


BRIEF REPORT

Conscious Thought During the Resting State in Patients With Severe Health Anxiety and Patients With Obsessive–Compulsive Disorder

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The resting state is a commonly used paradigm in neuroimaging studies that has demonstrated differences in functional connectivity during rest in anxiety disorders, compared to healthy controls. Surprisingly, the psychological aspects (e.g., thoughts, feelings) during the resting state have largely been ignored in clinical populations, while increasingly studied in healthy populations. To the knowledge of the authors, this is the first study to examine the cognitive and affective experiences of resting state cognition in patients with psychiatric disorders. In the present study, 31 patients with severe health anxiety, 32 patients with obsessive–compulsive disorder (OCD) and 32 control participants completed a 3-min resting state task, followed by a standardized questionnaire developed specifically to assess thoughts and feelings experienced during the resting period. Compared to healthy controls, both patient groups reported more discontinuity of mind, more negative feelings, more health concern and less comfort during rest. Patients with OCD reported more visual thought than the other groups. When controlling for depressive symptoms, patients with severe health anxiety reported more health concern than did patients with OCD. The study highlights the importance and informative value of examining qualities of resting state cognition (e.g., the subjective feeling of reduced control over one's thoughts, experiencing negative feelings) in health anxiety and OCD, and introduces psychological assessment of resting state cognition as a viable paradigm in the study of clinical disorders.

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Keep your eyes closed, relax and do not fall asleep. This is the essence of the typical instruction for the resting state task, a commonly used paradigm in neuroimaging (e.g., Delamillieure et al., 2010; Stoffers et al., 2015). Studies using this paradigm have consistently found differences in resting state functional connectivity between patients with anxiety disorders and control participants, and even between patients with different anxiety disorders (for a review, see Peterson, Thome, Frewen, & Lanius, 2014). However, the psychological aspects of the resting state, that is, the particular cognitive and affective experiences that characterize this state, have largely been ignored (e.g., Andrews-Hanna, Reidler, Huang, & Buckner, 2010; Gorgolewski et al., 2014; Stoffers et al., 2015). This is surprising, as it seems likely that the experienced thoughts and feelings would complement and inform the observed differences in brain activity in healthy as well as clinical populations.

It is well-established that the resting state is not a period when the mind “goes blank.” When there are no external demands for attention, the mind is highly active (e.g., Baars, 2010; Delamillieure et al., 2010), and studies have found that during rest, the mind is often occupied with memories of past events and thoughts about future events (e.g., Andrews-Hanna et al., 2010; Delamillieure et al., 2010), thinking about the self (e.g., D’Argembeau et al., 2005; Delamillieure et al., 2010), personal goals (e.g., Andrews-Hanna et al., 2010), mental imagery and inner language (e.g., Delamillieure et al., 2010; Doucet et al., 2012; Hurlburt, Alderson-Day, Fernyhough, & Kühn, 2015), and awareness of one’s body and physical sensations (e.g., D’Argembeau et al., 2005; Delamillieure et al., 2010; Hurlburt et al., 2015).

Surprisingly, we have not been able to identify any studies examining thoughts and feelings experienced during the resting state in clinical samples with psychiatric disorders (the closest is a study on patients with insomnia, see Palagini et al., 2016). Because mind wandering is frequent during rest (e.g., Doucet et al., 2012; Smallwood & Schooler, 2006; Stoffers et al.,

2015), we also searched for studies examining the *content* of mind wandering experiences in psychiatric populations, but were only able to identify one study. Hoffmann, Banzhaf, Kanke, BERPohl, and Singer (2016) found that during mind wandering, patients with major depressive disorder reported having more negative thoughts concerned with memories of past events and the self than control participants.

