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ORIGINAL RESEARCH—PAIN

Vaginismus: Heightened Harm Avoidance and Pain Catastrophizing Cognitions

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ABSTRACT

Introduction. Catastrophic appraisal of experienced pain may promote hypervigilance and intense pain, while the personality trait of harm avoidance (HA) might prevent the occurrence of correcting such experiences. Women inflicted with vaginismus may enter a self-perpetuating downward spiral of increasing avoidance of (anticipated) pain. In vaginismus the anticipation of pain may give rise to catastrophic pain ideation. This may establish hypervigilance toward painful sexual stimuli, which consequently results in negative appraisal of sexual cues. This process could impair genital and sexual responding, intensify pain and trigger avoidance, which in turn may contribute to the onset and persistence of symptoms in vaginismus and to certain extent also in dyspareunia.

Aims. To investigate whether women suffering from vaginismus are characterized by heightened levels of habitual pain catastrophic cognitions, together with higher levels of HA.

Methods. This study consisted of three groups: a lifelong vaginismus group (N = 35, mean age = 28.4; standard deviation [SD] = 5.8), a dyspareunia group (N = 33, mean age = 26.7; SD = 6.8), and women without sexual complaints (N = 54, mean age = 26.5; SD = 6.7).

Main Outcome Measures. HA scale of Cloninger's tridimensional personality questionnaire, and the pain catastrophizing scale.

Results. Specifically women inflicted with vaginismus showed significantly heightened levels of catastrophic pain cognitions compared with the other two groups, as well as significant enhanced HA vs. the control group, and a trend vs. the dyspareunia group. Both traits were shown to have cumulative predictive validity for the presence of vaginismus.

Conclusion. This study focused on the personality traits of catastrophizing pain cognitions and HA in women with lifelong vaginismus. Our findings showed that indeed, women suffering from vaginismus are characterized by trait of HA interwoven with habitual pain catastrophizing cognitions. This study could help in the refinement of the current conceptualization and might shed light on the already available treatment options for women with vaginismus. **Borg C, Peters ML, Weijmar Schultz W, and de Jong PJ. Vaginismus: Heightened harm avoidance and pain catastrophizing cognitions. J Sex Med 2012;9:558–567.**

Key Words. Harm Avoidance; Pain Catastrophizing; Sexual Pain Disorders; Vaginismus; Dyspareunia; Personality Traits

Introduction

In the current version of the Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR), vaginismus falls under the umbrella of sexual pain disorders [1].

In the present study, we used the definition suggested by an international consensus committee, which more comprehensively describes vaginismus as *persistent difficulties to allow vaginal entry of a penis/finger/object, despite the woman's expressed wish to do so. There is a variable involuntary pelvic floor muscle*

contraction (phobic) avoidance and anticipation/fear/experience of pain (p. 45) [2]. Vaginismus may occur in approximately 0.5% to 1% of women of child-bearing age, although accurate estimations are lacking [3]. Although pain is not required for the diagnosis of vaginismus, women inflicted with this disorder typically report pain; for instance, with vaginal palpitation during the gynecological examination [4].

Recently, it has been argued that the fear-avoidance model previously applied to chronic musculoskeletal pain can be applied to sexual pain disorders such as vaginismus, as similar affective and cognitive processes seem to be also involved in the perception and maintenance of *sexual* pain [5–8]. Previous studies in the context of musculoskeletal pain have shown that habitual pain catastrophizing (PC) and fear-avoidance beliefs may contribute to the development and/or maintenance of pain symptoms [9–11]. Thus, the habitual tendency to interpret pain signals in a catastrophic manner may be involved in the transition from acute to chronic pain symptoms [12–14]. In line with this, the fear-avoidance model of chronic pain indicates that catastrophic appraisal of experienced pain may promote hypervigilance and avoidance behavior [11,15]. Hypervigilance has been long attributed to cognitive misinterpretation and perceptual amplification of bodily sensations, symptoms, or cues [16,17]. Accordingly, catastrophic pain cognitions will operate in a way to intensify the pain experience and thus trigger further avoidance behavior, hence preventing the correction of such experiences [18,19]. As a consequence, people may enter a self-perpetuating downward spiral of increasing avoidance and anticipated pain.

