Intolerance of uncertainty as the vulnerability factor among parents of childhood cancer survivors: a 3-month follow-up study

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RUNNING HEAD: FOLLOW-UP IN PARENTS OF CHILDHOOD CANCER SURVIVOR

Authors' notes

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ABSTRACT

Purpose**:** In a 3-month follow-up study, we assessed the intolerance of uncertainty in 61 parents of a **childhood cancer survivor**. The objective was to compare its prevalence over time. We tested these parents twice (**i.e. at treatment completion (time 1) and 3 months later (time 2)**). We hypothesized that this personality factor stayed stable and had aversive effects on cognitive processes. ***Findings:*** Noticeable intolerance of uncertainty rates were found. At both assessments, results showed that this factor was central in the development of excessive worries, poor problem orientation, rumination, cognitive avoidance and positive beliefs about worry. Repeated measures revealed a decrease for anxiety and cognitive avoidance, and an increased level for somatic symptoms. ***Conclusions*****:** Parents who are intolerant of uncertainty are at risk to display dysfunctional behaviours over time. Sensitizing health care professionals to the identification of this factor and its associated difficulties is essential for the implementation of efficient intervention strategies.

Abbreviations: CCS: **childhood cancer survivor**; CI: colored interference; IU: intolerance of uncertainty; NI: negative interference; PI: positive interference; PTSS: posttraumatic symptoms syndrome; RT: reaction time (in milliseconds); Time 1: first assessment **(at treatment completion)**; Time 2: second assessment (3 months later).

Key words: parents, **childhood cancer survivor**, intolerance of uncertainty, anxiety, somatic symptoms, Stroop test.

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BACKGROUND

Cancer remains a rare disease during childhood. Compared to the total cancer burden in our country, Belgium, and other Western countries, childhood cancer accounts for less than 1%. Every year, about 320 children (< 15 years) and 180 adolescents (15-19 years) are diagnosed with cancer in Belgium (55% boys and 45% girls) [1, 2]. Having one's child with a chronic disease is observed as one of the most severe stressors that parents could experience. Parents often react with diverse symptoms such as anxiety, depression, and somatization[3]. It has been reported that parents of a childhood cancer survivor (CCS) have psychological distress and may be at risk for anxiety, depression, somatic symptoms, worries and posttraumatic symptoms (PTSS) [4,5]. As regards PTSS, studies [6, 7] found that the symptoms of PTSS are higher in mothers of CCS compared to mothers of a childhood cancer patient. On average, the psychological distress is highest during the diagnosis and studies found no gender differences between mothers and fathers in the long-term [8,9]. Clinical studies demonstrated diverse social concerns such as financial burden and marital strain [10,11] but also a trend to somatization, sleeping and marital problems [11]. From the parents' point of view, studies revealed major themes of relapse [12], worries about well-being, uncertainties about consequences of illness but also overprotective behaviour [13].

Nevertheless, the cancer experience may not necessarily be all negative for parents of CCS. Some studies [14, 15] highlight "growth experience" and resilience. Indeed, parents reported a positive "growth experience" and changed their life perspectives and priorities. Studies reported diverse themes retrieved from clinical interviews (e.g. closeness and family togetherness) and the positive effect of protective factors on parental adjustment (e.g. social support, family functioning, marital cohesion). For instance, a high perceived social support was related to high perceived sense of mastery, low perceived stress and led to less distress in parents of CCS)[16]. It is to be finally mentioned, that the parental adjustment depends on the interaction of various factors (e.g. psychological, cognitive, social) occurring through a specific social and cultural context.