In the present study, thoughts and feelings experienced during rest are examined in patients with severe health anxiety, patients with obsessive–compulsive disorder (OCD) and a control group. Severe health anxiety is a disorder characterized by excessive and intrusive worries about illness and a persistent preoccupation with one’s health (American Psychiatric Association, 2013; Fink et al., 2004; World Health Organization [WHO], 2019). OCD is characterized by recurrent stereotyped obsessional thoughts (i.e., recurrent thoughts, ideas or images experienced as distressing and unwanted) and/or compulsive acts (i.e., repetitive mental or behavioral acts/rituals performed to reduce anxiety; American Psychiatric Association, 2013; WHO, 2019). Severe health anxiety and OCD overlap in both behaviors and cognitions, such as excessive anxiety, intrusive thoughts and repetitive thinking (e.g., Abramowitz & Brad-dock, 2006; Reuman et al., 2017; WHO, 2019), but are recognized as independent disorders in the diagnostic classification systems (American Psychiatric Association, 2013; WHO, 2019).

Because of its unconstrained nature, examining cognitive and affective experiences during rest could provide further insights into critical similarities and differences in everyday cognition and the maintenance of symptoms in severe health anxiety and OCD. First, spontaneous thoughts, which can be seen to share many similarities with resting state cognition (for reviews see Baars, 2010; Smallwood & Schooler, 2015), account for up to half of all thoughts during a day, according to some estimates (e.g., Kane et al., 2017; Killingsworth & Gilbert, 2010; Smallwood & Schooler, 2006), but they might be especially frequent in patients with excessive anxiety, as negative affect consis-

tently has been linked with an increased frequency of mind wandering (e.g., Kane et al., 2017; Poerio, Totterdell, & Miles, 2013; Ruby, Smallwood, Engen, & Singer, 2013), and studies have also found this association for symptoms of OCD (Seli, Risko, Purdon, & Smilek, 2017; Soffer-Dudek, 2019). What the mind is engaged with during rest and how this is experienced therefore might provide important insights into the everyday cognition of these patient groups. Second, episodic memory and affective processes play a key role in determining where the mind wanders (e.g., Andrews-Hanna et al., 2010; Delamillieure et al., 2010; for a review see Smallwood & Schooler, 2015), and these processes are affected in patients with severe health anxiety and OCD (e.g., Muse, McManus, Hackmann, Williams, & Williams, 2010; Speckens, Hackmann, Ehlers, & Cuthbert, 2007). Therefore, the content and feelings during rest might be affected in these disorders relative to healthy cognition. Third, examining thoughts and feelings experienced during rest could be clinically relevant and highlight mechanisms involved in the maintenance of symptoms of severe health anxiety and OCD. Intrusive thoughts are involuntarily retrieved images and memories (e.g., Brewin, Gregory, Lipton, & Burgess, 2010), and are a crucial part of the symptoms of both severe health anxiety and OCD (e.g., Abramowitz & Braddock, 2006; WHO, 2019). Involuntary retrieval most often occurs in situations with diffuse attention, when the mind is not occupied with demanding tasks (for a review see Berntsen, 2010), that is, situations very similar to the one created in the resting state paradigm. Therefore, the resting state might provide an experimental analogue to real-life situations, such as relaxing on the couch or going to bed, which, based on clinical experience and patient reports, are characterized by a high frequency of intrusive thoughts (e.g., Schmidt, Harvey, & Van der Linden, 2011; Stan & Christoff, 2018).

We expected patients with severe health anxiety to experience more somatic awareness and health concern during the resting state period than the other groups, as body vigilance is prominent in this patient group and the worries specific to disease and illness (e.g., Abramowitz & Braddock, 2006; American Psychiatric Association, 2013; WHO, 2019). Furthermore, we expected patients with OCD to experience more

visual imagery during the resting period, in line with obsessional intrusions being experienced as more visual than worries or illness intrusions (e.g., Langlois, Freeston, & Ladouceur, 2000; Langlois, Ladouceur, Patrick, & Freeston, 2004; Romero-Sanchiz, Nogueira-Arjona, Godoy-Ávila, Gavino-Lázaro, & Freeston, 2017). Lastly, we expected both patient groups to experience more negative feelings during the resting period than the control participants (in line with Hoffmann et al., 2016).

