How many MINUTES in total** did you do your planned moderate activity **in a typical day**?

- _____ Total minutes in a typical day

**What kinds of moderate activity did you do (check all that apply):**

- _____ Walk
- _____ Swimming class
- _____ Swim laps
- _____ Land-based exercise class
Vigorous Physical Activity

Remember that vigorous activities make your heart beat really fast and cause you to breathe really quickly. You would only be able to say a few words before having to stop to catch your breath. On a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10, vigorous activity is a 7 or 8.

Think about the last 6 months. On average, how many days in each 7-day period (1-week) did you carry out your plans and actually do vigorous physical activity for at least 15 minutes at a time?

_____ 0 days in a week
_____ 1 day in a week
_____ 2 days in a week
_____ 3 days in a week
_____ 4 days in a week
_____ 5 days in a week
_____ 6 days in a week
_____ 7 days in a week

How many MINUTES in total did you do your planned vigorous activity in a typical day?

_____ Total minutes in a typical day
What kinds of vigorous activity did you do (check all that apply):

_____ Walk
_____ Swimming class
_____ Swim laps
_____ Land-based exercise class
_____ Bike
_____ Other (please write the activity here):____________________________________

Deciding about doing planned activity

Now, please think about the next month (4 weeks). Do you have plans to do moderate and/or vigorous activity for at least 15 minutes at a time?

_____ Yes
_____ No

Will you intend to follow through on your plans to do moderate and/or vigorous activity in the next month (4 weeks)?
<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitely will not intend</td>
<td></td>
<td></td>
<td></td>
<td>Maybe will intend</td>
<td></td>
<td></td>
<td></td>
<td>Definitely will intend</td>
</tr>
</tbody>
</table>

62
We are interested in any barriers that you may have when trying to carry out your plans to do physical activity in the next 4 weeks.

For any day, planned physical activity is moderate and/or vigorous endurance and/or resistance exercise for at least 15 minutes.

Barriers can make it difficult or completely stop you from doing your planned activity. We will ask you about barriers due to your arthritis.

For each listed barrier, we will ask you to report:

a) How often you think the barrier will come up in the next 4 weeks.

b) How limiting the barrier will be to your activity.

c) How you will try to cope with the barrier.

d) How sure you are that you can overcome the barrier and be active as planned.

Arthritis-Related Barriers to Activity

1) Will pain from your arthritis be a barrier to you doing your planned physical activity in the next two weeks?

_____ Yes

_____ No (if no, skip to next barrier)
There are times when pain from your arthritis can make it hard or stop you from carrying out your planned physical activity.

Based upon your past experience please estimate how often you expect this to happen in the next 4 weeks?

__________ total number of times

How much will pain from your arthritis limit you from doing your planned activity?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Will not limit my activity</td>
<td>Will moderately limit my activity</td>
<td>Will fully limit my activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What will you try to think about or do so that you overcome this barrier and do your planned activity? This is called a coping strategy.

Please type 1 coping strategy that you will be most likely to use to try to cope with the barrier:

_________________________________________________________________

Have you used this coping strategy IN THE PAST to try to cope with barriers to physical activity?

____ Yes   ____ No
How confident are you in your abilities to use the above strategy to cope with the barrier and be active as planned?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all confident</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Moderately confident</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Completely confident</td>
</tr>
</tbody>
</table>

2) Will joint stiffness form arthritis be a barrier to you doing your planned physical activity in the next 4 weeks?

___ Yes
___ No

There are times when your joints are stiff from your arthritis and make it hard or stop you from carrying out your planned physical activity.

Based upon your past experience please estimate how often you expect this to happen in the next 4 weeks?

__________ total number of times

How much will joint stiffness limit you from doing your planned activity?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Will not limit my activity</td>
<td></td>
<td></td>
<td></td>
<td>Will moderately limit my activity</td>
<td></td>
<td></td>
<td></td>
<td>Will fully limit my activity</td>
</tr>
</tbody>
</table>
activity

What will you do to cope with this barrier, and be active as planned? This is called a coping strategy.

Please type 1 coping strategy that you will be most likely to use to try to cope with the barrier:

_________________________________________________________________

Have you used this coping strategy IN THE PAST to try to cope with barriers to physical activity?

