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**A group intervention for motivational deficits: Preliminary investigation of a blended care approach using ambulatory assessment**

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A group intervention for motivational deficits: Preliminary investigation of a  
blended care approach using ambulatory assessment

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**Abstract**

*Objective:* Motivational deficits are an important predictor of functional outcomes in individuals with a serious mental illness such as schizophrenia and mood spectrum disorders. The aim of the present study was to explore the feasibility, acceptability and preliminary efficacy of a group version of “Switch”, an intervention that targets motivational deficits, enriched with an ecological momentary intervention (EMI) approach (i.e., prompts on the participants’ smartphone to encourage the use of trained strategies in their daily life). *Method:* Eight participants with schizophrenia, schizoaffective or major depressive disorder entered the study. The intervention took place twice a week for two months. Assessment measures included traditional evaluations of motivational negative symptoms, apathy, quality of life and daily functioning, in addition to ambulatory assessment methods strategies, including the experience sampling method (ESM) to assess motivation and related processes, and actigraphy (daily step-count) to assess participants’ activity level. *Results:* Four participants were considered as non-completers (followed less than 2/3 of the programme) and four were considered as completers. Only completers presented a decrease in amotivation/apathy and an improvement in functional outcomes after the intervention and at follow-up. Furthermore, mixed-effects ESM models showed significant interaction effects on multiple processes related to motivation, indicating improvements only in completers: heightened motivation, increased engagement in meaningful and effortful activities, better mood, higher levels of confidence, increased frequency of projection into the future (pleasure anticipation) and of positive reminiscence. *Conclusions:* This preliminary investigation provides evidence that Switch may be an effective intervention, with specific effects on motivation and associated processes.

*Keywords:* Motivation, therapy, apathy, daily functioning, quality of life, rehabilitation.

## 1. Introduction

Motivational deficits are important predictors of functional outcomes and quality of life in individuals with schizophrenia (Chang et al., 2019; Savill et al., 2016), and other disorders such as schizoaffective, major depressive and bipolar disorders (Foussias, Agid, Fervaha, & Remington, 2014; Herbener & Harrow, 2004; Kingston et al., 2018; Lewandowski, Cohen, & Ongur, 2020). Yet, adequate treatment schemes for motivational negative symptoms have been largely lacking. In the past few years, however, new interventions that specifically target motivational deficits have been developed and tested (e.g., Favrod et al., 2019; Thonon, Levaux, Della Libera, & Larøi, 2020). For example, our research group has found promising results from the “Switch” intervention provided in individual sessions, with specific improvements on motivational negative symptoms and functional outcomes (Thonon, Levaux, et al., 2020), as well as particular effects on daily life measures of savouring abilities, cognition (e.g., discouraging beliefs), and the engagement in meaningful and effortful activities (Thonon, Van Aubel, Lafit, Della Libera, & Larøi, 2020).

In addition to this individual therapeutic format, we developed a version of the Switch intervention for group settings to meet the increased service demands that are being placed upon mental health systems (Burlingame et al., 2016). Providing interventions in a group setting might indeed be more cost-effective than in individual settings (e.g., Neufeld et al., 2020). Furthermore, group interventions have several interesting advantages in terms of outcomes (Borek & Abraham, 2018; Borek et al., 2019; DeLucia-Waack, Gerrity, Kalodner, & Riva, 2004), namely: participants can receive and provide peer-support (e.g., receiving and giving feedback that bolster self-efficacy); they interact with individuals who experience similar issues and this can have a normalizing effect; participants can learn from their peers (e.g., gaining new perspectives on a problem; developing alternative solutions); and group settings offer an opportunity to develop social skills. Finally, in order to enhance the

## SWITCH – GROUP INTERVENTION FOR MOTIVATIONAL DEFICITS

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3 acquisition and generalisation of certain skills taught during the intervention, we  
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5 complemented the face-to-face group intervention with an ecological momentary intervention  
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7 (EMI or mobile health intervention; Lindhiem, Bennett, Rosen, & Silk, 2015; Myin-Germeys,  
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9 Klippel, Steinhart, & Reininghaus, 2016), by which participants were prompted (through their  
10  
11 smartphones) to use the trained skills in their daily life. This type of blended care has already  
12  
13 been shown feasible and effective in samples of individuals with schizophrenia (Bell, Lim,  
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15 Rossell, & Thomas, 2017; Depp, Perivoliotis, Holden, Dorr, & Granholm, 2019) and other  
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17 mental health disorders (Erbe, Eichert, Riper, & Ebert, 2017).  
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21 The aim of the present study was to examine the feasibility, acceptability and  
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23 preliminary efficacy of the Switch intervention provided in a group setting and complemented  
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25 with EMI. Furthermore, we wished to evaluate the feasibility of an innovative study design  
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27 that included the continuous evaluation of processes related to motivation, using the  
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29 experience sampling method (ESM) (Myin-Germeys et al., 2009) and actigraphy (Wee et al.,  
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31 2019), throughout the different phases of the study (baseline, intervention phase, post-  
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33 intervention and follow-up). ESM involves the repeated self-evaluation of various  
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35 experiences (e.g., thoughts, emotions, behaviours), allowing the evaluation of phenomena as  
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37 they unfold in a person's daily life. This approach shows high ecological validity, as the  
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39 assessment is done recurrently (i.e., allowing a representative sample of the observed  
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41 variables), in the person's natural environment, and in real time. The latter characteristic of  
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43 ESM also has the benefit of reducing retrospective recall bias. We wished to use ESM  
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45 throughout the different phases of the study (i.e., not only at baseline and post-intervention,  
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47 but also during the intervention) to explore possible mechanisms of change related to  
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49 improvement in negative symptoms and functional outcomes. As for actigraphy, a non-  
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51 invasive wearable device (e.g., an activity-band) allows for the objective recording of motor  
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53 activity (e.g., step-count). Actigraphy has been shown to be a good proxy measure for  
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3 motivational negative symptoms (Kluge et al., 2018). Evaluating the feasibility of such a  
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5 study design is essential as, to the best of our knowledge, ambulatory assessments have never  
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7 been used throughout the different phases of a clinical trial.  
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10 First, we hypothesized that, looking at traditional assessment scales, there would be an  
11  
12 improvement in motivation, apathy, functional outcomes and quality of life after completing  
13  
14 the Switch intervention (i.e., after attending at least two-thirds of the intervention; following  
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16 Pos et al., 2019). Second, we expected improvement on daily life measures (ESM and  
17  
18 actigraphy) that represent processes related to motivation and goal attainment (e.g.,  
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20 discouraging beliefs, savouring abilities, engagement in effortful activities, motor activity).  
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22 Third, we wished to explore any possible differences in terms of feasibility and preliminary  
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24 efficacy between participants who completed the intervention and those participants who did  
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26 not complete at least two-thirds of the intervention. Regarding feasibility and acceptability,  
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28 we hypothesized that the intervention would be both feasible (based on intervention  
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30 engagement, both face-to-face and EMI) and well accepted (based on participants feedback).  
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32 Finally, we hypothesized that the ambulatory assessment procedure would be feasible, as  
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34 indicated by a completion rate of at least one third of the ESM prompts (Delespaul, 1995) and  
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36 by the adherence to the activity band (i.e., number of days when it was worn).  
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## 42 2. Methods

### 43 2.1 Participants

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45 Participants were recruited via referral from a psychiatric day care and a psychiatric  
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47 hospital in the French speaking community of Belgium, where both the assessments and  
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49 intervention took place. Furthermore, Eligibility criteria included: (1) age between 18 and 65;  
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51 (2) DSM-V criteria for schizophrenia or schizoaffective disorder (American Psychiatric  
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53 Association, 2013); (3) a good understanding of French. The study was approved by the Liège  
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55 University Hospital Ethics Committee (B707201629105).  
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3 The recruitment process involved the distribution of flyers (see supplementary  
4 material (Figure S1 and Figure S2) and an oral presentation of the goals of the intervention  
5 and the implications for participating in the study (i.e., number of sessions, schedule,  
6 evaluation protocol). Switch was presented to 16 potential participants as an intervention that  
7 aimed to improve motivation to engage in the goals and values that are meaningful to them.  
8 Also, the targets of the intervention (i.e., the various processes involved in the model) were  
9 briefly presented. Twelve participants were then individually approached based on staff  
10 recommendations and participants availability on days of intervention. Nine individuals  
11 provided written informed consent to participate in the study. One did not commence the  
12 intervention. The eight participants were included into one intervention group. All  
13 participants continued their usual multidisciplinary (i.e. psychiatric, psychological, social)  
14 follow-up. At the end of the study, the participants were divided into two groups: completers,  
15 i.e., those who participated in at least 10 sessions out of the 16 sessions; and non-completers,  
16 i.e., those who attended less than 10 sessions. Ten sessions were considered as the minimum  
17 number of sessions needed to go through the entire model and the different strategies.  
18 Furthermore, the same criterion (i.e., following two-thirds of an intervention) has been used in  
19 previous studies (e.g., Pos et al., 2019). The categorization between completers and non-  
20 completers was done to provide a preliminary investigation of the efficacy of the intervention  
21 and to explore potential variables that could explain the drop out from, or reduced  
22 commitment to, the intervention. Sociodemographic and clinical characteristics of the two  
23 groups are reported in Table 1.