Method

Data for the present study were collected as part of a larger online questionnaire. The main measures reported in this article are nonoverlapping with previous publications from this data set (Gehrt, Frostholt, Obermann, & Berntsen, 2020).

Participants

Thirty-one patients fulfilling the diagnostic research criteria for severe health anxiety (Fink et al., 2004) participated in the study. They were recruited at the Research Clinic for Functional Disorders, Aarhus University Hospital, Denmark. Patients were invited to participate in this study after receiving a diagnosis but before entering treatment at the clinic. Trained clinicians performed the clinical assessment using a modified version of the semistructured psychiatric interview, Schedules for Clinical Assessment in Neuropsychiatry (WHO, 1998).

Thirty-two OCD patients were recruited through an outpatient clinic at Aarhus University Hospital, Denmark ($N = 21$), and the OCD association in Denmark ($N = 11$). Patients recruited at the outpatient clinic underwent clinical assessment by trained clinicians using a modified version of the Schedules for Clinical Assessment in Neuropsychiatry (WHO, 1998) or the Anxiety Disorders Interview Scale for DSM-IV (Di Nardo, Brown, & Barlow, 1994), and were invited to take part in the study when entering treatment at the clinic. Patients recruited from the OCD association received written information about the study distributed by the association among its members.

Thirty-two control participants were recruited through a database of adults interested in participating in research. Participant characteristics are displayed in Table 1. For further char-

Table 1
Participant Characteristics Presented According to Group

Characteristic	Severe health anxiety	OCD	Control participants	<i>F</i> (2, 92)
<i>N</i> (female)	31 (19)	32 (27)	32 (20)	
Age, <i>M</i> (<i>SD</i>)	40.42 (9.48) ^a	30.41 (9.98) ^b	40.00 (11.44) ^a	9.55 ^{***}
Years of education, <i>M</i> (<i>SD</i>)	16.47 (3.45)	15.72 (2.52)	17.39 (2.08)	3.00
Employment (%)				
Full- or part-time employment	61.29	28.13	81.26	
Unemployed	9.68	6.25	3.13	
On leave (e.g., child birth, illness)	6.45	21.88		
Student	12.90	37.50	9.38	
Regular and early retirement	9.68	6.25	6.26	
Comorbid mental disorders, %				
Depression (F32, F33)	16.13	21.88		
Anxiety disorders (F40, F41, F43)	9.68	21.88		
OCD (F42)	3.23			
Hypochondriasis (F45.2)		3.13		
Symptoms measures, <i>M</i> (<i>SD</i>)				
Health anxiety	28.84 (6.00) ^a	20.63 (8.83) ^b	11.63 (4.40) ^c	52.38 ^{***}
OCD	17.74(10.49) ^a	35.75 (15.16) ^b	7.03 (6.72) ^c	52.43 ^{***}
Physical symptoms	20.06 (10.82) ^a	18.13 (9.86) ^a	6.16 (4.69) ^b	22.98 ^{***}
Anxiety	8.29 (5.03) ^a	10.03 (3.93) ^a	1.69 (1.69) ^b	44.67 ^{***}
Depression	6.58 (5.40) ^a	11.41 (5.99) ^b	2.81 (3.35) ^c	23.40 ^{***}

Note. OCD = obsessive-compulsive disorder. Dissimilar superscripts indicate that scores in the same row are significantly different according to a Bonferroni adjusted post hoc test.

^{***} $p < .001$.

acteristics of the participants and details about recruitment and exclusion criteria, see Gehrt et al. (2020).

Procedure

Participants received a link to the study via e-mail and completed the questionnaire at home. Informed consent was obtained at the beginning of the questionnaire. The resting state task was a separate part of the questionnaire and was preceded by the following instructions (in line with Diaz et al., 2013):

This part of the questionnaire consists of a short task. The task concerns thoughts and feelings during rest. In order to complete this task, it is important that you are located in a place, where you can sit quietly without any interruptions. You will be asked to keep your eyes closed for three minutes, while you are sitting comfortably and move as little as possible, without falling asleep. When the three minutes are over, you will hear a sound and you can open your eyes. You will see a series of statements about feelings and thoughts that you might have experienced during the resting period. Your task is to indicate to what degree you agree with each statement.