____ Yes    ____ No

How confident are you in your abilities to use the above strategy to cope with the barrier and be active as planned?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
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<td>Completely confident</td>
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3) Will swollen joints from your arthritis be a barrier to you doing your planned physical activity in the next 4 weeks?
There are times when your joints are swollen from your arthritis and make it hard or stop you from carrying out your planned physical activity.

Based upon your past experience please estimate how often you expect this to happen in the next 4 weeks?

__________ total number of times

How much will swollen joints limit you from doing your planned activity?

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What will you do to cope with this barrier, and be active as planned? This is called a coping strategy.

Please type 1 coping strategy that you will be most likely to use to try to cope with the barrier:

_________________________________________________________________
Have you used this coping strategy IN THE PAST to try to cope with barriers to physical activity?

____ Yes     ____No

How confident are you in your abilities to use the above strategy to cope with the barrier and be active as planned?

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</table>

4) Will being tired from your arthritis be a barrier to you doing your planned physical activity in the next 4 weeks?

____ Yes

____ No

There are times when feeling tired from your arthritis can make it hard or stop you from carrying out your planned physical activity.

Based upon your past experience please estimate how often you expect this to happen in the next 4 weeks?

___________ total number of times
How much will **being tired from your arthritis** limit you from doing your planned activity?

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</table>

What will you do to cope with this barrier, and be active as planned? This is called a coping strategy.

Please type 1 coping strategy that you will be most likely to use to try to cope with the barrier:

______________________________________________________________

Have you used this coping strategy IN THE PAST to try to cope with barriers to physical activity?

_____ Yes   _____ No

How confident are you in your abilities to use the above strategy to cope with the barrier and be active as planned?

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</table>
5) Will you have other arthritis-related barriers in the next 4 weeks?

____Yes  _____No

Please type out what this barrier will be:

Based upon your past experience please estimate how often you expect this barrier to make it hard or stop you from being active as planned in the next 4 weeks?

__________ total number of times

How much will this barrier limit you from doing your planned activity?

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What will you do to cope with this barrier, and be active as planned? This is called a coping strategy.

Please type 1 coping strategy that you will be most likely to use to try to cope with the barrier:

_________________________________________________________________

Have you used this coping strategy IN THE PAST to try to cope with barriers to physical activity?

____ Yes   ____No

How confident are you in your abilities to use the above strategy to cope with the barrier and be active as planned?

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*NOTE – The same items will be asked of participants if they were in a flare state and will be prefaced with these instructions and the below definition of a flare:

We are interested in any barriers that you may have when trying to carry out your plans to do physical activity WHILE EXPERIENCING A FLARE in the next 4 weeks.

For any day, planned physical activity is moderate and/or vigorous endurance and/or resistance exercise for at least 15 minutes.

Barriers can make it difficult or completely stop you from doing your planned activity. We will ask you about barriers due to your arthritis.

For each listed barrier, we will ask you to report:

a) How often you think the barrier will come up in the next 4 weeks.

b) How limiting the barrier will be to your activity.

c) How you will try to cope with the barrier.

d) How sure you are that you can overcome the barrier and be active as planned.

“When we use the term ‘flare’, we are referring to those ‘bad days’ of worse/increased symptoms beyond your usual symptoms. Please keep in mind that the ‘bad day’ symptoms are not always the same for every person with arthritis. A flare may also be a series of more than one consecutive ‘bad day’ and can last for varying amounts of time.”.
SRE to schedule/plan

Doing things related to being active as planned

Please keep thinking about doing your planned physical activity.

For any day, planned activity is moderate and/or vigorous aerobic and/or resistance exercise for 15 minutes.