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51 [INSERT TABLE 1 HERE]

## 52 2.2 Study design and procedure

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54 This study followed the same evaluation protocol as the one used in a previous study  
55 that evaluated the Switch intervention in individual sessions (see Thonon, van Aubel, et al.,  
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2020). In short, three types of evaluation measures were used: traditional assessment scales of motivational deficits, apathy, quality of life and daily functioning; ambulatory assessment that included ESM questionnaires to evaluate the processes related to motivation and goal-directed behaviours; and actigraphy to measure step-count, as a proxy measure of motivational negative symptoms (Kluge et al., 2018). The traditional assessment scales were completed before and after the intervention, as well as at a three-months follow-up. The ESM and step-count started two weeks before the intervention (T0) and continued during the two months of intervention (T1), during two weeks after the intervention (T2), and during two weeks at follow-up (T3).

## 2.3 Measures

### 2.3.1 Acceptability and feasibility

Acceptability and feasibility of the Switch intervention was evaluated based on the intervention (face-to-face) attendance rate, on the reaction rates to the EMI prompts (see 2.4 Intervention: Switch), i.e., the number of times participants opened the app when being prompted, and on participants' feedback regarding the intervention (open-ended comments collected during the last session of the group programme). Feasibility of the ESM study design was assessed based on the ESM completion rate and the number of days where the activity band was used.

### 2.3.2 Traditional measures

Participants completed the motivation dimension of the French version (Mucci et al., 2019) of the Brief Negative Symptoms Scale (BNSS-mot) (Kirkpatrick et al., 2011). The evaluator scored the BNSS based on video or audio recordings and was blind in terms of the time (pre, post and follow-up) of evaluation. Participants also completed the Schizophrenia - Quality of Life questionnaire (S-QoL) (Auquier et al., 2003). Informants (staff members) were interviewed to provide an external understanding regarding participants' level of



functioning via (i) the informant version of the Lille Apathy Rating Scale (LARS-i) (Dujardin, Sockeel, Delliaux, Destée, & Defebvre, 2008), which is a structured interview, and (ii) the Functional Remission of General Schizophrenia (FROGS) (Llorca et al., 2009), which is a semi-structure interview.

### 2.3.3 ESM questionnaire

During the baseline phase (2 weeks), participants received pseudo-random prompts, five times a day, from the MetricWire app (<https://metricwire.com/>). During the intervention (2 months), in order to reduce the burden on the participants, they received pseudo-random prompts three times a day. After the end of the intervention, participants were prompted again 5 times a day for another 2 weeks. Note that as none of the participants completed a sufficient number of prompts after the end of the intervention and at follow-up, the post-assessment ESM observations (T2 and T3) were not taken into consideration.

The ESM questionnaire (see Thonon, van Aubel, et al., 2020) included 14 questions, plus three supplementary (branched) questions, i.e., which appeared depending on participant's answer to previous questions. Variables measured via the questionnaire included Activity's meaning (how important is the activity), Motivation, Wanting to give up, Effort, Energy, Mood, Confidence, Discouraging thoughts, Present enjoyment, Projection into the future, Reminiscence. These variables were rated on a 7-point Likert scale (1 = Not at all true; 7 = Totally true). The questionnaire also included nominal variables: Coping (in the presence of discouraging thoughts), Social contact (who the person was with), Activities (what she/he was doing), Initiation (was the activity initiated by her/himself or encouraged by someone else).

### 2.3.4 Step count

Participants were provided with an activity band (MiBand 3, Xiaomi) which they had to wear at all times, during the baseline, intervention, post-measurement, and follow-up phases of the study. The total amount of steps per day was collected through the Mi Fit app.

#### **2.4 Intervention: Switch**

The Switch intervention was created based on a model of motivation and goal directed behaviours and followed the same principles as previously described (Thonon, Levaux, et al., 2020; Thonon, Van Aubel, et al., 2020). Furthermore, different principles of learning were adhered to in order to enhance the potential of the intervention in the group format. First, we made sure that the different strategies provided in Switch could be assimilated through different learning processes, i.e., concrete experience, active experimentation, reflective observation, and abstract conceptualisation (for a description, see Kolb & Kolb, 2009). Second, the presentation was as interactive as possible (e.g., using serious games, requiring participants to move in the room during the session), using different medias (videos, images, sound clips, paper booklet, etc.), and varying the formats of the exercises (e.g., Hourst & Thiagarajan, 2019). For example, concerning this latter element, the learning usually started with individual reflexions, followed by sharing, experimenting and debriefing, both in pairs and in the whole group. This was done to stimulate peer support and to increase generalisation to everyday life, by learning from others' experiences. Finally, the therapists participated in most of the exercises themselves, to offer a model to follow (Nguyen, Favrod, Frobort, & Pellet, 2017) and to increase normalisation. Table 2 briefly summarizes the content of the different sessions.

[INSERT TABLE 2 HERE]

The two-hour sessions (that included a 10-minute break) took place twice a week for two months. The booster session took place two months later. The intervention was administered by two experienced psychologists (both were trained psychotherapists). The

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3 rationale for each strategy and the trainings were presented through a PowerPoint presentation  
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5 (all materials in French can be requested from the corresponding author). The participants  
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7 were provided with a folder containing the rationale for the different strategies, as well as  
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9 exercises to be completed during the sessions or at home. At the 11<sup>th</sup> session, they were also  
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11 provided with small reminder cards (that could fit in a wallet), with a brief presentation of  
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13 each strategy (e.g., What are my values? How can I cope with dysfunctional attitudes?).  
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15 Finally, after one month of intervention, different prompts were sent through the ESM app to  
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17 boost certain strategies outside of the face-to-face sessions, within participants' daily life  
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19 environment (i.e., EMI). Participants were prompted in the morning and invited to look  
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21 forward to upcoming events/activities (projection prompts). An mp3 could be listened to (via  
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23 the app) to be guided into multi-sensory imagery (for projection into the future) (see Figure  
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25 1). Moreover, a prompt was sent in the evening to invite participants to look back at their day  
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27 and reminisce about past positive events during the day (reminiscence prompts). Finally, a  
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29 prompt every two to four days enquired about participants' goal pursuit (action prompts),  
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31 congratulating participants when actions had been initiated and encouraging them to initiate  
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33 the action plan if it had not yet been done.  
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40 [INSERT FIGURE 1 HERE]  
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## 42 2.5 Analyses 43

44 We used charts and descriptive analyses to present absolute changes on scores from the  
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46 BNSS, LARS-i, FROGS and S-QoL. We calculated Cohen's *d* coefficients based on paired-  
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48 samples *t*-tests to provide effect sizes. Given the sample size, the significance of those tests  
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50 was not considered. Results on the subscales of the BNSS can be found in Supplementary  
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52 data (Table S1).  
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55 For step-count and ESM ordinal variables (i.e., with an answer format consisting of a 7-  
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57 point Likert scale), we provided descriptive statistics for each group and for each phase. In  
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3 order to evaluate the effects of the intervention on these outcomes, we conducted a repeated  
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5 measures mixed-effects model for each outcome variable (steps and ordinal variables only),  
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7 with fixed effects for the Phase (baseline = 0, vs. intervention = 1), the Group (non-  
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9 completers = 0, vs. completers = 1), an interaction effect (Phase x Group), and random  
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11 intercepts corresponding to the level of the individual<sup>1</sup>. Such models have the advantage of  
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13 acknowledging individual differences. In the case of missing data, the analysis omitted the  
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15 entire row including the missing observation. The  $\beta$  standardized coefficients in Table 4  
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17 indicate the magnitude of the effects. Finally, for nominal ESM variables, we created pie-  
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19 charts for each group and for each phase.  
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### 24 **3. Results**