In the field of pediatric oncology, few researchers have examined the role of personality on psychological adjustment in parents of CCS. One important and fairly new aspect is the concept of " intolerance of uncertainty" (IU) and its potential effects on psychological adjustment over time. In this context impregnated with constant uncertainty, it is reasonable to assume that some factors may influence the parents' adjustment. Indeed, the process of survivorship is choked with uncertainty for the parent because the child remains at risk of relapse and/or suffers from noxious effects of the disease (sequelae, neurological disorders, endocrine pathologies). Therefore, if the parent is initially sensitive to uncertainty (intolerant of uncertainty), it could be more difficult for the parent to adjust and to regulate behaviours. The findings on IU are quite consensual, and describe it as a personality trait factor, which is implicated in diverse emotional disorders, namely across anxiety disorders (e.g. generalized anxiety disorder) and leads to misperception with more hypervigilance reactions inducing more cognitive biases (attentional bias towards the threat) [17, 18,19].

The lack of longitudinal studies integrating the vulnerability factor of IU is observed in the current research on parents' psychological adjustment. In order to obtain more definitive information about the status of IU, we conducted a prospective follow-up study. The first aim was to compare the prevalence of IU over time. We hypothesized that parents who are identified as intolerant of uncertainty at the first assessment will preserve this trait at the second assessment because it is a relatively permanent personality trait. The second aim was to examine the role of the associated difficulties of the IU (i.e. excessive worries, cognitive avoidance, negative problem orientation, rumination and positive beliefs about worry) over time. We hypothesized that parents who are intolerant of uncertainty will also preserve these associated difficulties related to IU at both assessments.

METHODS

Participants and procedure

Note. We tested these parents twice: at treatment completion (time 1) and 3 months later (time 2).

The study took place in two centres treating childhood cancer in Liège (Belgium). Inclusion criteria were to be French-speaking and to be parents of CCS who had been diagnosed in remission (aged between 4 and 6 years) after neoadjuvant chemotherapy. Exclusion criteria were diagnosis of cancer treated only by surgery, radiotherapy (with no adjuvant chemotherapy), benign tumour and non-French-speaking parents.

Follow-up telephone calls were made and letters sent to arrange data collection. Subsequent to exclusion criteria, there were 311 presumed-eligible participants among these 50.80% included therapeutic protocol (e.g. benign tumour, surgical resection or radiotherapy), 9.96% were children who were no longer followed at the hospital and contact could not be established (e.g. moving away), the remission range was exceeded or too recent (8.70%), the child died (8.36%) and, the child had a relapse (2.57%). The characteristics of the study groups are listed in Table 1.

There were 61 parents at the first assessment (mothers: n = 45; fathers: n = 16) from 150 families of CCS. Mean age for mothers was 43.8 years and for fathers 46.25 years. The majority of parents had completed some postsecondary education (22 mothers, [78 %]; 6 fathers, [22%]. Among CCS, 37 were males and 24 were females. The mean age at diagnosis of remission for the child was about 8.7 years (*SD*, ± 5.6). Ten parents were unable to perform the follow-up study: three because of an inability to attend assessment and seven because they were at work. Therefore, there were 51 of 61 parents at the second assessment (mothers: n = 39; fathers: n = 12).

The Ethics commission accepted the research plan. The subjects signed an informed consent form.

Insert here Table 1

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Measures

Parents of CCS responded to several questionnaires and performed two Stroop tasks: classic Stroop test and emotional Stroop test (first assessment/Time1). Three months later, parents returned to the laboratory and completed the same questionnaires and performed the two Stroop tasks again (second assessment/Time2).

The questionnaires for the parents were:

Medical variables

Eight medical variables were included in this study. The two main categories were the *child's medical condition* and *his/her socio-demographic status*. Medical condition was related to the type of cancer, the number of cytotoxic cures, hospitalizations the year before the study and medical appointments. Socio-demographic status included the gender of the CCS and the age of the child at the diagnosis of cancer, remission diagnosis and the child's current age in the course of the study.

