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Experiential avoidance and anxiety sensitivity in patients with panic disorder and agoraphobia: Do both constructs measure the same?

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ABSTRACT. We examined whether Anxiety Sensitivity (AS) and Experiential Avoidance (EA), two potentially relevant constructs in the evolution of anxiety and related disorders with significant implications for cognitive-behavioral treatments, differentially relate to symptom expressions of patients with panic disorder and agoraphobia. Within a multi-center study 369 patients meeting the DSM-IV-TR criteria for panic disorder with agoraphobia (PD/AG) completed the multidimensional Panic and Agoraphobia Scale (PAS), the Anxiety Sensitivity Index (ASI), the Acceptance and Action Questionnaire-II (AAQ-II) and the Beck Depression Inventory-II (BDI-II). Overlap, distinctiveness, and predictive validity of AS and EA were examined using explorative item analyses and multiple hierarchical regression analyses. AS and EA moderately correlated with

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each other (r=-.50, p<.01). EA explained additional variance in PAS-subscales *Anticipatory Anxiety* and *Panic-Related Disability*, but not in *Panic Attacks*, *Agoraphobic Avoidance* and *Health Worries*. ASI, AAQ-II and BDI-II explained a low to moderate amount of variation in the five PAS-subscales (R^2 =.04-.29; p<.005). AS and EA are overlapping, yet distinct constructs. Results suggest that EA contributes to a significantly improved understanding of vulnerability, at least in patients with PD/AG.

KEYWORDS. Experiential avoidance. Anxiety sensitivity. Panic disorder. Agoraphobia. *Ex post facto* study.

RESUMEN. Se examinó si la sensibilidad a la ansiedad (SA) y la evitación experiencial (EE), dos constructos potencialmente relevantes en la evolución de los trastornos de ansiedad relacionadas con importantes consecuencias de los tratamientos cognitivo-conductuales, se relacionan de forma diferencial con la expresión de síntomas en pacientes con trastorno de pánico y agorafobia. Dentro de un estudio multicentro, 369 pacientes que cumplían con los criterios DSM-IV-TR para el trastorno de pánico con agorafobia (TP/AG) completaron la *Panic and Agoraphobia Scale* (PAS), el *Anxiety Sensitivity Index* (ASI), el *Acceptance and Action Questionnaire-II* (AAQ-II) y el *Beck Depression Inventory-II* (BDI-II). Paralelamente se examina la validez predictiva de la SA y la EE mediante análisis exploratorio de los ítems y análisis de regresión múltiple. SA y EE correlacionaron de forma moderada entre sí (r = 0,50, p < 0,01). SA explicó un porcentaje de la varianza de las subescalas *Ansiedad anticipatoria* y *Pánico relacionado con la incapacidad*, pero no de *Ataques de pánico*, *Evitación agorafóbica* y *Preocupaciones por la salud*. ASI, AAQ-II y BDI-II explicaron un porcentaje de varianza entre bajo y moderado de las cinco subescalas PAS (R^2 = 0,04-0,29, p < 0,005). SA y EE se superponen en constructos distintos. Los resultados sugieren que SA contribuye a una comprensión mucho mejor de la vulnerabilidad, al menos en pacientes con TP/AG.

PALABRA CLAVE. Evitación experiencial. Sensibilidad a la ansiedad. Trastorno de pánico. Agorafobia. Estudio *ex post facto*.

Despite the fact that CBT for PD/AG is considered one of the most efficacious treatments currently available (*e.g.* McHugh, Smits, and Otto, 2009; McIntosh *et al.,* 2004; Otto, Pollack, and Maki, 2000) current treatment approaches, including Cognitive Behavioral Therapy (CBT), are limited by the fact that still about one third of patients do not respond to therapy (Johansson and Høglend, 2007). Therefore, the examination of concepts which aim to expand the current understanding of the psychopathology of PD/AG and its implications for treatment are warranted.