In vaginismus, sexual pain or the anticipation of sexual pain may similarly give rise to catastrophic ideation (e.g., *vaginal penetration will be painful*) and vaginal penetration-related fear [4,5,20]. In turn, the anticipation of catastrophic consequences may well contribute to hypervigilance toward painful sexual stimuli and stimuli that may predict painful experiences, which may not only lower the threshold for negative physical sensations or touch, but may also contribute further to a negative appraisal of sexual cues, avoidance, and/or withdrawal [15,21]. Additionally, attempts of penetration that are met with a defensive pelvic floor muscle contraction or increased muscle tone may well add to the negative cognitions and confirm the negative expectations [4,20,22]. Germane to this model, there is evidence that people with sexual pain show

heightened vigilance for coital pain and selective attention toward pain stimuli [15].

PC has been broadly conceived as an exaggerated negative “mental set” brought to bear during actual or anticipated pain experience, which contributes to more intense pain and emotional distress [23]. Catastrophizing is described as a multidimensional trait in which activation, appraisal, attention, and coping are intertwined with the experience of noxious events [23]. Several studies have shown that dispositional PC has predictive value for the intensity of experimentally induced pain response [24,25]. This supports the view that dispositional catastrophizing can be considered as an enduring mode of responding that impacts on various pain experiences. One would expect that women who show a habitual tendency to make such catastrophic interpretations of pain are likely to also apply a similar strategy to situational pain during (attempts of) penetration. Consistent with this idea that dispositional PC can be interpreted as a distal factor influencing more specific PC cognitions, previous research in the context of experimental pain typically reported correlations of around 0.45 between dispositional and pain specific situational catastrophizing [25,26]. Thus, if indeed dysfunctional pain cognitions play an important role in the etiology and maintenance of sexual pain disorders, women with high PC would be especially at risk for developing this type of disorder. However, previous research has not found this straightforward association with heightened levels of generalized PC in women with vaginismus [4,27].

One explanation could be that the relationship between generalized PC and the development of sexual pain during vaginal penetration is moderated by individuals’ habitual sensitivity for signals of punishment (such as pain) often defined as harm avoidance (HA) [28–30]. HA is a *tendency to respond intensely to previously established signals of aversive stimuli and to learn to passively avoid punishment, novelty and frustrating non-reward* (p. 32) [28]. Thus, the personality trait of HA is generally associated with hesitation, pessimism, being fearful, and doubtful, and will logically support pain avoidance or escape behaviors, thereby preventing the disconfirmation of PC cognitions [28]. Therefore, the influence of trait PC would be especially prominent in generating persistent dysfunctional pain-related cognitions in women with relatively strong trait HA. If so, women with both high HA and high PC would be especially prone to develop vaginismus, and thus as a group, women with

vaginismus would be characterized by a combination of heightened trait HA and PC.

In addition, trait HA might also be more directly relevant in the development and maintenance of vaginismus. The enhanced tendencies to avoid behaviors/stimuli that may inflict harm which characterizes HA could well express itself in relatively strong defensive responses. In line with this, it has been shown that the harm-potentiated startle reflex is especially pronounced in high trait HA individuals [31]. In the context of vaginismus, this enhanced defensive responding might also be reflected in relatively strong contraction of the pelvic floor muscles/vaginal flinching, which would logically interfere with sexual responding [4,22]. Following this, heightened trait HA per se may also contribute to the increased avoidance of vaginal penetration activities and defensive behaviors during gynecological examination, even independent of PC [4].

To test the specificity of PC and HA in vaginismus, we added both a control group of women without sexual complaints, and a clinical control group of women suffering from dyspareunia, a sexual dysfunction from the same diagnostic category as vaginismus (i.e., sexual pain disorders). Thus, the purpose of also including a dyspareunia group in this study was to add specificity in testing our hypothesis in a homogenous group of women with lifelong vaginismus. Whereas the inability to have sexual intercourse is most central to vaginismus, for dyspareunia recurrent genital pain is the defining feature. Accordingly, dyspareunia is succinctly defined, as *recurrent or persistent pain during sexual activities with attempts or successful completion of penile-vaginal intercourse* [2,3]. For dyspareunia, its prevalence varies considerably with estimates as low as 0.4% up to 61% [32]. This high variation in this group reflects the inconsistent use of case definition and the heterogeneity of dyspareunia [33,34]. Provoked vestibulodynia (PVD), which is a common cause underlying dyspareunia, is estimated to affect 12% of premenopausal women in the general population [35]. Several studies showed that penetration-specific PC is an important component of dyspareunia and PVD [27]. Therefore, enhanced general PC might also contribute to the development of dyspareunia (i.e., via influencing situational catastrophizing). However, just as for women with vaginismus, previous studies failed to find convincing evidence for heightened habitual PC in women with dyspareunia/PVD [27,36]. Nevertheless, perhaps also for this category of sexual pain disorders,