Psychological distress: somatic symptoms, anxiety, depression and worry

The Psycho Soma-Oncology Scale (PSOS, [20]) is an 8-item self-report instrument that assesses psychosomatic symptoms; items are rated on a 5-point Likert scale (i.e., ranging from "1:Not at all typical of me" until "5: Very typical of me"). The PSOS examines six dimensions: insomnias, loss of energy, weight, gastrointestinal symptoms, headaches and sexual disorders. Our exploratory reliability statistics observed sufficient internal consistency for the scale (α = .657).

The Hospital Anxiety Depression Scale (HADS, [21]) is a 14-item instrument assessing anxiety (7 items) and depression (7 items). Internal consistency of both subscales is excellent (anxiety Cronbach's α =0.84-0.85; depression Cronbach's α=0.79-0.81).

The Penn State Worry Questionnaire (PSWQ, [22]) is a 16-item self-report instrument that assesses excessive and pathological worry; items are rated on a 5-point Likert Scale (i.e., ranging from "1:Not at all typical of me" until "5: Very typical of me"). PSWQ demonstrates good internal consistency (α = .84). For the needs of the current study, we retained 10 of the 16 PSWQ items which were relevant to parents of CCS. The instruction was modified and presented as following: "about the evolution of my child's health". Examples of the items include " My worries overwhelm me" (item 1). Our exploratory results showed good internal consistency (α =. 765) (PSWQ-R15) [23].

The Intolerance of Uncertainty Model: intolerance of uncertainty, positive belief about worry, negative problem orientation, cognitive avoidance and rumination

The Intolerance of Uncertainty Scale (IUS, [24]) is a 27-item self-report instrument that assesses beliefs about uncertainty. Items are rated on a 5-point Likert scale (i.e., ranging from "1:Not at all characteristic of me" until "5: Entirely characteristic of me"). IUS demonstrates excellent internal consistency (α = .94).

The Why Worry Questionnaire second version (WW-II, [25]) is a 25 item self-report measure containing five subscales of which each subscale assesses one type of positive belief about worry: (1) problem solving, (2) motivation, (3) emotion, (4) magical thought and (5) positive personality trait. WW-II demonstrates excellent internal consistency (α = .93).

The Negative Problem Orientation Questionnaire (NPOQ, [26]) is a 12-item self-report instrument on a 5-point Likert scale (i.e., ranging from "1:Not at all true of me" until "5: Extremely true of me") that assesses dysfunctional cognitive pattern influencing the ability to solve daily life problems. NPOQ has excellent internal consistency ($\alpha = .92$).

The Cognitive Avoidance Questionnaire (CAQ, [27]) is a 25-item measure of the tendency to use cognitive avoidance when dealing with threatening intrusive thoughts. CAQ contains five subscales, each of which assesses one type of avoidance strategy: (1) substitution, (2) transformation, (3) distraction, (4) avoidance and (5) thought suppression. CAQ has excellent internal consistency ($\alpha = .95$).

The Mini Cambridge-Exeter Repetitive Thought Scale (Mini-CERTS, [28]) is a 14-item scale assessing seven constructive (i.e., CET; "concrete experiential thinking") and seven unconstructive (i.e., AAT; "abstract analytical thinking") modes of thinking. The items were rated on a 1-4 scale (ranging from 1= almost never to 4 = almost always). Coefficients for the AAT ($\alpha =. 75$) and CET ($\alpha =. 77$) scales indicated acceptable internal consistency.

Cognitive processes: control of interference and cognitive inhibition: Stroop tasks

Two Stroop tasks (classic Stroop test and emotional Stroop test) were used in order to assess the effect of IU on cognitive processes. It is noteworthy that we did a pre-test for the selection of the words (positive, negative, coloured and neutral). Parents were instructed to target the colour of words both emotional and control (or neutral) while ignoring the semantic of the word. Emotional and neutral words in red, green, blue and yellow were displayed separately on a black computer screen. Inquisit software (Inquisit version 4.0.9.0 Lab) was used on a computer (MacBook, OS X; version 10.11.15). This neuropsychology software allows the encoding of a neuropsychological script (similar to the E-Prime program).