Following these instructions were tips on how to avoid being disrupted during the resting pe-

riod. Participants were instructed to turn off all sources of noise (TV, radio, cell phone etc.), to close all windows, and to close any other currently active programs on their computer to avoid being disrupted by noise from incoming e-mails, chats, and so forth. Lastly, a sound check was performed to ensure that participants could hear the sound marking the end of the resting period.¹ After the sound check, the following instructions appeared on the screen:

During the resting period it is important that you remain seated, keep your eyes closed, move as little as possible, and avoid falling asleep. You will hear a sound when the resting period is over. Then you have to open your eyes and follow the instructions on the screen. Are you ready to start the task?

When the resting period was over, participants completed the Amsterdam Resting State Questionnaire (ARSQ; Diaz et al., 2013, 2014). At the end of the questionnaire, participants indicated whether they had been interrupted during

¹ If participants failed two sound checks, they did not perform the resting state task. This applied to one severe health anxiety patient and one OCD patient, resulting in the deviation in sample size from Gehrt et al. (2020).

the resting period. If they had, they were prompted to give a detailed description of the interruption² (in line with Diaz et al., 2013, 2014).

Materials

The ARSQ (Diaz et al., 2014) quantifies thoughts and feelings experienced during a resting period along 10 dimensions: Discontinuity of Mind (e.g., “I had rapidly switching thoughts”), Theory of Mind (e.g., “I thought about others”), Self (e.g., “I thought about myself”), Somatic Awareness (e.g., “I was conscious of my body”), Health Concern (e.g., “I thought about my health”), Planning (e.g., “I thought about solving problems”), Sleepiness (e.g., “I felt tired”), Comfort (e.g., “I felt relaxed”), Visual Thought (e.g., “I pictured events”), and Verbal Thought (e.g., “I thought in words”). There are three items assessing each of the 10 dimensions (Diaz et al., 2014). The present study also included 20 nonfactor items (that is, single items not belonging to a dimension) and five validation questions from the first version of the ARSQ (Diaz et al., 2013). All items, except the validation items, were presented in random order (the 10 dimensions and the nonfactor items separately), consistent with the original questionnaire (Diaz et al., 2013, 2014), and rated on a scale from 1 (*completely disagree*) to 5 (*completely agree*), giving each of the 10 dimensions a sum score ranging from 3 to 15 and each nonfactor item a sum score ranging from 1 to 5. For internal reliability measure of the 10 dimensions, see Table 2.

Health anxiety symptoms were assessed with the Whiteley index seven-item version (Conradt, Cavanagh, Franklin, & Rief, 2006; Fink et al., 1999). The scale has a total sum score ranging from 7 to 35, and demonstrated good internal consistency in the present study ($\alpha = .96$).

Symptoms of OCD were assessed with the Obsessive–Compulsive Inventory–Revised (Foa et al., 2002), which consists of 18 items with a total sum score ranging from 0 to 72. The scale demonstrated good internal consistency in the present study ($\alpha = .94$).

Three modified subscales from the Symptom Check List–Revised (Christensen et al., 2005; Derogatis, 1983) were employed. Four items measured symptoms of anxiety, with a total sum

score ranging from 0 to 16 and showed good internal consistency ($\alpha = .92$). Six items measured symptoms of depression, with a total sum score ranging from 0 to 24 and good internal consistency in the present study ($\alpha = .90$). Note that the anxiety and depression subscales had a reduced number of items compared to the respective scales in the Symptom Check List–Revised (Christensen et al., 2005). Twelve items measured degree of physical symptoms, with a total sum score ranging from 0 to 48, showing good internal consistency in the present study ($\alpha = .91$).