One established construct that has been associated most frequently with the development of panic attacks and PD is Anxiety Sensitivity (AS; Reiss and McNally, 1985). AS, a trait-variable, is defined as the tendency to respond fearfully to bodily sensations (*e.g.* sweating, increased heart rate) due to the belief that these sensations could result in harmful somatic, cognitive, or social consequences (Reiss, Peterson,

Gursky, and McNally, 1986). AS is often regarded as a core feature of PD. Indeed, increased AS, as measured by the Anxiety Sensitivity Index (ASI; Reiss *et al.,* 1986), has been observed to predict panic symptoms and spontaneous panic attacks, functional impairment and new or recurrent onset of an anxiety disorder (see McNally, 2002 for a review; Olatunji, Feldner, Karekla, and Forsyth, 2008). AS has therefore been conceptualized as a risk factor for the development of panic attacks and panic disorder (McNally, 2002; Reiss *et al.,* 1986; Taylor, 1999). Early explorations supported the unifactorial conceptualization of AS. In contrast, recent studies suggest AS to be multifactorial (*e.g.* Schmidt and Joiner, 2002; Taylor, 1999; Taylor and Cox, 1998)[2].

Experiential Avoidance (EA) has been suggested to play an important role in the etiology, maintenance and amelioration of psychopathology (*e.g.* Hayes, Wilson, Gifford, Follette, and Strosahl, 1996; Kingston, Clarke, and Remington, 2010), including panic disorder (Carrascoso López and Valdivia Salas, 2009; Eifert and Forsyth, 2005). EA, a central unidimensional concept within Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, and Wilson, 1999), is defined as the unwillingness to stay in contact with negatively evaluated internal experiences (*i.e.* thoughts, bodily sensations, emotions) and to engage in unhealthy efforts to avoid or escape from these experiences (Hayes *et al.,* 1999). In cross-sectional studies, measures of EA were found to be moderately to highly correlated with measures of mental health (Fledderus, Bohlmeijer, Smit, and Westerhof, 2010), general psychopathology (Hayes, Luoma, Bond, Masuda, and Lillis, 2006; Ruiz, 2010), and measures of depression and anxiety (*e.g.* Chawla and Ostafin, 2007; Eifert and Forsyth, 2005; Fledderus, Bohlmeijer, and Pieterse, 2010; Forsyth, Parker, and Finlay, 2003). Further, experimental studies have shown that elevated EA amplifies self-reported panic symptoms and uncontrollability in persons without history of anxiety disorders (Feldner, Zvolensky, Eifert, and Spira, 2003; Karekla, Forsyth, and Kelly, 2004).

AS and EA overlap theoretically, as both target a person's reactions to symptoms - although AS refers exclusively to anxiety, while EA targets a person's unwillingness to experience negatively evaluated thoughts and emotions more generally and beyond the focus on the fear of bodily symptoms. Within ACT, it is assumed that the main mechanism through which normally occurring fear becomes clinically relevant are the extensive and rigid efforts to avoid, suppress or escape from these experiences which get in the way of valued life goals (Eifert and Forsyth, 2005). Therefore, high levels of AS would only be pathogenic if one's belief that bodily symptoms could lead to negative consequences are actually avoided and become a barrier to living a valued life. As such, EA should explain additional statistical variance in relevant measures of psychopathology – and especially in measurements of anxiety avoidance.

Examination of these constructs within the PD/AG spectrum is crucial given the centrality of PD to AS. While, empirical studies show that AS and EA are correlated with each other and with other anxiety-related variables (*e.g.* Berman, Wheaton, McGrath, and Abramowitz, 2010; Karekla *et al.,* 2004; Kelly and Forsyth, 2009), empirical studies

[2] As the factor-structure is not exhaustivly examined, when we refer to AS we are referring to the higher-order factor (conceptual) or the ASI total score (measurement).