Our design was built upon 130 trials (10 training trials and 120 experimental trials (30 coloured, 30 negative, 30 positive and 30 neutral stimuli)). Each target was presented during 500 milliseconds (ms.) and followed by a white screen during 250 ms. [29]. Examples of positive words were: [*happy, wonderful*], negative words (centred on parents of CCS) [*tumour, bereavement*], coloured [*blue, green*] and neutral [*word, page*].

To assess the attentional bias toward emotional words, we calculated the mean time reaction [RT] to target the colour of the emotional stimuli (positive and negative) and subtract it from the mean time reaction to probe the neutral words. The term *interference* is used to describe the cognitive process that occurs during the emotional Stroop task. Interference is calculated as follows:

- *Coloured interference* (CI)=$RT^{\text{coloured words}} - RT^{\text{neutral words}}$ (classic Stroop test)
- *Negative interference* (NI) = $RT^{\text{negative words}} - RT^{\text{neutral words}}$ (emotional Stroop task)
- *Positive interference* (PI) = $RT^{\text{positive words}} - RT^{\text{neutral words}}$ (emotional Stroop task)

It is noteworthy that for the second assessment, we changed the words for all categories (i.e. negative, positive and neutral) except for the coloured words category.

RESULTS

Statistical analyses were performed using SPSS for Mac, released 10.11.15. For descriptive statistics, mean and standard deviation were calculated. We used repeated ANOVA measures in order to compare if the test detected any overall differences between the first and the second assessment.

TIME 1: AT TREATMENT COMPLETION

Correlations between medical variables and IU scores at the first assessment

Correlations between medical variables measured at the first assessment and parents' IU scores are presented in Table 2. Of the eight medical variables, the type of cancer was significantly associated with higher IU scores at the first assessment ($r_s = .267$, p <5%) while the number of hospitalizations (the year before our study) was significantly associated with lower IU scores at the first assessment ($r_s = -.294$, p <5%).

Results showed that parents of CCS treated for lymphoma, nephroblastoma or soft tissue tumor presented a high IU score. In addition, parents whose children were hospitalized the year before our study, showed a lower IU score than those who were not admitted to the hospital that year. No significant association was found between the age of the child at the diagnosis of cancer or remission, the current age of the child and the number of cytotoxic cures or medical appointments at the first assessment.

Insert here Table 2

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TIME 2: 3 MONTHS LATER

Prevalence of psychological distress in parents of CCS over 3 months

The results of the psychological distress for parents are presented in Table 3. At the first assessment (N = 61), 40 % of the participants presented significant symptoms of depression with a higher trend for mothers (67%).

Concerning anxiety, 70 % of the sample showed a score beyond the threshold of 7 points on the HADS anxiety subscale. At the second assessment (N=51), 33% of the participants remained on a pathological border of depression (score ≥ 7 points) and 65 % continued to suffer from anxiety (n= 33/51/ score ≥ 7). At the first assessment, the total score for HADS was 15.56 with a standard deviation about 8.62. At the second assessment, the total score for HADS was 14.37 (a slight decrease) and the paired difference was about 1.19 (t (50) = 2.152; p = 0.036). Although the HADS score had slightly decreased, parents of CCS stayed on a pathological border for anxiety (depression was not significantly pathological).

As regards somatic symptoms, at the first assessment, a majority of the participants suffered from sleep disturbances and loss of energy. A significant difference was found for the somatic symptoms between the two assessments (t (50) = -2.194, p = 0.033). Results revealed an increase of the somatic symptom score (+1.666; SD = 5.42) at the second assessment for the sexual dysfunction item (t (50)= -3.314, p = 0.002).

Lastly, there was no significant difference between the two assessments for parental worries (PSWQ-R15) related to the health evolution of their child. On average, parents of CCS had moderate to high worries about the health evolution of their child and scored alike for the second assessment.