Data Analysis

The 10 dimensions of the ARSQ, the nonfactor items and the validation items were analyzed with individual analyses of variance (ANOVA) using SPSS (Version 24). Pairwise Bonferroni adjusted post hoc comparisons of levels of the independent variable were performed. Analyses of covariance controlling for depressive symptoms were performed for the 10 dimensions and nonfactor items for the two patient groups only. All p values are two-tailed and regarded statistically significant at $p < .05$.

Results

Results from the 10 dimensions of the ARSQ are presented in Table 2. For theory of mind, somatic awareness, sleepiness and verbal thought, the ANOVAs were statistically nonsignificant, indicating no group differences for these variables. As also indicated in Table 2, a number of statistically significant group effects were observed. These were followed up by post hoc comparisons. Both patient groups reported more discontinuity of mind ($ps < .034$), more health concern ($ps < .001$), and lower levels of comfort ($ps < .001$) during rest than the control participants, but the scores of the patient groups did not differ ($ps > .110$). Patients with OCD reported engaging in more visual thought than

² No participants were excluded based on interruptions, as these were judged to not having compromised the resting period. Participants reported being temporarily interrupted by noise (e.g., the sound of a car passing on the street; $n = 13$), their own racing thoughts ($n = 2$), or physical sensations ($n = 2$). Four participants reported resting longer than 3 min, because their computer went into sleep mode.

Table 2
The 10 Dimensions of the Amsterdam Resting State Questionnaire

Dimension	α	Means							
		Severe health anxiety		OCD		Control participants		ANOVA	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	η_p^2
Discontinuity of mind	.86	10.52 ^a	2.92	11.38 ^a	3.08	8.50 ^b	3.28	7.25 ^{***}	.14
Theory of mind	.74	8.29	2.64	9.53	2.78	8.78	3.01	1.55	.03
Self	.64	9.07	2.24	10.44 ^a	2.79	8.34 ^b	2.91	5.08 ^{**}	.10
Somatic Awareness	.54	9.52	2.67	8.97	3.17	9.25	2.79	0.28	.01
Health concern	.80	8.13 ^a	3.25	7.41 ^a	3.19	3.94 ^b	1.44	21.03 ^{***}	.31
Planning	.66	10.36	2.39	11.91 ^a	2.09	9.22 ^b	3.23	8.51 ^{***}	.16
Sleepiness	.86	8.45	2.69	8.44	3.17	7.19	3.43	1.72	.04
Comfort	.89	8.03 ^a	2.58	6.69 ^a	2.86	10.94 ^b	2.06	23.78 ^{***}	.34
Visual thought	.50	8.87 ^a	2.14	11.09 ^b	1.82	9.22 ^a	2.85	8.49 ^{***}	.16
Verbal thought	.66	9.10	3.19	10.06	2.99	8.41	2.88	2.42	.05

Note. OCD = obsessive-compulsive disorder; ANOVA = analysis of variance. Dissimilar superscripts indicate that scores in the same row are significantly different according to a Bonferroni adjusted post hoc test.

** $p < .01$. *** $p < .001$.

the other two groups ($ps < .005$), whereas the scores of patients with severe health anxiety and control participants did not differ ($p = 1.00$). Patients with OCD reported engaging in more self-focused thought ($p = .007$) and more planning ($p < .001$) than the control participants, whereas patients with severe health anxiety differed from neither of the other groups ($ps > .062$). By a Bonferroni correction controlling for the number of analyses (corrected threshold: $p = .005$), the ANOVAs remain statistically significant, except for the dimension of self ($p = .008$).

To more carefully examine the differences between the two patient groups, we reran the ANOVAs, only including these two groups, while controlling for depressive symptoms. All differences between the two clinical groups remained the same, except for the dimension of health concern: Patients with severe health anxiety reported significantly more concern for own health than OCD patients, $F(1, 60) = 6.80$, $p = .011$, $\eta_p^2 = .10$.