#### 25 **3.1 Participants**

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28 In Table 1, participants' sociodemographic characteristics and information regarding  
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30 participation in the Switch intervention are presented. Clinical characteristics from baseline  
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32 are presented in Figure 2. On a descriptive level, it appears that participants from the  
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34 completers group were, on average, a little older, had been ill for longer, were less educated,  
35  
36 had more severe motivational deficits and had lower levels of functioning. Completers also  
37  
38 had more severe motivational deficits and had lower levels of functioning. Completers also  
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40 appeared to report fewer discouraging thoughts and more passive activities than non-  
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42 completers (see Figure 3).  
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#### 45 **3.2 Acceptability and feasibility of the intervention and the evaluation procedure**

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53 <sup>1</sup> Supplementary analyses were conducted using Number of sessions attended instead of Group (see  
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55 supplementary material, Table S2). This was done to observe if there was a “dose-effect” of the intervention.  
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57 Furthermore, the categorisation between completers and non-completers implied that the number of sessions  
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59 attended by some participants differed only slightly (i.e., being just below or above the 10-session threshold).  
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Thus, repeated measures mixed-effects model for each ordinal variable included fixed effects for Phase (baseline  
= 0, vs. intervention = 1) and Number of sessions, an interaction effect (Phase x Number of sessions), and  
random intercepts corresponding to the level of the individual.

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3 Regarding the acceptability and feasibility of the Switch intervention, on average, participants  
4 who entered the intervention followed 9.5 sessions ( $SD = 3.85$ ) out of the 17 sessions that  
5 were organised (56%, including the booster session). Within the non-completers, two  
6 participants (2g-3 and 2g-5) interrupted their participation after 6 and 3 sessions, respectively.  
7  
8 The other non-completers did not actively drop out of the intervention, but came on an  
9 irregular basis: 2g-1 came approximately one session out of two (i.e., on days when the  
10 participant was already in the vicinity), until the end of the intervention (excluding the booster  
11 session), whereas 2g-7 was unable to attend the last five sessions due to holidays, but was  
12 present for the booster session. On average, participants reacted to around 50% of the  
13 prompts: 39.08% of the projection prompts, 61.46% of the reminiscence prompts, and 58.33%  
14 of the action prompts. Finally, qualitative feedback from participants in response to several  
15 questions regarding their appreciation of the intervention can be found in Table 3. In general,  
16 the intervention appeared to be well appreciated. Furthermore, the advantages of the group  
17 format were raised. Also, several strategies that were taught during the programme were  
18 spontaneously highlighted as being appreciated or useful: focusing on goals and planning,  
19 looking forward (or pleasure anticipation), coping with negative cognitions (namely via  
20 mindfulness and cognitive defusion), and problem solving (e.g., “give ideas to move forward”  
21 refers to the exercises to train solution seeking skills).

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44 [INSERT TABLE 3 HERE]

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47 Regarding the feasibility of the evaluation protocol, it should be noted that one  
48 participant (2g-5) refused to adhere to both ESM and actigraphy measures (he did not wish to  
49 use this technology), one participant (2g-8) had technical issues with the MetricWire app that  
50 prevented the completion of the ESM, and one participant did not use the activity-band (2g-  
51 4), for no particular reason. Regarding the engagement with the ESM, on average, participants  
52 completed 33.33 ( $SD = 4.32$ ; min = 27; max = 40) prompts out of 70 in the baseline phase  
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(48%), and 45.83 ( $SD = 12.83$ ; min = 23; max = 58) prompts out of 180 in the intervention phase (25%). Engagement with the ESM procedure radically dropped at post-assessment and follow-up (<10% of completion rate). Note that one participant (2g-4) had health issues that prevented him to continue the evaluation, from post-assessment on, and one participant (2g-7) was re-hospitalized at follow-up due to drug consumption, which also prevented the continuation of the evaluation. Finally, regarding activity measures, at baseline, participants wore the activity-band for the whole 14 days, except for one who missed one day (engagement of 99%). During the intervention phase, it is more difficult to estimate the number of days where the activity-band was worn, as we encountered data collection issues with the Mi Fit app, which did not save all the data (probably due to synchronisation problems with the activity-band). Nonetheless, on average, step-count was collected for 74% of the 60 days of the intervention phase.

### 3.3 Traditional measures

On a descriptive level (see Figure 2), at post-assessment, non-completers' scores on BNSS Motivation increased ( $d = 0.88$ ), showing a worsening of their motivational deficits, while completers' scores decreased ( $d = -1.73$ ), indicating an important improvement. At follow-up, completers' scores still indicated a large improvement compared to baseline ( $d = -1.10$ ). Regarding the LARS-i, non-completers' scores increased at post-assessment ( $d = 4.19$ ), showing a substantial worsening of apathy, whereas completers' scores decreased ( $d = -1.05$ ), indicating a reduction in apathy. At follow-up, the apathy scores of completers were still lower compared to baseline, indicating a maintenance of the improvement in the moderate range ( $d = -0.43$ ). Regarding the FROGS, non-completers' scores decreased at post-assessment ( $d = -0.80$ ), indicating a worsening of functional outcomes, whereas completers' scores increased ( $d = 0.59$ ), showing improved functional outcomes. At follow-up, the completers' improvement was on average maintained ( $d = 0.75$ ). As for the S-QoL at post-

assessment, non-completers' scores only slightly increased ( $d = 0.23$ ) and completers' scores increased moderately ( $d = 0.61$ ), representing an improved quality of life. At follow-up, completers' scores no longer indicated an improvement ( $d = -0.17$ ). Looking at the individual scores, however, there is no clear general worsening or improvement on quality of life, in either group.

[INSERT FIGURE 2 HERE]

### 3.4 Daily life measures

Descriptive statistics regarding the ESM outcomes and step-count are presented in Table 4, along with the interaction effects (Phase x Group) from the repeated measures mixed-effects models. There was a significant interaction effect on Activity's meaning, with completers engaging in more meaningful activities during the intervention, compared to non-completers who did not. There was a significant interaction effect on Motivation, in that motivation increased in the intervention phase in the completers group, whereas motivation decreased slightly in the non-completers group. The significant interaction effect on Wanting to give up indicates that completers were slightly more likely to want to give up what they were undertaking during the intervention phase, in comparison to non-completers who were slightly less likely to want to give up. There was a significant interaction effect on mood, so that mood increased during the intervention solely in the completers group. Mood did not appear to change in the non-completers. The interaction effect on Confidence indicates a trend towards increasing confidence during the intervention in the completers group, and decreasing confidence in the non-completers group. Finally, we found a significant interaction effect on Projection into the future and Reminiscence, indicating that the frequency of the use of both savouring skills increased during the intervention in the completers group, while it slightly decreased in the non-completers group. Note that there was also a significant phase effect for Energy, so that energy levels decreased slightly in both groups during the intervention phase

( $\beta = -0.17$ ;  $p = .03$ ). No significant effects were found for discouraging beliefs, present enjoyment, nor steps.

[INSERT TABLE 4 HERE]

On a descriptive level (see Figure 3), coping strategies in the face of discouraging beliefs did not seem to change in either group. Non-completers appeared to spend more time alone during the intervention phase, while there was no apparent difference between phases regarding social contact in the completers' group. Activities did not appear to change for non-completers. Completers reported fewer occurrences of doing nothing at all, and more occurrences of resting or engaging in passive activities. Both groups appeared to report slightly more often doing nothing in particular during the intervention (see Figure 3, Initiation).

[INSERT FIGURE 3 HERE]

### **Discussion**

This study aimed to explore the acceptability, feasibility and preliminary efficacy of the Switch intervention delivered in a group setting and enriched with EMI, as well as the feasibility of ambulatory assessment throughout the different phases of the study. Overall, our preliminary findings confirm most of our hypotheses, and shed some light on possible mechanisms of change regarding the improvement on motivation and functional outcomes.