Insert here Table 3

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The Intolerance of Uncertainty Model in parents of CCS over 3 months

The behavioural measures results for parents are presented in Table 4. The sum variables for the Intolerance of Uncertainty Scale (IUS), the Why Worry Questionnaire (second version) (WW-II), the Negative Problem Orientation Questionnaire (NPOQ) and the Cambridge Exeter Repetitive Thought Scale (CERTS) showed no statistically significant differences between Time 1 and Time 2 (p>5%).

As regards descriptive analysis, parents of CCS showed a high score for the IUS during the 3-month follow-up period ($M_I = 60.05/SD_I = 21.46$; $M_{II} = 57.19$ / $SD_{II} = 21.63$) (the authors' standards [24]: a total score of IUS >47 revealed significant intolerance of uncertainty in adults). A thorough case-by-case analysis was performed for the IUS. This analysis aimed to verify if some parents who were intolerant of uncertainty at the first assessment would become tolerant of uncertainty at the second assessment. The analysis revealed no change from intolerance of uncertainty towards tolerance of uncertainty. Therefore, parents who were intolerant of uncertainty at the first assessment (total score of IUS> 47) tended to maintain a high score on the scale 3 months later and continued to present some associated difficulties (e.g. cognitive avoidance and positive beliefs about worry).

Lastly, one statistically significant change was the cognitive avoidance (CAQ) score. A decrease was found between the first and the second assessment (t (50)= 2.153; p = 0.036). At the first assessment, the mean score was 54.33 with a standard deviation of 21.20 and at the second assessment the mean score was 51.19 with a standard deviation of 19.54. In spite of this significant difference (p<5%), parents of CCS are still situated in the superior border for this variable (the authors' standards [27]: [34.46 - 69.84]) (See Figure 1. Paired differences for somatic symptoms, HADS and cognitive avoidance).

Insert here Table 4

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Insert here Figure 1

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Cognitive processes: control of interference and cognitive inhibition in parents of CCS over 3 months

The results of the two Stroop tasks are presented in Table 5.

No significant differences between the two assessments were found for coloured interference (CI), negative interference (NI) and positive interference (PI) (p>5 % for NI, PI and CI). In general, CI [$RT^{colour\ words}$ - $RT^{neutral\ words}$] and NI [$RT^{negative\ words}$ - $RT^{neutral\ words}$] (ms.) were slightly higher than positive interference [PI] (except for the second assessment where they were slightly faster for NI compared to PI and CI). These results may indicate an increased response time for negative emotional and coloured words compared to positive emotional words. These results may be explained by the presence of an attentional bias towards threatening stimuli (i.e. negative words) and a cognitive inhibition deficit because the parents tended to be slower for coloured words.

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DISCUSSION

This study is the first to compare the prevalence of IU among parents of CCS over a 3-month period. Despite its relatively small sample size, this study population represents an entire group of parents of CCS recruited in Belgium. Overall, parents of CCS showed considerable rates of IU (score > 47 on the IUS) at both time points, amounting to 60% at Time 1 and 62% at Time 2. Our study showed that IU and its difficulty rates stayed practically unchanged over the 3-month period highlighting it as a stable personality trait. Therefore, parents who are intolerant of uncertainty would tend to maintain these difficulties over time. As for notable changes, we found two decreases between the two assessments for cognitive avoidance and HADS. In spite of this slight decrease for both these components, parents met the criteria of clinical anxiety and used cognitive avoidance strategies. Conversely, the paired analysis for somatic symptoms revealed a significant change with an increase between the two assessments. The results observed an increase in sexual disorders and a slight increase in insomnia at Time 2. Furthermore, some significant correlations at Time 1 were found between the type of cancer and the IU score (positive relation) and between the number of hospitalizations and the IU score (negative relation).

Our study had four limitations that merit mention.