Results from the nonfactor and validation items are reported in Table 3. Both patient groups reported having more negative feelings ($ps < .008$), less control over their thoughts ($ps < .008$) and finding it harder to rate the statements in the questionnaire ($ps < .045$) than the control participants, whereas the scores of the patient groups did not differ for these items ($ps > .130$). Patients with OCD reported feeling

more restless ($p = .010$), enjoying the session less ($p = .001$), having more thoughts that they would not share with others ($p = .001$), thinking more about past experiences ($p = .033$) and having deeper thoughts ($p = .024$) than the control participants, whereas patients with severe health anxiety differed from neither of the other groups for these items ($ps > .101$).

Discussion

The present study examined cognitive and affective experiences during rest in patients with severe health anxiety, patients with OCD and a control group. The two patient groups reported more discontinuity of mind, more concern for own health, more negative feelings and less comfort during the resting period than the control participants. Patients with OCD reported engaging in more visual thought than the other groups, and in more planning and self-focused thought than the control participants. When controlling for depressive symptoms, patients with severe health anxiety reported more health concern than patients with OCD.

To the knowledge of the authors, this is the first study to examine the content of resting state cognition in clinical samples with psychiatric disorders. In line with predictions, both patient groups experienced more negative feelings during rest than the control participants. The emotional tone of the mind wandering content has

Table 3
Nonfactor and Validation Items From the Original Amsterdam Resting State Questionnaire

Item	Severe health anxiety		OCD		Control participants		ANOVA	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	η_p^2
Nonfactor								
I felt restless	3.16	1.13	3.41 ^a	1.16	2.53 ^b	1.19	4.84 ^{**}	.10
I enjoyed the session	2.87	1.12	2.34 ^a	1.07	3.28 ^b	0.85	6.83 ^{**}	.13
I had negative feelings	2.84 ^a	1.21	3.44 ^a	1.27	1.94 ^b	0.98	13.53 ^{***}	.23
I felt bored	2.90	1.11	2.38	1.10	2.81	1.06	2.14	.04
I felt nothing	2.16	1.04	1.81	0.97	1.97	0.93	1.00	.02
I felt about the same throughout the session	3.42	0.96	3.69	0.90	3.63	0.98	0.69	.02
I thought about my work/study	2.71	1.27	3.09	1.38	3.16	1.37	1.02	.02
I had thoughts that I would not readily share with others	2.26	1.06	2.91 ^a	1.45	1.72 ^b	1.05	7.82 ^{**}	.15
I had similar thoughts throughout the session	2.90	1.19	2.69	1.15	3.09	1.06	1.03	.02
I thought about pleasant things	2.68	0.98	2.56	1.22	3.09	1.06	2.10	.04
I had my thoughts under control	2.35 ^a	0.84	2.03 ^a	0.90	3.09 ^b	1.09	10.54 ^{***}	.19
I thought about the aim of the experiment	2.90	1.22	2.84	1.37	2.50	1.44	0.83	.02
I had superficial thoughts	3.19	1.11	2.78	1.04	3.41	1.01	2.91	.06
I thought about the past	2.35	1.11	2.88 ^a	1.21	2.16 ^b	0.99	3.59 [*]	.07
I thought about the present	3.16	1.04	2.72	1.28	3.16	1.05	1.62	.03
I had deep thoughts	2.48	1.12	2.94 ^a	0.88	2.28 ^b	0.89	3.86 [*]	.08
I thought about nothing	1.94	1.09	1.63	1.01	1.81	1.06	0.69	.02
I thought about the sounds around me	3.29	1.22	3.06	1.34	3.56	1.11	1.34	.03
I thought about the odors around me	1.97	0.95	1.84	0.99	1.66	0.90	0.87	.02
In my thoughts I heard music	1.74	0.86	1.81	1.03	1.53	0.84	0.82	.02
Validation								
I had my eyes closed (1 = yes; 4 = no)	1.74	0.86	1.66	0.79	1.47	0.57	1.11	.02
I was disturbed during the resting period (1 = yes; 2 = no)	1.74	0.45	1.81	0.40	1.78	0.42	0.18	.00
I had difficulty remembering my thoughts (1 = yes; 2 = no)	1.68	0.48	1.75	0.44	1.88	0.34	1.78	.04
I had difficulty remembering my feelings (1 = yes; 2 = no)	1.74	0.45	1.78	0.42	1.94	0.25	2.35	.05
I felt motivated to participate (1 = yes; 2 = no)	1.16	0.37	1.16	0.37	1.09	0.30	0.37	.01
I was able to rate the statements (1 = yes; 3 = no)	2.00 ^a	0.58	1.84 ^a	0.57	1.50 ^b	0.51	6.75 ^{**}	.13