especially the combination of heightened HA and PC is most relevant rather than heightened PC per se. Germane to this speculation, previous research has provided preliminary evidence that PVD is indeed associated with heightened HA [37].

The present study was designed to examine whether women with vaginismus are indeed characterized by heightened levels of both trait PC and trait HA, and to explore whether these characteristics are restricted to lifelong vaginismus or are more broadly involved in sexual pain disorders in general.

Methods

Participants

This study consisted of three groups: a lifelong vaginismus group (N = 35, mean age = 28.4; standard deviation [SD] = 5.8), a dyspareunia group (N = 33, mean age = 26.7; SD = 6.8), and healthy women without sexual complaints (N = 54, mean age = 26.5; SD = 6.7). The two clinical groups were recruited at the University Medical Center Groningen (UMCG). The healthy controls were recruited after the participants themselves contacted the research team following advertisement in the local media and on the university premises. A screening was conducted with the clinical group as well as with the healthy controls. The phone screening was especially important for the healthy controls to assure that we would only recruit women without sexual complaints. This screening was conducted over and above the other procedures. There were no significant differences in demographic data ($P > 0.10$) between the three groups in terms of age and education level. All the women were Caucasian and native Dutch individuals. The participants had to be involved in a heterosexual relationship for a minimum of 6 months to be eligible for participation in the study.

An experienced gynecologist/sexologist examined both clinical groups (i.e., lifelong vaginismus and dyspareunia) using a gynecological–sexual clinical interview routinely used in our department as part of the assessment and diagnostic procedure [38–42]. The gynecological–sexual clinical interview included questions whether the women have tried and succeeded to insert a finger, penis, or any other object (e.g., tampon) in her vagina. In addition, the diagnostic procedure included a physical examination following a thorough history of the participants, in accordance with recent comprehensive guidelines [43]. During the physical exam, the women were always accompanied by their

partner. To have a sense of control, preparation was done in advance by informing the woman that she has full autonomy to end the examination at any time, and was also reassured that a speculum was never used in the diagnostic procedure. As a first step, the woman was given a mirror and the gynecologist guided her through an anatomical description of her genital area using a moistened cotton swab to identify all structures. Once encouraged to feel as relaxed as possible, the woman was asked to press against the gynecologist finger—placed on the hymen. At this point, in women with lifelong vaginismus, the gynecological–sexual exam was usually terminated due to overactivity of the pelvic floor and/or involuntary guarding behavior. In this study, the diagnosis of lifelong vaginismus and of dyspareunia was made based on formulated criteria by Basson et al. [2]

Inclusion criteria for the (acquired/lifelong) dyspareunia group were persistent or recurrent pain in at least 50% of attempted or complete vaginal penetrations and/or penile–vaginal intercourse, with duration of 6 months or more. In the current study, the dyspareunia group was found to be composed of 60.6% of women with PVD. In order to have a highly homogenous group, no women included in the lifelong vaginismus group had a diagnosis or comorbidity of PVD. For the purpose of this study, inclusion in the lifelong vaginismus group was only possible when in the context of being assisted to relax, attempts to insert a finger into the vagina elicited an involuntary guarding reaction, and a report of state fear at the attempt (or even the thought) of vaginal penetration during the gynecological–sexual exam [44,45]. For the inclusion, this guarding–avoidance behavior had to be present also outside the clinic on attempts of vaginal penetration, together with the history of no previous vaginal penetration (finger, penis, or any other object) [2,45]. The total sample diagnosed with lifelong vaginismus and dyspareunia was recruited in the period of 2005–2011.