examining this complex issue further are scarce, results inconsistent – especially in patient samples – and none have compared these relationships across the core features of PD/AG (*i.e.,* panic attacks, anticipatory anxiety, avoidance, and disability). In one of the few studies that have addressed this relationship, EA was related to self-reported fear and panic responses in a laboratory CO_2-challenge procedure even after AS had been statistically controlled for (Karekla *et al.,* 2004). In another sample consisting of several hundred patients diagnosed with PD/AG or clinically relevant Social Phobia, EA differentiated patients from healthy controls, showed preliminary indications of treatment sensitivity and incremental validity above AS, especially for indices of functioning (Gloster *et al.,* 2011). Thus, preliminary evidence suggests that these constructs are to some degree meaningfully independent. Other studies have failed to find incremental validity of EA above and beyond AS: AS showed incremental utility in the explanation of bodily sensations, measures of fear and control over bodily reactions, above and beyond EA, whereas EA did not after controlling for AS in a non-clinical sample (N = 43; Kelly and Forsyth, 2009). Independently of EA, the *ASI-Physical Concerns* subscale was found to be a more robust correlate of evaluative and self-reported panic symptom severity in a sample of N = 42 adults diagnosed with DSM-IV anxiety disorders (Berman *et al.,* 2010; Wheaton, Berman, and Abramowitz, 2010).

These inconclusive and partially contradictory findings leave open the question of whether EA is able to explain additional variance of psychopathology above and beyond the older – and at this point better established – construct of AS. This stimulated our interest to cross-sectionally examine in a large sample of patients with PD/AG to what degree AS and EA are differentially associated with the core features of panic-agoraphobia spectrum disorders (*i.e.* subscales of the Panic- and Agoraphobia Scale [PAS; Bandelow, 1999]: PAS-*Panic-Attacks*, PAS-*Agoraphobic-Avoidance,* PAS-*Anticipatory-Anxiety, PAS-Disability, and PAS-Health-Worries*). We expected that the constructs of EA and ASI share domains based on similar item-content. We also expected on theoretical grounds both constructs to be related to all PAS-subscales. AS has especially been related to the development of panic attacks and panic disorder. Thus, the ASI was expected to be more strongly related to PAS-Panic-Attacks. As by definition AS includes the fear of detrimental social, cognitive and physical consequences of anxiety-related bodily symptoms the PAS-Health-Worries was also expected to be stronger related to AS compared to EA. According to the definition of EA high experiential avoiders would avoid anticipated negative consequences and symptoms in a way that becomes a barrier to living a valued life. Thus, EA was expected to be more strongly associated with PAS-Agoraphobic-Avoidance, and PAS-Disability. As only in this avoidance-context one would expect anxiety to be detrimental we expected EA compared to AS to be stronger related to PAS-Anticipatory-Anxiety. Due to the fact that depressive and panic symptomatology overlap highly (*e.g.* Kessler *et al.,* 1998; Watson, Clark, and Stasik, 2011) and were also found to be highly comorbid in the present sample (comorbid major depression: 35.2%, see Gloster *et al.,* 2009), we assumed that the degree of self-reported depressive cognitions might play a critical role as confounder (Naragon-Gainey, 2010; Tull, Gratz, and Lacroce, 2006). Further, previous studies to address these

constructs have taken depression into account in part because it taps into general distress (Berman *et al.,* 2010). We therefore assumed this approach to be more conservative by requiring the AAQ-II to account for unique variance above and beyond well-established constructs and thus tested this assumption by including the BDI-II as a moderating factor. From these considerations we derived specific statistical hypotheses (see Table 1).

Table 1. Theoretically derived statistical hypotheses (H1-H5).

PAS-subscale	*H1 PAS-Panic-Attacks*	*H2 PAS-Agoraphobic-Avoidance*	*H3 PAS-Anticipatory-Anxiety*	*H4 PAS-Disability*	*H5 PAS-Health Worries*
Correlation with PAS-subscale	AS>EA	EA>AS	AS=EA	EA>AS	AS>EA
AAQ-II would explain additional variance above and beyond the ASI and the BDI-II depression score	no	yes	yes	yes	no

Note. PAS = Panic and Agoraphobia Sacale; AS = Anxiety Sensitivity; EA = Experiential Avoidance.