Note. OCD = obsessive-compulsive disorder; ANOVA = analysis of variance. Dissimilar superscripts indicate that scores in the same row are significantly different according to a Bonferroni adjusted post hoc test.

* $p < .05$. ** $p < .01$. *** $p < .001$.

been found to determine the impact on later mood (e.g., Poerio et al., 2013; Ruby et al., 2013), thereby potentially playing a role in maintaining negative mood over time. Interestingly, the three groups reported thinking about pleasant things to the same extent, which is in contrast to patients with major depressive disorder, who report both more negative and less positive thoughts during mind wandering than control participants (Hoffmann et al., 2016).

Furthermore, the two patient groups experienced less comfort and more discontinuity of mind during rest than the control participants. This is consistent with a study employing the ARSQ in a nonclinical sample showing that

lower levels of comfort and high discontinuity of mind is associated with symptoms of anxiety and depression (Diaz et al., 2013). Diaz et al. (2013) speculated that being less comfortable interferes with the flow of thoughts, making participants report more discontinuity of mind. This interruption of the flow of thought could also explain why both patient groups, when answering the validation items, indicated being less able to rate the statements of the ASRQ compared with the control participants. Another factor influencing these aspects of resting state cognition could be negative affect, as negative thoughts during rest are related to reporting less specific and more vague thoughts in nonclinical

samples (Gorgolewski et al., 2014), and higher levels of neuroticism are associated with more racing thoughts during mind wandering (Kane et al., 2017).

The subjective sense of control over one's thoughts, experiencing negative feelings, and feeling less comfortable are all qualities of resting state cognition. These qualities could appear important in distinguishing the experience of resting state cognition in severe health anxiety and OCD from healthy cognition. For example, racing thoughts may not necessarily be unpleasant, as long as they are positive and infrequent, but will likely become unpleasant if they are negative and frequent. Future studies should examine how psychopathology influences both the frequency, content and quality of spontaneous thoughts.

Contrary to predictions, patients with severe health anxiety did not report more somatic awareness during rest than the other groups. Being aware of one's own body during rest is also frequent in healthy samples (e.g., Delamillieure et al., 2010; Hurlburt et al., 2015), and could follow naturally from being attentive to one's inner mentation more than to the external environment. Furthermore, patients with severe health anxiety reported more concern for own health than the control participants but not more than patients with OCD, only partly confirming our hypothesis. However, when controlling for depressive symptoms, patients with severe health anxiety reported significantly more health concern than patients with OCD, suggesting that concern for own health is associated with depressive symptoms in OCD, but not in severe health anxiety. This is consistent with health concern being a core feature of health anxiety (American Psychiatric Association, 2013; WHO, 2019) and a study showing that although mood disorders are commonly comorbid with severe health anxiety, the health concern in severe health anxiety is not related to mood disturbance (Scarella, Laferton, Ahern, Fallon, & Barsky, 2016).