First, regarding the preliminary efficacy of the intervention, taking the findings on traditional assessments together, individuals who completed the intervention showed a large improvement on motivation and apathy after the intervention as well as at follow-up, although to a lesser degree (moderate to large improvement). Non-completers on the other hand, showed a worsening of motivational deficits and apathy at post-assessment. We observed similar findings regarding daily functioning, where completers showed an improvement after the intervention and at follow-up, while non-completers showed worse functional outcomes at



## SWITCH – GROUP INTERVENTION FOR MOTIVATIONAL DEFICITS

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2  
3 post-assessment. Nevertheless, the categorisation between completers and non-completers  
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5 might have introduced a certain number of confounders, such as different personal  
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7 characteristics that may have been related to study completion or non-completion. At  
8  
9 baseline, completers had more severe symptoms, worse functional outcomes and lived in  
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11 more supervised housing conditions compared to the non-completers. Those individuals with  
12  
13 the most severe symptoms may be the ones who gain more from the intervention.  
14  
15 Furthermore, the fact that more completers lived in supervised housing conditions might play  
16  
17 a role in the engagement with the intervention, as members of the staff are more often present  
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19 and therefore there may be more occasions for them to encourage and reinforce attendance  
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21 (e.g., reminding them to leave in time, showing interest in their participation). Nonetheless,  
22  
23 all participants (both completers and non-completers) received regular reminders of the  
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25 intervention sessions via SMS. It is not clear why non-completers showed a deterioration in  
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27 amotivation/apathy symptoms and daily functioning and whether this deterioration was a  
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29 cause or result of the intervention drop-out or little engagement, or whether there is no  
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31 association with intervention engagement. Quality of life did not seem to change in a coherent  
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33 manner in either group. Although this does not concur with our hypotheses, this finding adds  
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35 to previous literature showing that quality of life is a difficult target to ameliorate (for a  
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37 review, see Laws, Darlington, Kondel, McKenna, & Jauhar, 2018).  
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45 Second, participants who completed the intervention showed a coherent pattern of  
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47 improvement, not only on traditional assessments, but also on the ESM variables. Indeed, the  
48  
49 decrease of motivational deficits and apathy, and the improvement on functional outcomes  
50  
51 were concurrent with improvement on daily life variables during the intervention: namely, we  
52  
53 observed increases in motivation, in engagement in meaningful and effortful activities, in  
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55 mood, in confidence (although small in magnitude), and observed larger increases in  
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57 savouring processes, i.e., projection into the future and reminiscence. Based on the significant  
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3 interaction effects that were found in the mixed-effects models, these improvements may be  
4  
5 attributable to the Switch intervention. It should be noted that the larger effects were found on  
6  
7 the savouring skills that had also been the object of EMI (i.e., morning and evening prompts  
8  
9 to encourage positive projection into the future and reminiscence). Future studies should use  
10  
11 more complex modelling to test whether processes such as projection into the future (or  
12  
13 pleasure anticipation), positive reminiscence and confidence (or self-efficacy) represent  
14  
15 mechanisms of change responsible for the increase in motivation and goal-directed  
16  
17 behaviours. On the contrary, it could be that the intervention supported more meaningful  
18  
19 goal-directed behaviours, which might be the primary mechanism through which participants'  
20  
21 motivation, confidence and savouring skills increased subsequently. Additional studies  
22  
23 therefore need to focus on the dynamical relationships between those processes. Note that no  
24  
25 effects were found regarding step-count. This could be due to a ceiling effect, given that  
26  
27 participants already showed high numbers of daily steps (i.e., around 10 000 a day).  
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33       Regarding the feasibility and acceptability of the intervention, the level of engagement  
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35 was moderate, including a reasonable actual dropout (25% actively interrupted their  
36  
37 participation) and an average attendance rate of more than 50% of both the face-to-face group  
38  
39 sessions and the EMI prompts. The attendance rate could nonetheless be improved. A number  
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41 of participants had to travel to the venue where the intervention took place, which might have  
42  
43 hindered participation. Providing the intervention in their home setting or in usual settings  
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45 outside of the home (e.g., day centre) would potentially increase the attendance rate.  
46  
47 Nevertheless, based on participants' feedback, the intervention was well accepted and well  
48  
49 comprehended. Participants were indeed highly engaged in the various exercises during the  
50  
51 sessions. A key element that seemed to help motivate participants and that led to high levels  
52  
53 of in-session engagement, was that particular attention was made as to how the intervention  
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55 was provided. Indeed, therapists applied various learning (Kolb & Kolb, 2009) and  
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## SWITCH – GROUP INTERVENTION FOR MOTIVATIONAL DEFICITS

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3 facilitating strategies (e.g., varying the settings of the exercises in order to make participants  
4 active, using different types of media, getting participants to stand up and move around). In  
5 terms of the content of the intervention, each participant highlighted in their feedback various  
6 strategies that had been taught. The multifactorial feature of the intervention thus appears to  
7 be beneficial. Within a group, each participant might indeed need to focus on different  
8 strategies. The Switch intervention could nonetheless be improved by progressively adding  
9 EMI prompts, and extending those to other strategies (e.g., planning, coping with negative  
10 thoughts). This could build further bridges between the intervention and participants' daily  
11 life, increasing the mastering of the many strategies taught during the intervention. Such EMI  
12 could continue after the end of the face-to-face group intervention, in order to ensure the  
13 maintenance of the benefits.  
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28 “A few comments should be shared regarding the adaptation of the individual version  
29 of the Switch intervention to the group setting. First, the group format appeared to be well  
30 appreciated by some participants who enjoyed sharing their projects with others and receiving  
31 their support. Nevertheless, the group setting might have been a drawback for other  
32 participants who were more inclined to upward social comparison (e.g., comparing  
33 themselves to other individuals in the group who are doing better) (Festinger, 1954). This  
34 could have played a role in the engagement with the intervention and in the outcomes (Dibb  
35 & Yardley, 2006). For instance, a person who had the impression that he or she was making  
36 less progress compared to the others, could feel discouraged, which would have the opposite  
37 effect of the motivating effect expected from the Switch intervention. Thus, this kind of social  
38 comparison merits a particular focus, as it may negatively impact motivation.  
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53 Second, the two therapists found that the group format made it more difficult for them  
54 to help participants identify and follow up on individual goals and values. A first difficulty  
55 appeared to be the identification of individual goals. We used a set of different tools to  
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## SWITCH – GROUP INTERVENTION FOR MOTIVATIONAL DEFICITS