Measures

HA of the Tridimensional Questionnaire

The HA scale of the Cloninger's tridimensional personality questionnaire consists of 34 items with statements about one's feelings and beliefs [46,47]. Participants who score high on HA are described as individuals who worry a lot and perceive the future as more pessimistic, and who are usually anxious, doubtful, avoidant, shy, and easy to

exhaust [48]. The translated version of HA was used for this study. The psychometric properties of the Dutch HA have not been published but it has been used in several studies with Dutch samples, with generally good psychometric properties [49]. In the current study, the reliability of the HA scale in terms of internal consistency was excellent with a Cronbach's alpha of 0.85. Participants had to respond with either *True* or *False* to each of the statements.

Pain Catastrophizing Scale

Pain catastrophizing scale (PCS) is a 13-item self-report measure which consists of statements, describing thoughts, and feelings that people experience when they are in pain [50]. Thus, participants who score high on PCS are described as individuals who have a tendency to magnify the pain sensation, show difficulty diverting attention away from pain, and express an inability to cope with the pain [23]. The Dutch-translated PCS was used for this study [51]. This version of the PCS has shown to be valid and reliable [52]. The current study showed a Cronbach's alpha of 0.90. The participants were asked to read and indicate to what degree a given statement applies to them when they are in pain (with no specific context of pain) on a five-point scale from 0 (*not at all*) to 4 (*all the time*).

Procedure

This study is part of a broader ongoing research into the cognitive–motivational processes involved in sexual pain disorders. Part of the participants sample ($N = 80$) completed the questionnaires in the research lab; the other part of the sample ($N = 41$) filled in the questionnaires at their own house. Data from the second group were added from a sequential study using functional magnetic resonance imaging. Recruitment did not influence the results in any direction in terms of outcome measures. Approval was obtained from the Medical Ethical Committee of University of Groningen, and all the work was carried out according to its standard. A modest reimbursement was given to each participant after completion of the study.

Statistical Analysis and Data Reduction

To test the potential difference in PCS and HA across the three groups, we carried out a one-way analysis of variance (ANOVA) with each dependent variable (i.e., *HA and PCS total score*), and *Group* as the independent variable. Finally, in order to further explore to what extent PC and HA and/or

Table 1 Pain catastrophizing (PC) and harm avoidance (HA)

Group	PC total	HA total
Controls	17.4 (9.1):3–43	13.3 (6.2):2–33
Vaginismus	22.0 (9.3):1–39	16.5 (5.2):6–25
Dyspareunia	15.3 (7.3):5–34	14.6 (5.7):3–27

Mean (Standard Deviation): Range

their interaction ($PC \times HA$) are independently related to vaginismus and/or dyspareunia, a series of logistic regression analyses with dummy coded group as the dependent, and HA, PC, and ($PC \times HA$) as the predictors were done. Variables were centered before entering the analyses. Three comparisons were conducted in order to explore the unique predictability: (i) vaginismus vs. group free of sexual complaints; (ii) vaginismus vs. dyspareunia; and (iii) dyspareunia vs. group free of sexual complaints.

Results

Pain Catastrophizing

The means, SDs, and the range are presented in Table 1. There was a medium-sized main effect of group ($F [2, 119] = 4.9, P < 0.01, \eta^2 = 0.08$). As can be seen in Table 1, the vaginismus group ranked highest in PC cognitions, dyspareunia showed the lowest scores, and the women free of sexual complaints ranked in between the two clinical groups. Post hoc comparison using least square difference (LSD) demonstrated that women in the vaginismus group reported significantly more PC cognitions than women with dyspareunia ($M\text{-diff} = 6.3, SD = 2.1, P < 0.01$ [95% confidence interval (CI): 2.1–10.5]) and women free of sexual complaints ($M\text{-diff} = 4.6, SD = 1.9, P < 0.01$ [95%CI: 0.8–8.30]). There was no significant difference between the dyspareunia group and the group free of sexual complaints ($M\text{-diff} = -1.7, SD = 1.9, P > 0.05$ [95%CI: -5.6 to 2.1]).