Consistent with predictions, patients with OCD reported more visual thought during rest than the other groups, in line with obsessional intrusions being more visual than illness intrusions (associated with health anxiety) that are experienced in both verbal and visual form (e.g., Langlois et al., 2004; Romero-Sanchiz et al., 2017). Furthermore, patients with OCD dif-

fered significantly from the control participants, but not from patients with severe health anxiety, on a number of variables. Some of these differences could be attributable to OCD symptomatology, such as having thoughts that one would not readily share with others (e.g., Emmelkamp & Aardema, 1999). However, for some variables, the higher levels of depressive symptoms of the OCD patients could be involved in shaping the observed differences. Sad mood before mind wandering has been associated with a greater tendency to think about memories of past events (e.g., Poerio et al., 2013; Smallwood & O'Connor, 2011), and patients with major depressive disorder report more thoughts concerned with past events and the self when mind wandering than control participants (Hoffmann et al., 2016).

Examining resting state cognition could prove useful in other areas of research, such as presleep cognitions and mindfulness. Like resting state cognition, presleep cognitions can be considered spontaneous thoughts (e.g., Stan & Christoff, 2018), and their interference can keep the person from falling asleep (e.g., Harvey, 2000). Problems falling asleep are associated with affective disorders and adversely impact symptoms. Presleep cognitions can be problematic, when they are concerned with content, such as worries or regrets, and are experienced as racing or less intentional (e.g., Harvey, 2000; Schmidt et al., 2011). An association between sleep problems and enhanced mind wandering is well established (e.g., Stawarczyk & D'Argembeau, 2016). Future research could consider the resting state paradigm as an experimental analogue of presleep cognitions in patients with psychiatric disorders. Furthermore, resting state cognition could also prove useful when examining potential benefits of mindfulness on spontaneous thoughts. Future studies could employ the ARSQ to examine the effectiveness of mindfulness on reducing negative spontaneous thoughts in clinical populations.

The present study holds limitations. The method employed requires participants to retrospectively report where their minds have wandered, that is, it depends on the individual's ability to retrospectively assess the content of their thoughts. An alternative method is to prompt participants at random time points to report what they are thinking and feeling, but this method has its own limitations, and reports

obtained at random time points correlate highly with retrospective questionnaires (e.g., Hurlburt et al., 2015; for a discussion, see Smallwood & Schooler, 2006). Also, the period for which the participants were asked to report their thoughts was only the preceding 3 min, which corresponds to many of the intervals used in experimenter probed reporting.

Furthermore, participants performed the task at home, therefore we cannot control if they did the task as intended. However, the employed procedure has been used in previous studies (e.g., Diaz et al., 2013) and the answers to the validation items and the descriptions of interruptions during the resting period indicated that participants did comply with the task instructions. Also, questionnaires answered prior to the ARSQ could have primed patient's concerns, making these more salient during the resting state. However, as the present study recruited patients that either currently sought treatment for their symptoms or were in contact with a patient organization, their disorder-specific concerns were most likely already highly active.

Lastly, despite the resting state being a good model for studying spontaneous thoughts like mind wandering (e.g., Diaz et al., 2013, 2014; Smallwood & Schooler, 2006), it might represent a more deliberate type of thought processes, which is different from nondeliberate spontaneous thoughts initiated without conscious awareness (e.g., Seli et al., 2017; Smallwood & Schooler, 2006). However, the resting state task might still resemble real-life situations such as relaxing on the couch or going to bed, that is, situations when attention is directed away from the external environment toward inner thoughts, feelings and sensations.

Conclusion

In summary, the present findings suggest that the subjective feeling of reduced control over one's thoughts, more negative feelings, and feeling less comfortable are common qualities in resting state cognition of patients with severe health anxiety and patients with OCD. These qualities might distinguish resting state cognition in severe health anxiety and OCD from healthy cognition. Resting state neuroimaging has been recognized as an important method for identifying similarities and differences in functional connectivity between disorders (e.g., Pe-

tersen et al., 2014). However, the content and phenomenological aspects of the resting state activity have been largely ignored. The present study demonstrated that examining resting state cognition through psychological measures is a viable paradigm for studying everyday cognitive processes in individuals diagnosed with psychiatric disorders. Future research may use this paradigm in relation to other clinical disorders than OCD and severe health anxiety.

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