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3 explore personal goals and values. One advantage of our approach is that participants  
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5 generally realise that there is a wide range of goals that they could progress towards, opening  
6  
7 the realm of possibilities and eliciting hope. However, the difficulty was then to help each  
8  
9 participant to pick a goal that would both bring a significant change in their life and be  
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11 attainable. Another difficulty was to follow the same one or two goals from the beginning to  
12  
13 the end of the intervention. Participants' priorities changed, making it difficult to maintain  
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15 direction. Goal-progress seemed to go astray in some cases, preventing goal attainment,  
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17 especially in those participants with apparently more disorganisation symptoms. Even if  
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19 Switch allowed each participant to use different strategies for goals relating to various life  
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21 domains (e.g. social relationships, leisure, study), for some it seemed that no domain was  
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23 improved in a meaningful way. This might explain why we found benefits on general daily  
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25 functioning (FROGS), but did not consistently observe benefits on quality of life (s-QoL). In  
26  
27 order to have a significant effect on quality of life, more changes in daily life might be  
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29 needed. In order to do so, the group version of Switch may need to narrow its focus on  
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31 specific life domains that are known to be related to quality of life or that are particularly  
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33 affected in individuals with schizophrenia, for example social relationships and physical  
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35 health (Dong et al., 2019). Finally, a difficulty stemming from the group setting and a  
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37 difficulty to stick to one personal goal, was related to action initiation. At the end of each  
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39 session (from the sixth session onwards), participants were asked to imagine themselves  
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41 engaging in one task included in their action plan (i.e. projection into the future through  
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43 imagery). We were guided by implementation intention strategies in order to foster action  
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45 initiation. However, more time should have been dedicated to this exercise. Furthermore,  
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47 participants' attention might have been already switched off and the therapists did not always  
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49 have the time to check if the implementation intention was properly executed for each  
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3 participant. In future group interventions, the closure of sessions probably needs to start  
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5 earlier (i.e., at least 15 minutes before the end).  
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8 A final note concerning the group format of the Switch intervention concerns its main  
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10 advantage. The therapists noticed that progress towards a goal common to the whole group  
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12 (which involved participating in an activity all together, i.e., going on a picnic) was an  
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14 important factor driving motivation and goal-directed behaviours. Participants seemed to be  
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16 more engaged in the planning of this common goal, compared to their individual goals. For  
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18 the common goal, each participant was responsible for different parts of the activity (e.g.,  
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20 planning, checking bus schedules, preparing/buying food/drinks, bringing specific material).  
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22 Sharing the “load”, the social nature of the activity and the perspective of a high chance of  
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24 success if everyone participated, might all have been important factors that drove  
25  
26 commitment. Future interventions could focus more on these shared goals by setting a goal  
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28 for the whole group earlier on, that is, before setting individual goals. An alternative could be  
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30 to have participants work in pairs on their individual goals, i.e., each member of the pair  
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32 works on their individual goal, but also helps and supports the other member in attaining  
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34 his/her individual goal. This way, social interactions and social support are also boosted  
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36 within the intervention itself.  
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42 In sum, the group format of the Switch intervention seemed to be well appreciated and  
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44 to hold advantages, in spite of the difficulties regarding goal identification and attainment.  
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46 Working together towards a common goal seemed to foster more motivation and goal-  
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48 directed behaviours. Furthermore, participants enjoyed sharing their projects and planning for  
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50 them. Thinking about their personal goals seemed to be unusual for them. This approach is in  
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52 line with the recovery movement and a partnership approach where patients are actors of their  
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54 recovery and their life choices (Carman et al., 2013; Pomey et al., 2015).  
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3           Regarding the feasibility of the study design, the adherence to the daily evaluation  
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5 procedure (i.e., ESM and actigraphy) partly confirms our hypotheses as it was satisfactory  
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7 during the baseline phase, but more problematic in the following phases of the study.  
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10          Regarding ESM, the baseline completion rate of around 48% is comparable to some studies  
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12 (e.g., Ben-Zeev, McHugo, Xie, Dobbins, & Young, 2012; van Os et al., 2017), but lower  
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14 compared to others reporting an average response-rate of 70-80% (Kimhy, Myin-Germeys,  
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16 Palmier-Claus, & Swendsen, 2012). Nevertheless, it confirms our hypothesis and meets the  
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18 recommendations of a completion rate of minimum one-third of ESM prompts (Delespaul,  
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20 1995). The completion rate during the intervention phase (around 25%) is difficult to compare  
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22 to other studies. Indeed, to the best of our knowledge, no previous study examining an  
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24 intervention has included continuous ambulatory assessment (ESM or similar types of  
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26 assessment strategies) during the intervention phase, whether it be for individuals with  
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28 schizophrenia or another diagnosis. The only comparable study we can refer to (van Aubel et  
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30 al., 2021) has used 8 prompts per day, three consecutive days per week, during an 8-week  
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32 intervention, in individuals at ultra-high risk for psychosis or with first-episode of psychosis.  
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34 Similar to our findings, participants in that study responded to 25% of the prompts. Study  
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36 designs like the latter and the one in the present study are clearly more challenging for  
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38 participants compared to the majority of studies that use ESM for isolated periods (i.e., only  
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40 one assessment period) and for much shorter durations (e.g. a week) (Myin-Germeys et al.,  
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42 2018). Nonetheless, the ESM completion rate during the intervention phase did not reach the  
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44 requested minimum of 33% of valid responses. As for the activity-band, its constant use  
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46 during the baseline phase in all participants indicates a good level of acceptability and  
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48 feasibility of this measurement strategy. The feasibility of the continuous evaluation protocol  
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50 could nevertheless be improved. First, the ESM sampling frequency during the intervention  
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52 phase could be the same than during the other phases (i.e., five prompts per day, instead of  
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three per day). As opposed to what we originally assumed, a recent study observed that increased sampling frequency does not increase the burden of the procedure (Eisele et al., 2020). With only three prompts per day, there is an increased chance that participants simply missed the notifications or some of the notifications and were not even bothered by them. Second, the inclusion of these diverse evaluations (i.e., ESM and actigraphy) would have required more staff (Christensen, Barrett, Bliss-Moreau, Lebo, & Kaschub, 2003; WHO, 2016) in order to monitor and solve potential technical or adherence problems. For future studies, a research-assistant could be responsible for monitoring the ESM questionnaires adherence and for contacting participants in case of a certain number of continuous missed prompts, for example, or once in a while in order to prevent high numbers of missed prompts. Furthermore, a research-assistant could be present at the intervention sessions and be in charge of collecting step-count data, ensuring that activity-bands were charged and used continuously. Finally, in order to increase the adherence to the ESM procedure, money incentive, regular drawings for small prizes, or occasional gift vouchers could be useful for future studies (Christensen et al., 2003).

This study is limited by its preliminary nature, namely regarding the small sample size and the lack of a control group. Furthermore, although the adherence to the ambulatory assessment was adequate for the whole sample, the low ESM completion rates for certain participants resulted in a reduced number of observations. Our results should thus be considered with caution and do not warrant a strong conclusion regarding the efficacy of the intervention. Another limitation concerns the design of our study, which does not allow distinguishing between the effect of the face-to-face intervention and the possible additional effect of the elements of EMI. Additionally, although general feedback from participants was collected, there was no feedback questionnaire in which participants could have indicated the usefulness of the specific parts of the intervention (e.g., group dynamics, specific strategies,



EMI elements). In future studies, the face-to-face group intervention condition could be compared with a condition in which a blended approach is taken, i.e., combining the regular intervention with EMI.

The design of our study is innovative and presents many strengths. First, we combined different types of evaluation, including continuous subjective (i.e., ESM) and objective (i.e., step-count) daily life measures, thus guaranteeing a high level of ecological validity (Shiffman, Stone, & Hufford, 2008). Pre-post traditional assessments, although important to provide a broad picture of change, do not capture the “film” of how change occurs (Wichers et al., 2011). Collecting intensive longitudinal data through ESM, not only during baseline and post-intervention, but also throughout the intervention, allows the all-important exploration of how and when change occurs, through which – interacting – mechanisms. This approach is essential to further refine therapeutic interventions (i.e., increasing the focus on processes responsible for the improvement on the desired outcomes). Future studies should include this kind of continuous, daily-life assessment to evaluate the contribution of possible mechanisms of change in the improvement on primary outcomes of motivation, daily functioning and quality of life. Second, the group intervention was designed in a very meticulous way: it is based on a theoretical model of motivation and goal-directed behaviours which allows targeting highly relevant skills to develop; the addition of EMI increases the likelihood to generalise these skills to daily life; and finally, techniques used for group facilitation were based on well-founded and validated techniques to support acquisition and foster interactive learning.

In conclusion, the Switch intervention, as delivered in a group format and combined with EMI, showed preliminary evidence of its benefits for individuals with moderately severe to severe negative symptoms, in terms of their motivational symptoms, their functional outcomes, their daily motivation, engagement in meaningful and effortful activities, mood,



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3 confidence and savouring skills. Future studies should include larger samples, a control  
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5 condition and a randomisation procedure in order to further examine the efficacy and the  
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7 internal validity of the Switch intervention. Furthermore, field tests should be performed in  
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9 order to evaluate the effectiveness of the intervention, i.e., to evaluate if it works in real-world  
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11 conditions and to assess its external validity (Ernst & Pittler, 2006). This is of particular  
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13 importance since mental health services include users with motivational deficits and various  
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15 diagnoses and comorbidities (e.g., patients with substance use disorders), who could benefit  
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17 from the Switch intervention and who should be included in effectiveness clinical trials.  
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### 23 24 ***Data statement***

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26 The datasets generated and analysed during the current study, as well as the  
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28 intervention materials are available from the first author.  
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### 33 34 ***Biographical statement***

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12 psychosis.  
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20 technology in assessment and treatment contexts for various psychological disorders,  
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22 especially schizophrenia.  
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Table 1

*Sociodemographic and clinical characteristics, and number of completed Switch sessions.*

Participant	Non-completers					Completers				
	2g-1	2g-3	2g-5	2g-7	M (SD)	2g-4	2g-6	2g-8	2g-10	M (SD)
Age	40	29	28	28	31.25 (5.85)	47	26	25	46	36 (12.14)
Diagnosis	SZ	SZ	SZ	SZ		SZA	SZ	SZ	MDD	
Illness duration (years)	4	10	10	9	8.25 (2.87)	21	11	6	6	11 (7.07)
Antipsychotic Medication	Arip <sup>a</sup>	Arip <sup>a</sup>	Arip <sup>a</sup>	Arip <sup>a</sup>		Risp <sup>a</sup>	Cloz <sup>a</sup>	Arip <sup>a</sup>	Arip <sup>a</sup>	
			Clot <sup>a</sup>					Ol <sup>a</sup>		
								Pip <sup>b</sup>		
Education (years)	14	9	6	12	10.25 (3.50)	12	9	6	8	8.75 (2.50)

Living conditions	Independent	Supervised housing	Psychiatric nursing home	Supervised housing		Psychiatric nursing home	With family	Psychiatric nursing home	Psychiatric nursing home	
Number of sessions	9 + 0	6 + 0	3 + 0	7 + 1	6.50	14 + 0	14 + 1	10 + 0	11 + 1	12.75
+ booster session					(2.64)					(2.22)

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*Notes.*

Arip = Aripiprazole; Clot = Clotiapine; Cloz = Clozapine; Ol = Olanzapine; Pip = Pipamperone; Risp = Risperidone; <sup>a</sup> atypical antipsychotic; <sup>b</sup> typical antipsychotic.