Personality Trait of HA

A one-way ANOVA with *HA total score* as the dependent variables, and *Group* as the independent variable, showed a significant medium-sized difference between groups ($F [2, 119] = 3.23, P < 0.05, \eta^2 = 0.05$). Subsequent paired comparisons (LSD) demonstrated that women in the vaginismus group showed a significantly higher score than women free of sexual complaints ($M\text{-diff} = 3.21, SD = 1.3, P < 0.01$ [95%CI: 0.71–5.7]), whereas the difference between the vaginismus and dyspareunia

group did not reach significance ($M\text{-diff} = 1.9, SD = 1.4$ [95%CI: -0.9 to 4.7]). Neither did the dyspareunia group differ significantly from the group free of sexual complaints ($M\text{-diff} = 1.33, SD = 1.3, P > 0.05$).

HA and PC

The full first model containing all the predictors was statistically significant $\chi^2 (3, N = 89) = 15.93, P < 0.001$, indicating that the model was able to distinguish between participants belonging to the vaginismus group and those in the group free of sexual complaints. The model as a whole explained between 16.4% (Cox and Snell R square) and 22.2% (Nagelkerke R squared) of the variance in group membership, and correctly classified 64% of the participants. On inspecting further the independent variables, each one of the three made a unique statistically significant contribution to the model (Table 2; HA, PC, and $PC \times HA$).

The presence of vaginismus was associated with high PC and high HA, with the highest predictive validity for the presence of vaginismus when high PC and high HA were combined. The significant interaction term indicates that high PC is especially relevant for women with relatively low HA scores. In other words, the stronger the HA the less additional predictive validity it has for PC.

The second full model containing all the predictors was statistically significant $\chi^2 (3, N = 68) = 13.37, P < 0.004$, indicating that the model was able to distinguish between participants belonging to the vaginismus group and those to the dyspareunia group. The model as a whole explained between 17.8% (Cox and Snell R square) and 23.8% (Nagelkerke R squared) of the variance in group membership. Further inspecting the independent variables in more detail revealed that only PC made a unique statistically significant contribution at $P < 0.05$ with an odds ratio of 1.4. Although there was a trend suggesting that high HA has additional predictive validity for classifying women as belonging to the vaginismus group,

Table 2 Variables predicting membership in either the vaginismus or the control group

	B	SE	Wald	d.f.	Significance	Exp(B)
PC	0.22	0.08	7.62	1	0.006	1.25
HA	0.34	0.121	7.89	1	0.005	1.40
$PC \times HA$	-0.01	0.00	5.53	1	0.019	0.99
Constant	-6.28	1.89	11.00	1	0.001	0.00

Predictors entered in the regression PC, HA, $PC \times HA$; Exp(B) = odds ratio
d.f. = degrees of freedom; HA = harm avoidance; PC = pain catastrophizing;
SE = standard error

Table 3 Variables predicting membership in either the vaginismus or the dyspareunia group

	B	SE	Wald	d.f.	Significance	Exp(B)
PC	0.32	0.14	5.28	1	0.02	1.37
HA	0.30	0.16	3.60	1	0.058	1.35
PC × HA	−0.01	0.01	3.19	1	0.07	0.98
Constant	−5.99	2.51	5.69	1	0.02	0.00

Predictors entered in the regression PC, HA, PC × HA; Exp(B) = odds ratio
d.f. = degrees of freedom; HA = harm avoidance; PC = pain catastrophizing;
SE = standard error

this contribution did not reach the conventional level of statistical significance ($P = 0.058$). Neither did the contribution of the interaction term reach significance ($P = 0.074$) (Table 3).

The last model in this series of logistic regressions compared dyspareunia with the women free of sexual complaints. The full model containing all the predictors did not reach statistical significance $\chi^2 (3, N = 62) = 3.1, P < 0.38$, indicating that the model was not able to distinguish between participants belonging to the dyspareunia group and those women free of sexual complaints.

Discussion

The core findings can be summarized as follows: (i) specifically women inflicted with lifelong vaginismus showed heightened levels of catastrophic pain cognitions (PC) as well as enhanced personality trait of HA compared with women free of sexual complaints; (ii) although both PC and also HA showed to be associated with vaginismus, results indicated that PC was especially relevant for women with relatively low HA; (iii) women with dyspareunia showed similar levels of PC and HA as the women free of sexual complaints; and (iv) the difference between dyspareunia and vaginismus was pronounced for PC (but not for HA).