In the next month how confident are you in your abilities to do the following…

1. Make your planned physical activity a priority each week
2. Plan and prepare in advance so that nothing interferes with your planned physical activity each week
3. Rearrange your schedule so that you can fit your planned activity into your day
4. Make sure you do not miss a whole week of your planned physical activity over the next 4 weeks
5. Take time for yourself and be physically active as planned regardless of your other commitments
6. Find a time that most suitably fits your weekly lifestyle so you can do your planned activity
7. Put in 2 or more planned physical activity sessions in a week
8. Stick with the times you have planned to be active each week
9. Change your planned physical activity when needed, in order to stay on schedule (e.g., alter the plans to walk for 30 minutes to fit in a walk for 20 minutes.)
*NOTE – The same items will be asked of participants if they were in a flare state and will be preaced with these instructions and the below definition for a flare:

Please keep thinking about doing your planned physical activity if you were in a flare.

For any day, planned activity is moderate and/or vigorous aerobic and/or resistance exercise for 15 minutes.

In the next month how confident are you in your abilities to do the following if you were in a flare…

“When we use the term ‘flare’, we are referring to those ‘bad days’ of worse/increased symptoms beyond your usual symptoms. Please keep in mind that the ‘bad day’ symptoms are not always the same for every person with arthritis. A flare may also be a series of more than one consecutive ‘bad day’ and can last for varying amounts of time.”.
Extent of Persistence

ANTICIPATORY PERSISTENCE

INSTRUCTIONS: Think of completing your planned physical activity during a flare and the solutions you proposed.

If you encountered a flare in the next 4 weeks, what would your persistence for your planned activity be like?

1. How much *time* are you willing to put forth in order to pursue your planned activity over the next 4 weeks, if you experience a flare?

   1  2  3  4  5  6  7  8  9
   Little to no time  Will spend as much time as it takes

2. How much *effort* are you willing to put forth in the pursuit of your planned activity over the next 4 weeks, if you experience a flare?

   1  2  3  4  5  6  7  8  9
   Little to no effort  Will put forth as much effort as it takes

3. How willing are you to *persist with your solutions* towards the pursuit of your planned activity over the next 4 weeks, if you experience a flare?

   1  2  3  4  5  6  7  8  9
Would not be willing to persist with solutions
Will persist with solutions as much as it takes

4. How much of your attention can you direct toward applying your solutions so you can be active as planned over the next 4 weeks, if you experience a flare?

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<td>As much attention as needed</td>
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Chronic Pain Acceptance Questionnaire

CPAQ

Directions: below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is ‘Always True,’ you would write a 6 in the blank next to that statement.

0               1                   2                3 4 5 6
Never      Very        Seldom      Sometimes       Often       Almost       Always
true     rarely     true      true        true      always        true
true

1. I am getting on with the business of living no matter what my level of arthritis pain is ………
2. My life is going well, even though I have chronic arthritis pain………
3. It’s OK to experience arthritis pain ………
4. I would gladly sacrifice important things in my life to control this arthritis pain better ………
5. It’s not necessary for me to control my arthritis pain in order to handle my life well ………
6. Although things have changed, I am living a normal life despite my chronic arthritis pain ……..
7. I need to concentrate on getting rid of my arthritis pain ………
8. There are many activities I do when I feel arthritis pain ………
9. I lead a full life even though I have chronic arthritis pain………
10. Controlling arthritis pain is less important than any other goals in my life ………
11. My thoughts and feelings about arthritis pain must change before I can take important steps in my life ………
12. Despite the arthritis pain, I am now sticking to a certain course in my life ………
13. Keeping my arthritis pain level under control takes first priority whenever I’m doing something ……..

14. Before I can make any serious plans, I have to get some control over my arthritis pain ……..

15. When my arthritis pain increases, I can still take care of my responsibilities ……..

16. I will have better control over my life if I can control my negative thoughts about arthritis pain ……..

17. I avoid putting myself in situations where my arthritis pain might increase ……..

18. My worries and fears about what arthritis pain will do to me are true ……..

19. It’s a relief to realize that I don’t have to change my arthritis pain to get on with my life ……..

20. I have to struggle to do things when I have arthritis pain………..
### Pain Questionnaire

**Arthritis Pain**

1) How much pain do you have from your arthritis **during a typical day**?

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<th>5</th>
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2) How much pain do you have from your arthritis **during a typical FLARE-UP**?

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3) How much pain do you usually have from your arthritis **when you are NOT flared-up**?

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4) How much pain do you have from your arthritis **at the present moment**?

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