Firstly, we assessed by standardized questionnaires (except for PSOS and PSWQ-R15) with sufficient psychometric values, but without direct clinical interviews. It would be advantageous to integrate semi-structured interviews (mixed method design) in order to obtain more clinical indications of IU, to analyse the entire range of parental experience and to highlight other dimensions influencing IU (e.g. risk factors: pessimism, anxiety trait; protective factors: coping strategies, family cohesion, social support)[11].

Secondly, this population of parents was difficult to access because CCS*s* only attend the hospital for check-up once a year. It would be relevant to conduct a multiple prospective follow-up study constructed on four times of assessment (at 3 months, 6 months, 9 months and 12 months) in order to obtain more precise measures of the state of the IU. This systematic measure would allow observation of variations (improvement or degradation) of IU and its difficulties over time and would answer the question of the stability (or not) of the IU[17,18]. The results of our study partially answered the question of stability and we need to develop more tools to assess IU in order to get closer to the true score of IU in parents of CCS. At the present time, IU prevalence rates can only be considered as an estimation of IU rates and 3 months is not enough time in this population to have definitive conclusions about the IU.

Thirdly, we could not measure in this study some factors which may have an impact on parental distress. The child's psychological adjustment was not considered, although associations between parents and their child's psychological condition have been reported previously [13]. Post-traumatic stress syndrome is also a relevant factor. This factor is frequently described in studies investigating parents of CCS. The traumatic aspect of the cancer experience and its associated effects may lead to greater distress and the occurrence of hypervigilance and ruminations for parents [9,11].

Finally, we could not evaluate the role of social desirability in the parents' responses. Indeed, studies [30] found a higher score of IU among medical populations. It would be interesting to compare the percentages of our population to the non-medical population. Despite these limitations, the results of our study highlight the presence of a sub-clinical population which could present the vulnerability factor of IU and may be at risk for long-term and possibly permanent distress.

Clinical implications

However, our present study has two major strengths. First, the study evaluates IU in parents of a CCS not only at a single point in time but over a period of 3 months. Indeed, studies using a longitudinal design are still few in the oncology literature where the great majority are cross-sectional. Second, this study integrated a neuropsychological tool (classic Stroop and emotional Stroop task) in order to obtain more precise results for cognitive processes and specifically the control of interference and cognitive inhibition.

Overall, this study raises awareness of the need for ongoing monitoring of IU among parents of CCS; and opportunities for future research, incorporating parent interviews and intervention development. Indeed, it is relevant to hypothesize that if parents of CCS were already intolerant of uncertainty they would also be intolerant of uncertainty during their child's treatments and after. Therefore, these results highlight the necessity to identify parents who are at risk for IU at an early stage of the cancer management in order to propose personal psychological interventions (e.g. problem solving therapy), to adapt certain cognitive strategies (e.g. excessive worries, cognitive avoidance), to develop resilience, and to promote "positive growth" for the parents (holistic approach to the exploration of IU).

Health care professionals should be sensitized for the appearance of IU symptoms such as positive beliefs about worry, cognitive avoidance, ruminations, and hypervigilance. After identifying those parents most in need of support, the next step is to develop a screening tool related to IU and its associated difficulties during the diagnosis, treatments period and remission.

While strategies and interventions to minimize the child's distress have become part of comprehensive medical care in paediatrics, it also becomes urgent to develop research into parents of CCS in order to: [1] train the medical staff to identify the serious issue of parental IU, which can promote severe distress over time; [2] detect other markers of vulnerabilities (e.g. pessimism, anxiety trait) and [3] provide them with a personalized psychological intervention.

This would allow vigilance of the medical staff in detecting parents' distress and could defuse their descent into a vicious circle of hypervigilance created by intolerance of uncertainty (IU).