In apparent conflict with previous research that failed to find a generally heightened PC in women suffering from vaginismus, the present study found a significant difference between the general PC scores of women with vaginismus vs. both women free of sexual complaints and women suffering from dyspareunia [4]. The PC scores of the women with vaginismus were in the same range as those previously found for people suffering from chronic low back pain, thereby supporting the view that enhanced PC may set women at risk for developing vaginismus [52].

One explanation for the fact that in contrast to previous research the present study did find

heightened PCS scores in women with vaginismus might be that in this study we used a very rigid categorization, in that only women with lifelong vaginismus and no underlying PVD were assigned to the vaginismus group. The diagnosis of lifelong vaginismus vs. acquired vaginismus may impact the results; in that in lifelong vaginismus trait PC may prevent successful penetration, whereas in acquired vaginismus penetration was possible (at some point) and only after a specific (painful/noxious) penetration-related event it became impossible. Thus, in secondary vaginismus specific experiences rather than premorbid traits may be most critical. Perhaps, then, differences in the diagnostic procedure (including lifelong vs. a broader spectrum of women with vaginismus) and/or severity of the cases may help explain why in the mentioned previous study there was neither a significant difference between the vaginismus and the healthy control group, nor between women assigned to the vaginismus and those assigned to the dyspareunia group [4].

The present finding that women with vaginismus show heightened PC is consistent with the view that catastrophic appraisal of anticipated pain may promote hypervigilance to pain, with further distraction and avoidance behavior which keeps these women in the *vicious cycle of vaginismus* [5,15]. Women with vaginismus also showed heightened HA, which was found to independently contribute to group membership (in vaginismus vs. women free of sexual complaints). Moreover, there was a similar trend suggesting that HA was also higher in the vaginismus group than in the dyspareunia group. This is in line with previous behavioral evidence showing that women with vaginismus displayed stronger defensive reactions during gynecological examinations than women with dyspareunia [4]. Heightened HA may play a critical role in motivating avoidance behaviors, and thus in preventing the occurrence of correcting these negative experiences [23,53–55]. In the same vein, HA could express itself as a general tendency to avoid behaviors/stimuli that may inflict harm, which in turn could give rise to relatively strong defensive responses (e.g., pelvic floor muscle contraction) [4,22]. As a consequence, PC and HA may jointly contribute to elicit further (harm) avoidance behavior, triggering this downward vicious spiral which may contribute to the inability to have sexual intercourse.

Based on earlier research that failed to find significantly heightened general PC in women suffering from vaginismus, we hypothesized that the

relationship between PC and vaginismus might perhaps only be evident in high HA individuals [4]. Although, indeed, the combined presence of high PC and high HA was most predictive for the presence of vaginismus; PC also showed to be relevant for women who were relatively low on HA. We even found that the additional predictive validity of PC was especially pronounced for low HA women. However, this probably reflects a ceiling effect. That is, once HA is high to a specific extent, it exceeds and overshadows the importance of the other main effect (i.e., PC) and vice versa. Our findings are most consistent with a (summative) main effect model, and suggest that women with both high PC as well as high HA might be especially at risk for developing and maintaining the vicious cycle of vaginismus.

The present study also indicates that there are differences between dyspareunia and vaginismus regarding their *general* PC and HA cognitions. The current findings suggest that in contrast to vaginismus, heightened *general* PC and/or high HA are not critically involved in our sample of women with dyspareunia. The absence of heightened trait PC in dyspareunia is consistent with previous research that also failed to find evidence for generally heightened PC. Yet, these earlier studies did find evidence for sexual pain specific PC in dyspareunia and convincingly showed that women with PVD (which makes up 60.6% of our dyspareunia group) do report more *penetration-specific* catastrophizing thoughts [27,43]. Apparently in dyspareunia/PVD, PC is very specific and elicited by particular painful experiences related to penetration, rather than being the result of a more distal generalized tendency to catastrophize about potential painful experiences which seems to be playing a role in vaginismus [25,26]. It would be interesting for future research to more directly test whether heightened general PC is specifically involved in vaginismus, whereas the more penetration-specific cognitions are reciprocally involved in both dyspareunia and vaginismus.

The absence of systematically heightened HA in our group of women with dyspareunia seems in line with the observation that women with dyspareunia often report to continue having intercourse though with pain. However, the absence of heightened HA in the present study is in apparent contrast with previous findings showing that women with dyspareunia report higher trait HA than healthy controls [37,56,57]. This incongruence could perhaps (at least partly) be explained by the heterogeneity within this diagnostic category.