Table 2

*Content of the sessions of the Switch programme.*

Session	Brief content description
1	Presentation of the model and illustrations.
2	Self-esteem: identification of personal strengths, qualities, successes, resources.
3	Enjoying the present moment: introduction to mindfulness. <sup>a</sup> Values: identification of personal values.
4	Values and goals: identification of personal values and goals. Selection of one goal and a related value.
5	Planning: subdividing chosen goal into accessible sub-goals or steps.
6	Planning: creating an action plan. Action initiation: tricks to initiate an action plan. Looking forward to the future: multi-sensory imagery exercises to help projection into the future. <sup>b</sup>
7	Remembering: reminiscence training and rationale. <sup>c</sup> Motivational boost: "Switch" decisional balance and quick solution finding.
8	Dysfunctional attitudes: identifying discouraging thoughts. Action initiation: implementation intention.
9	Dysfunctional attitudes: coping with discouraging thoughts with alternative, more constructive thoughts (i.e., cognitive restructuring). Check-up: where do we stand regarding our goals/values?
10	Dysfunctional attitudes: coping with discouraging thoughts with cognitive defusion. Problem resolution: strategies to seek solutions.
11	Check-up: what have we learnt so far?

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3 Summary by the participants of the different strategies and a presentation of the  
4 reminder cards that were given to the participants.  
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7 Choice of a goal to be followed by the whole group (e.g., organising an activity  
8 together).  
9

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12 12-15 Pursuit of personal goals and group goals.  
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14 The participants were invited to explain which strategy to use in order to pursue  
15 their personal goal.  
16

17 The group goal was pursued by following the Switch model. Each participant  
18 was responsible for a certain task or for explaining and using a strategy  
19 regarding the goal.  
20

21 Progressively, the participants were invited to run certain exercises themselves:  
22 the mindfulness training at the beginning of each session and the projection into  
23 the future at the end of each session.  
24

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27 16 Completion of the group goal (e.g., picnic).  
28

29 Summary of the different strategies that were used regarding the group goal.  
30

31 Feedback from the participants.  
32

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35 17 Booster session: check-up and reminder of the different strategies.  
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42 <sup>a</sup> From this session on, each session started with a short mindfulness exercise, each time  
43 focusing on a different modality (e.g., physical sensations, sounds, thoughts, smells) or a  
44 mix.  
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49 <sup>b</sup> From this session on, each session ended with a multi-sensory projection exercise  
50 (imagery) to boost action initiation and goal attainment. The projection goes through  
51 different modalities (e.g., visualisation of the achieved goal or the process to attain it,  
52 imagining the sounds, the sensations, the thoughts), depending on the chosen  
53 action/goal/value.  
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3 <sup>c</sup> Already from the second session on, each session began with a reminiscence exercise, and  
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5 focused on what had been done in the previous session and what participants had done  
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7 since then.  
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For Peer Review

Table 3

*Feedback provided by the participants (both completers and non-completers).*

Participant	<i>What did you like about Switch?</i>	<i>What strategy did you find useful for your motivation?</i>	<i>What did you dislike?</i>
2g-1	“Coping with negative thoughts through mindfulness and focusing on our goals.”	“Keeping the goals in mind.”	“It was a bit long.”
2g-4	“I was expecting from Switch to find new motivations in my life and it went well. The fact that we are several people in Switch is a good thing. The fact that we are all different, we can learn from the others.”	“Putting on paper the goals that we like.”	“You need to believe in it. Sometimes you have doubts.”
2g-6	“Being in a group, the people in the group, highlighting our goals, being proactive, supporting each other, giving ideas to move forward. It’s encouraging!”	“Writing down our goals.”	“That some people left.”
2g-10	“The method does work. The way of coping with negative thoughts, distancing from them. All the process. It takes some training to apply it to different parts of one’s life, but it is	“Looking forward, via the app. I really projected myself into the future.	“You need to travel.”

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worth doing this training because when Mindfulness to  
we get used to it, it works. Now I know cope with  
my projects will be realised.” thoughts.”

For Peer Review



Table 4

*Descriptive statistics of the different outcomes at baseline and during the intervention (means and standard deviations of both within-person means and within-person standard deviations) and repeated measures mixed-effects models of intervention effects (Phase x Group).*

Outcomes	Non-completers				Completers				Phase x Group effect
	Phase	<i>M</i> ( <i>SD</i> )	<i>SD</i> ( <i>SD</i> )	<i>SD</i> ( <i>SD</i> )	Phase	<i>M</i> ( <i>SD</i> )	<i>SD</i> ( <i>SD</i> )	<i>SD</i> ( <i>SD</i> )	$\beta$
Activity's meaning	T0	4.04 (1.80)	1.56 (0.95)		T0	4.08 (1.47)	0.98 (0.40)		0.29*
	T1	3.88 (1.71)	1.46 (1.07)		T1	4.91 (1.64)	0.66 (0.30)		
Motivation	T0	4.37 (2.57)	0.78 (0.38)		T0	4.29 (0.34)	1.25 (0.94)		0.28*
	T1	4.05 (2.39)	0.71 (0.44)		T1	4.50 (0.47)	1.06 (0.92)		
Wanting to give up	T0	3.51 (1.86)	1.57 (0.94)		T0	2.52 (1.13)	0.95 (0.40)		0.45**
	T1	3.07 (0.60)	1.57 (0.98)		T1	2.72 (1.31)	0.86 (0.24)		
Effort	T0	2.09 (0.48)	1.21 (0.60)		T0	2.62 (0.93)	1.11 (0.57)		0.40**
	T1	1.82 (0.85)	0.72 (0.69)		T1	3.00 (1.20)	0.98 (0.57)		
Energy	T0	4.39 (2.64)	0.68 (0.12)		T0	4.46 (0.54)	1.28 (0.79)		0.12
	T1	4.02 (2.39)	0.64 (0.50)		T1	4.35 (0.61)	1.26 (1.11)		
Mood	T0	4.08 (2.41)	0.83 (0.47)		T0	4.82 (0.50)	1.03 (0.76)		0.22*
	T1	4.00 (2.56)	0.55 (0.32)		T1	5.10 (0.64)	0.88 (0.56)		
Confidence	T0	4.32 (2.49)	0.52 (0.10)		T0	4.65 (0.55)	1.19 (0.98)		0.19 <sup>+</sup>
	T1	4.04 (2.45)	0.61 (0.33)		T1	4.74 (0.71)	0.91 (0.79)		