Table 1. Characteristics of the parents

	At the first assessment (I) (N=61)		***At the second assessment (II) (n = 51/N = 61)***	
Variable	***N***	%	***N***	%
Remission group (parents of CCS)				
4 years	***29***	*48%*	***23***	45%
5 years	***19***	*31%*	***15***	29%
6 years	***13***	*21%*	***13***	26%
Gender				
Mother	***45***	*74%*	***39***	76%
Father	***16***	*26%*	***12***	24%
Marital status				
Single	***5***	*8%*	***5***	10%
Married/ with a partner	***48***	*79%*	***40***	78%
Divorced/ separated	***8***	*13%*	***6***	12%
Education				
Elementary school	***1***	2%	***1***	2%
Junior High School	***16***	*26%*	***12***	24%
Senior High school	***16***	*26%*	***12***	24%
Undergraduate	***23***	*37%*	***22***	43%
University (Masters)	***4***	*7%*	***3***	5%
Post-University	***1***	*2%*	***1***	2%
Working status				
High-skilled worker	***7***	*11%*	***5***	10%
Employee	***26***	*43%*	***24***	47%
Manager	***1***	*2%*	***1***	2%
Independent worker	***10***	*16%*	***8***	15%
Unemployed	***4***	*7%*	***2***	3%
Incapacity	***5***	*8%*	***5***	10%
Retirement	***1***	*2%*	***1***	2%
Other	***7***	*11%*	***6***	11%
Working Hours				
Full time	***26***	*43%*	***23***	45%
Part time	***20***	*32%*	***17***	34%
Job-hunting	***4***	*7%*	***2***	3%
Incapacity	***6***	*9%*	***5***	10%
Retirement	***1***	*2%*	***1***	2%
Other	***4***	*7%*	***3***	6%
Gender of the CCS				
Girl	***24***	*39%*	***24***	47%
Boy	***37***	*61%*	***27***	53%
Mean age of CCS at the diagnosis of remission	*8.7 years (SD, ± 5.6).*		/	

Note: CCS: childhood cancer survivor

Table 2. Correlations between medical variables and parents' IU scores at Time 1

Variables	**IU Time 1**
	r_s
Type of cancer	*.267**
Number of cytotoxic cures	*.171*
Number of hospitalizations last year	*-.294**
Number of medical appointment	*-.166*
Gender of the CCS	*-.025*
Age of the child at the diagnosis of cancer	*.063*
Age of the child at the diagnosis of remission	*.082*
Current age of the child cancer survivor	*.089*

Note. IU = intolerance of uncertainty

*** $p < 0.05$; ** $p< 0.01$**

Table 3. **Prevalence of psychological distress in parents of CCS over 3 months** (paired samples statistics / N=51)

Measures	**At the first assessment (I) (n = 61)**		**At the second assessment (II) (n = 51)**		**Paired differences**	**95% Confidence Interval of the Difference**		**t**	**df**	**Sig. (2-tailed)**
	Mean	SD	Mean	SD	Mean (score I – score II)	Lower	Upper			
Somatic symptoms	14.68	6.86	16.35	7.07	-1.666	-3.19	-.140	-2.19	50	***.033****
HADS	15.56	8.62	14.37	7.75	1.19	.079	2.31	2.152	50	***.036****
PSWQ-R15	25.21	7.91	23.96	6.34	1.25	-.153	2.66	1.790	50	*.080*

Notes: HADS: Hospital anxiety depression scale; PSWQ-R15: Penn state worry questionnaire revised.

*** p < 0.05; ** p< 0.01**

Table 4. **The Intolerance of Uncertainty Model in parents of CCS over 3 months** (paired samples statistics / N=51)

Measures	**At the first assessment (I) (n=61)**		**At the second assessment (II) (n=51)**		**Paired differences**	**95% Confidence Interval of the Difference**		**t**	**df**	**Sig. (2-tailed)**
	Mean	SD	Mean	SD	Mean (score I – score II)	Lower	Upper			
IUS	60.05	22.37	57.19	21.63	2.86	-.441	6.16	1.740	50	*.088*
WW-II	46.35	18.67	44.37	17.07	1.98	-.870	4.83	1.395	50	*.169*
NPOQ	25.68	10.22	24.60	10.26	1.07	-.661	2.81	1.245	50	*.219*
CAQ	54.33	21.20	51.19	19.54	3.13	.211	6.06	2.153	50	***.036****
Mini-CERTS	37.33	6.62	36.31	6.50	1.01	-.533	2.57	1.318	50	*.193*