In addition, it might be due to insufficient power of the present study to reliably detect small effects. Clearly, then, future research is required to arrive at more final conclusions regarding the relevance of HA in dyspareunia.

Clinical Implications

The present findings of heightened general PC and HA particularly in vaginismus elicit consideration for treatment interventions. PC denotes a series of pain cognitions such as difficulty focusing attention away from pain, perceiving pain as more intense, and feeling helpless to control pain. Hence, the previously mentioned difficulties associated with pain during vaginal penetration become even more disruptive. These findings and previous literature illustrate that women with vaginismus might benefit by learning to identify, and replace the maladaptive pain-related thoughts [58]. For instance, challenging women's dysfunctional beliefs and pain-related catastrophic thinking could also be tracked by using the responses of a tool similar to PCS to discuss the clients' general catastrophic thought processes. Thus, it is beneficial when women understand that despite that a small percentage of the catastrophic thoughts might contain some truth, certain aspects of these catastrophic cognitions might not be completely realistic. Choosing alternative thoughts might also aid to understand how these negative PC cognitions can elicit automatic associations that maintain further the avoidance behavior. This is especially relevant when the person is also characterized by HA, and therefore avoids experiences that can disconfirm these beliefs. These findings emphasize the importance of targeting catastrophic thinking and possibly help the individual to engage (e.g., via exposure) in experiences to reframe such beliefs [59,60]. Moreover, the success of exposure treatment in women with vaginismus is entirely in line with the idea that symptoms (at a minimum) are maintained by avoidance, which may be fuelled by PC and/or HA [61–63]. Additionally, evidence from previous studies show that HA correlates with strong pain response, thus it would be particularly beneficial for relatively high HA individuals to replace the downward spiral discussed earlier with a more functional approach [28,63].

Limitations and Research Directions

The present study relied on subjective retrospective questionnaires, which can be influenced by self-presentational concerns. However, as pain and pain cognitions are intrinsically subjective, there is

no easy way to circumvent this potential drawback. Another limitation is that the subjective fear reported by women during the gynecological–sexual exam which was unstandardized. It would be helpful for future studies to have such measures more standardized. In addition, the cross-correlational nature of this study does not allow any firm conclusion regarding the direction of the relationships. Prognostic studies are required to test whether indeed enhanced PC/HA sets people at risk for developing and/or promote the persistence of pain with vaginal penetration or can better be interpreted as a consequence of this condition/specific symptom. Furthermore, it should be acknowledged that we did not measure pain/harm cognitions related to concrete sexual activities or sexual context. It would be interesting for future research to replicate whether a similar pattern would be evident if the cognitions are confined to pain during vaginal penetration [4,45,62]. In addition, previous research with the PCS has shown that PC consists of three largely independent components: rumination, magnification, and helplessness [15]. It would be interesting to explore further whether the different components of PC would also be differentially related to the processes that are implied by the fear-avoidance model of vaginismus. One might expect that the subscale of PCS magnification would be most closely related to the perceptual amplification of pain cues and thus heightened hypervigilance, while rumination might be involved more in distraction from sexual cues. Thus, both these subscales might also be related to HA and contribute to the downward fear-avoidance spiral. The helplessness component might be more related to (preventing) attempts of having intercourse, thereby contributing to avoidance of particular sexual behaviors that might refute their dysfunctional (fearful) cognitions. Additionally, it might be beneficial to know the motivational goals for women with pain during intercourse (dyspareunia), to still approach (and have) sexual intercourse. As a final limitation, we have to be cautious in generalizing these results as our sample was strictly consisting of highly homogenous women with lifelong vaginismus, who were in a relationship, and showed only limited or no variation in their cultural background.

Conclusions

This study is a first attempt to focus on general pain cognitions together with personality traits of HA in women with lifelong vaginismus, and our

findings indeed show that women suffering from vaginismus are characterized by traits of HA and by habitual PC cognitions. The application of this research may aid in the refinement of the present conceptualization of vaginismus and it sheds light on personality traits that seems to be implicated in the etiology and/or persistence of this disorder. This is not only of theoretical relevance, but may also provide leads to improve further the currently available treatment options.

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