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3	Discouraging	T0	3.50 (2.74)	0.56 (0.08)	T0	2.55 (0.84)	1.12 (0.63)		
4	thoughts	T1	3.55 (2.95)	0.25 (0.22)	T1	2.50 (0.95)	0.89 (0.40)		
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7									-0.05
8	Present	T0	3.89 (2.00)	1.15 (1.03)	T0	4.28 (0.05)	1.14 (1.07)		
9	enjoyment	T1	3.84 (1.68)	1.35 (1.01)	T1	4.61 (0.30)	1.13 (1.04)		
10									
11									0.18
12									
13	Projection	T0	4.64 (2.71)	0.34 (0.30)	T0	3.23 (1.36)	0.99 (0.35)		
14	into the	T1	4.49 (2.86)	0.28 (0.25)	T1	5.01 (0.75)	1.07 (0.99)		
15	future								0.93***
16									
17	Reminiscence	T0	3.65 (1.62)	0.76 (0.28)	T0	3.68 (0.66)	1.17 (1.11)		
18		T1	3.54 (1.93)	0.44 (0.14)	T1	4.73 (0.59)	1.23 (1.19)		
19									0.65***
20									
21	Steps	T0	9778 (1367)	5492 (907)	T0	9985 (6798)	6020 (4425)		
22		T1	7933 (3345)	3334 (683)	T1	9618 (5694)	4974 (2522)		
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32	+ $p = .051$ , * $p < .05$ , ** $p < .01$ , *** $p < .0001$								
33	<i>Notes.</i> T0 = baseline phase; T1 = intervention phase; $\beta$ = standardized beta-coefficient.								
34	ESM: Non-completers: $n = 3$ (2g-1, 2g-3, 2g-7); Completers: $n = 3$ (2g-4, 2g-6, 2g-10)								
35	Step-count: Non-completers: $n = 3$ (2g-1, 2g-3, 2g-7); Completers: $n = 3$ (2g-6, 2g-8, 2g-10)								
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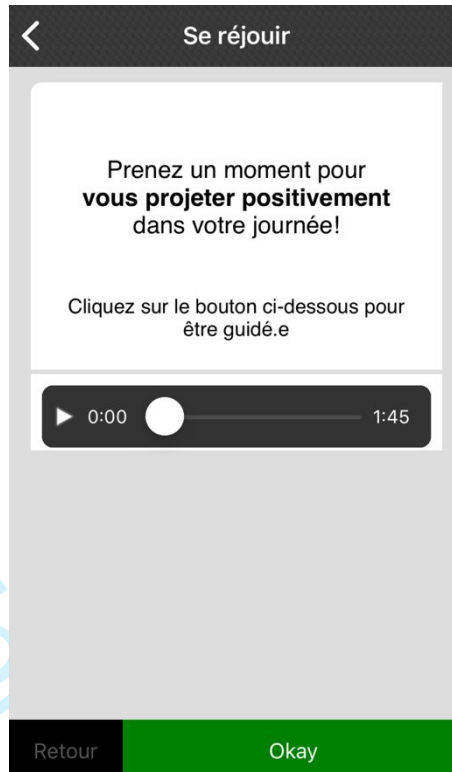
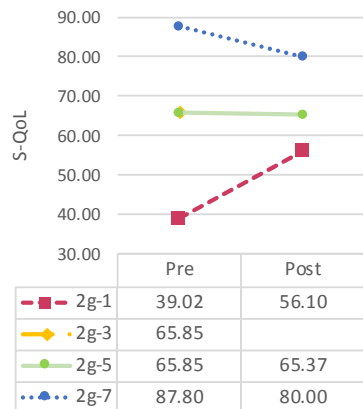
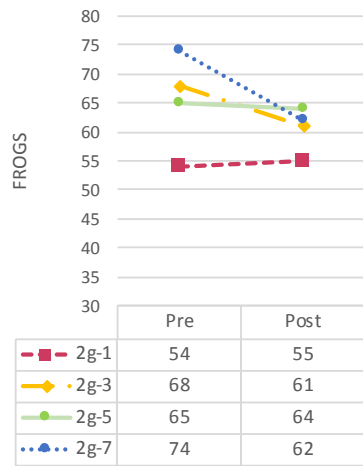
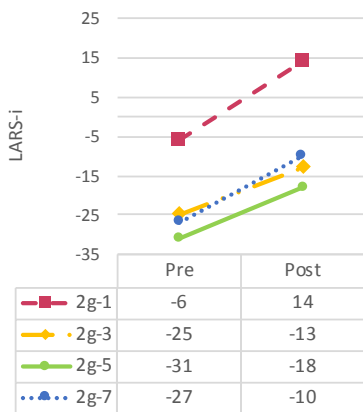
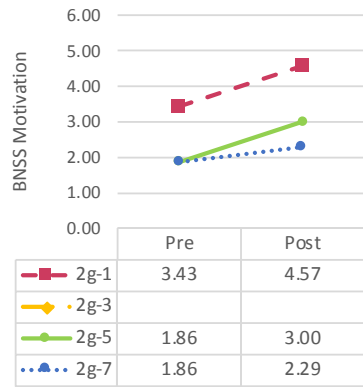


Figure 1. Screen shot of the morning prompt (“Take a moment to project yourself positively into your day. Click on the button below to be guided”).

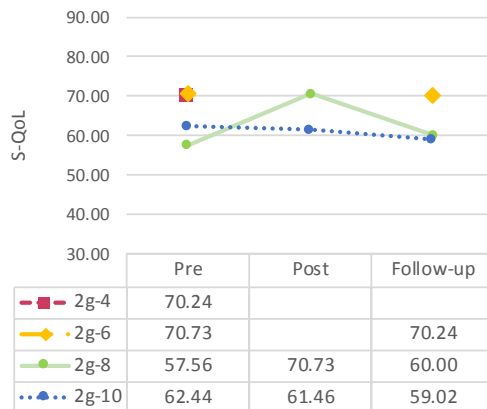
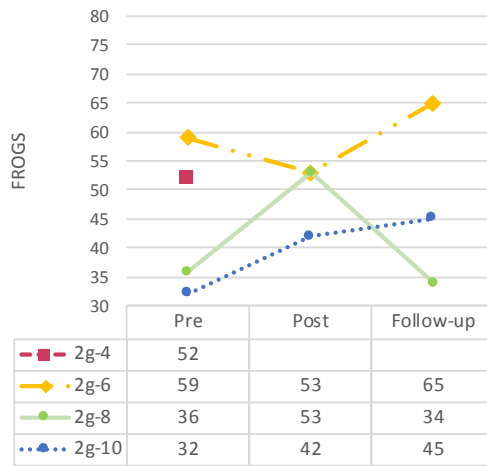
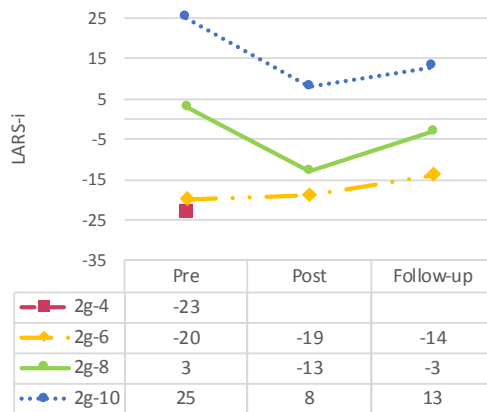
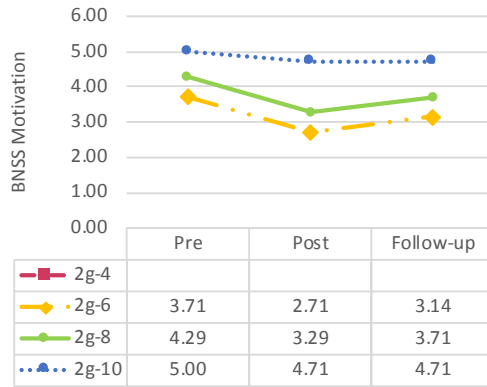
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For Peer Review

A Non-completers



B Completers



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3 *Figure 2.* Graphs representing scores at the different assessment points (pre, post, and  
4 follow-up) on the traditional measures, for non-completers (A) and completers (B). Each line  
5 represents a different participant. BNSS Motivation = Brief Negative Symptom Scale  
6 Motivation subscale (Mean); LARS-i = Lille Apathy Rating Scale informant version (Total);  
7 FROGS = Functional Remission of General Schizophrenia (Total), S-QoL = Schizophrenia  
8 Quality of Life questionnaire (Total out of 100).  
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For Peer Review