Notes: IUS: the intolerance of uncertainty scale; WW-II: Why worry questionnaire; NPOQ: negative problem orientation questionnaire; CAQ: cognitive avoidance questionnaire; ***Mini-****CERTS:* ***Mini-****Cambridge Exeter repetitive thought scale.*

$* p < 0.05$; $** p< 0.01$

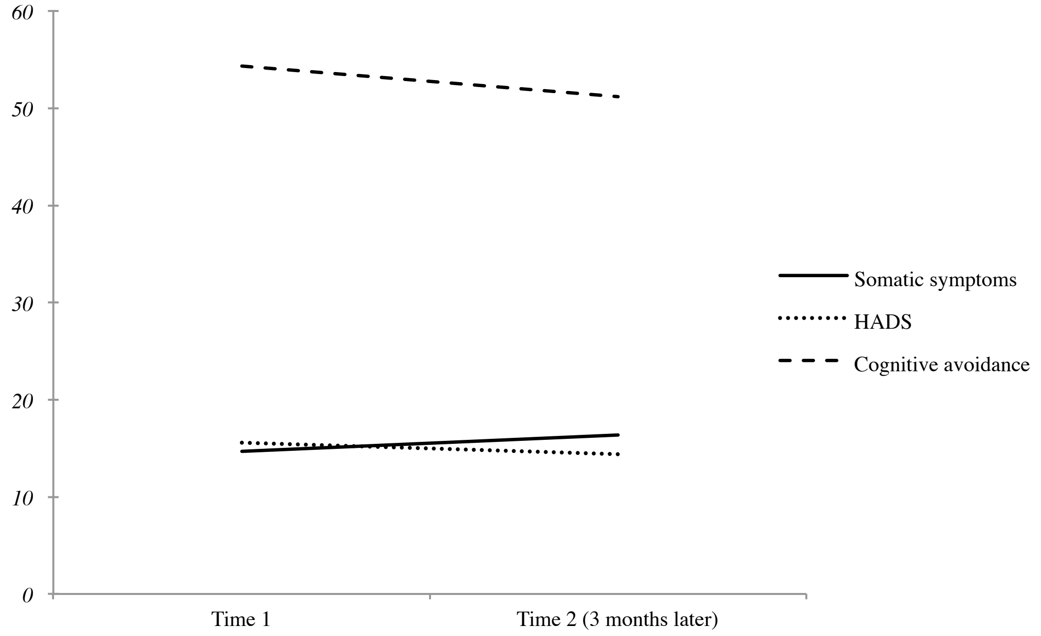
Table 5. **Cognitive processes: control of interference and cognitive inhibition in parents of CCS over 3 months** (paired samples statistics / N=51)

Measures	**At the first assessment (I) (n=61)**		**At the second assessment (II) (n=51)**		**Paired differences**	**95% Confidence Interval of the Difference**		**t**	**df**	**Sig. (2-tailed)**
	Mean	SD	Mean	SD	Mean (score I – score II)	Lower	Upper			
CI	**40.22**	67.70	**28.32**	43.82	11.89	-11.02	34.82	1.043	50	*.302*
NI	**10.18**	56.14	**8.81**	37.09	1.37	-17.45	20.200	.146	50	*.884*
PI	**-4.93**	39.71	**9.44**	36.65	-14.37	-30.36	1.627	-1.80	50	*.077*

Notes: CI: coloured interference; NI: negative interference; PI: positive interference

*** p < 0.05; ** p< 0.01**

Figure 1. Paired differences for somatic symptoms, HADS and cognitive avoidance



Note. We tested these parents twice: at treatment completion (time 1) and 3 months later (time 2).

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