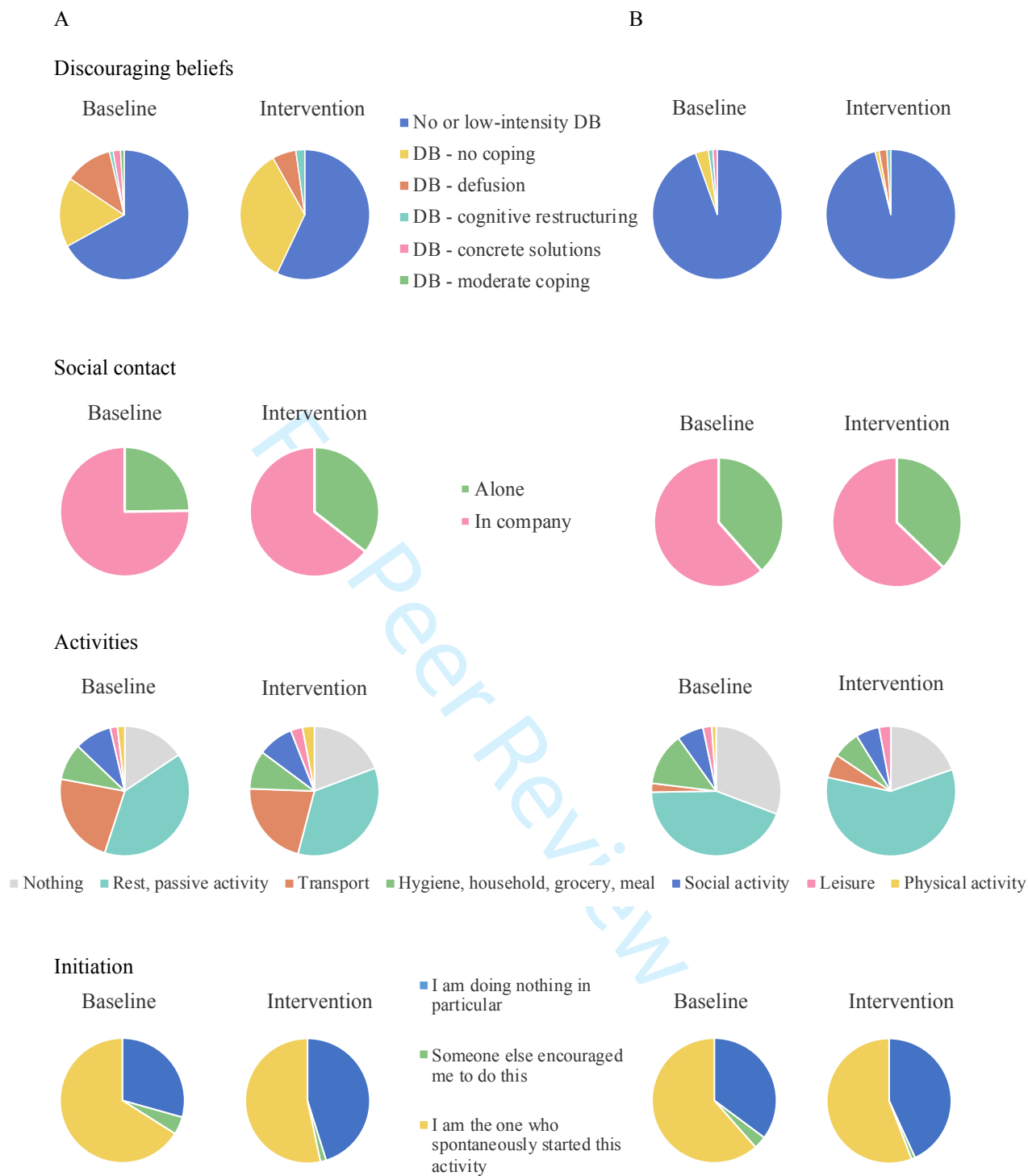


Figure 3. Pie charts representing change between baseline and intervention phases, in nominal variables of Coping strategies in case of discouraging beliefs, Social contact, Activities, and Initiation skills, for non-completers (A) and completers (B).

## Supplementary material

Table S1

*Subscales of the BNSS at baseline (T0), after intervention (T2) and 3 months follow-up (T3). Cohen's d effect sizes.*

	T0	T1	T2	T0-T2	T0-T3
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>d</i>	<i>d</i>
<b>Non-completers</b>					
<i>n</i> = 3					
BNSS Anhedonia	2.33 (1.15)	3.44 (1.39)		-1.36	
BNSS Asociality	2.17 (0.29)	2.83 (1.61)		-3.27	
BNSS Avolition	2.67 (1.15)	3.00 (1.32)		-0.41	
<b>Completers</b>					
<i>n</i> = 3					
BNSS Anhedonia	4.11 (0.96)	3.33 (1.00)	3.89 (0.51)	1.14	0.33
BNSS Asociality	4.33 (0.58)	3.50 (1.32)	3.83 (1.26)	2.04	1.22
BNSS Avolition	4.67 (0.76)	4.00 (0.87)	3.83 (1.04)	1.23	1.54

Sig. (2-tailed): \*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .001$

*Note:* BNSS – Brief Negative Symptom Scale (Kirkpatrick et al. 2011); *d* = effect size coefficient, Cohen's *d*, with pooled standard deviation as the denominator.



Table S2

*Repeated measures mixed models of intervention effects on ESM outcome variables with Phase and Number of sessions as independent variables.*

Outcome	Fixed effects		
		$\beta$	$p$
Activity's meaning	Phase	-0.479	<b>0.028</b>
	N sessions	0.002	0.990
	Phase x N sessions	0.051	<b>0.012</b>
Motivation	Phase	-0.469	<b>0.012</b>
	N sessions	-0.040	0.766
	Phase x N sessions	0.042	<b>0.012</b>
Wanting to give up	Phase	-0.533	<b>0.0475</b>
	N sessions	-0.064	0.5166
	Phase x N sessions	0.0412	0.0893
Effort	Phase	-0.607	<b>0.015</b>
	N sessions	0.023	0.792
	Phase x N sessions	0.064	<b>0.005</b>
Energy	Phase	-0.315	0.097
	N sessions	-0.021	0.872
	Phase x N sessions	0.019	0.263
Mood	Phase	-0.304	<b>0.056</b>
	N sessions	0.022	0.874
	Phase x N sessions	0.033	<b>0.022</b>
Confidence	Phase	-0.340	0.040

	N sessions	-0.005	0.970
	Phase x N sessions	0.027	<b>0.071</b>
Discouraging	Phase	0.060	0.645
beliefs	N sessions	-0.047	0.754
	Phase x N sessions	-0.005	0.681
Present	Phase	-0.231	0.352
enjoyment	N sessions	-0.012	0.908
	Phase x N sessions	0.030	0.183
Projection into	Phase	-1.236	<b>0.000</b>
the future	N sessions	-0.134	0.356
	Phase x N sessions	0.152	<b>0.000</b>
Reminiscence	Phase	-0.793	<b>0.000</b>
	N sessions	-0.040	0.718
	Phase x N sessions	0.098	<b>0.000</b>

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*Notes.* N sessions= number of sessions; Phase= Baseline vs.

Intervention

# SWITCH

## Un nouveau programme thérapeutique visant les difficultés de motivation afin d'améliorer la qualité de vie

Nous vous proposons de bénéficier d'une nouvelle intervention thérapeutique pour vous aider à dépasser vos difficultés de motivation. Avec Switch, l'idée, c'est de sortir du mode « off » et de **remettre l'interrupteur sur « ON »**.

L'intervention **Switch** est basée sur de nombreuses et récentes études scientifiques. Switch cible les pensées, croyances, émotions, comportements... qui sont en lien avec la **motivation**. Les difficultés de motivation peuvent parfois vous empêcher de vous engager dans des activités qui vous feraient du bien, qui vous permettraient d'avancer vers vos **objectifs** et vos **valeurs**. Le but de Switch est de relever ces barrières et d'**améliorer votre quotidien et votre qualité de vie** en vous aidant à vous engager dans vos projets.



Switch utilise des outils thérapeutiques qui ont déjà montré leur efficacité. Cette intervention est innovante car elle cible *tous les mécanismes* qui influencent la motivation. De plus, Switch s'adapte à **vos besoins et vos souhaits**.

*Figure S1.* Front side of the flyer used for the recruitment of participants.

### Informations pratiques

L'intervention Switch est offerte gratuitement dans le cadre d'un projet de recherche scientifique. L'objectif de cette recherche est d'évaluer l'efficacité de Switch.

En pratique, nous vous offrons un **groupe thérapeutique d'environ 1h45, 2 fois / semaine** (mardi et jeudi 14h-16h), du 7 mai au 4 juillet.

Vous répondez à des questionnaires avant, pendant et après l'intervention (du 23 avril au 19 juillet), de manière à ce qu'on puisse vérifier si Switch a bien fonctionné comme on le souhaitait.

***Cette recherche a été approuvée par les Comités d'Éthique Hospitalo-Facultaire Universitaire de Liège et de l'Intercommunale des Soins Spécialisés de Liège (ISoSL).***

Information et inscription : Contactez **Quentin Longrée** qui vous mettra en lien avec **Bénédicte Thonon** et **Marie-Noëlle Levaux**.



*Figure S2.*

Back side of the flyer used for the recruitment of participants.