Method

Participants

The sample consisted of 369 patients from a multicenter randomized treatment outcome study (Gloster *et al.,* 2009, Gloster *et al.,* 2011) diagnosed with PD/AG (M_{age} = 35.5 years, *SD* = 10.8, *n* = 282 women). Participants reported living with a partner (69.9%), alone (18.9%), with parents (5.2 %), other (6%). Reported education levels were grammar school (44.7%), secondary school (40.7%), elementary school (11.7%), no degree (2.9%). 59.1% were employed, followed by university 4.3%, job training 26.2%, unemployed 9.2% and homemaker .8%.

Measures and procedure

The cross-sectional data used in the current paper were collected during baseline assessment. All participants completed a comprehensive assessment (see Gloster *et al.,* 2009). Only those relevant for this study are described.

- Composite International Diagnostic Interview (CIDI-M/DIA-X; Wittchen and Pfister, 1997*)*. A standardized clinical interview was used to assess symptoms, syndromes and diagnoses of mental disorders according to DSM-IV-TR criteria along with information about onset, duration and severity.
- Acceptance and Action Questionnaire II (AAQ- II; based on the AAQ, Bond *et al.,* 2011). A unidimensional self-report measure for EA (German version). Items are rated on a 7-point-Likert-scale. High scores reflect less EA. Preliminary data suggest scores <48 to be clinically relevant.
- Anxiety Sensitivity Index (ASI; Reiss *et al.,* 1986) is a self-report instrument assessing anticipatory fear and sensitivity to anxiety symptoms. 16 items are

rated on a 5-point-Likert-scale. The German version shows good internal validity (Cronbach's alpha from .82-.92; Alpers and Pauli, 2002). Mean values of $M = 32.1$-46.7 were reported for PD (Peterson and Reiss, 1992).

- Panic and Agoraphobia Scale (PAS, Bandelow, 1999). The self-report scale assesses severity in PD with/without Agoraphobia. 13 items are rated on a 5-point-Likert-scale. The scale consists of a total score and five subscales: PAS-*Panic-Attacks* (frequency, duration, severity of panic attacks), PAS-*Agoraphobic-Avoidance (*frequency of avoidance, number and importance of avoided situations), PAS-*Anticipatory-Anxiety* (frequency and intensity of anticipatory anxiety), PAS-*Disability* (perceived disability in the areas family/partnership, social relationships, leisure time, employment/housework) and PAS-*Health-Worries* (worries about health damage). Cronbach's α .86 for the total score and .66-.82 for the subscales were reported. A mean score of 23.5 (SD = 10.3) was observed in a sample of 425 PD/AG patients (Bandelow, 1999).
- Beck Depression Inventory-2nd Ed. (BDI-II, Beck, Steer, and Brown, 1996; German version by Hautzinger, Keller, and Kühner, 2006). A 21-item self-report questionnaire, measures depression symptoms according to DSM-IV criteria. Participants rate symptom severity on a 4-point-Likert-Scale with respect to the past two weeks. Cronbach's α for the German version ranges between .89-.93.

Data analytic strategy

The overlap of EA and AS and the predicted patterns of relations between AAQ-II, ASI, and PAS were analyzed by Zero-Order-Pearson-correlation coefficients. To further examine the conceptual overlap of the ASI and the AAQ-II we first calculated item-to-scale-correlations of the 16 ASI-items with the AAQ-II total-score, and the 10 AAQ-II-items with the ASI-total score respectively. Second, the content of the three highest ($r > .40$) and lowest ($r \leq .20$) correlations were analyzed. As these definitions of «high» and «low» were chosen arbitrarily we third examined whether these correlation coefficients differed statistically significantly from the next correlation coefficient in descending and ascending order respectively (comparison of correlations, procedure by Meng, Rosenthal, and Rubin, 1992). To analyze the specificity of EA and AS in predicting the multiple facets of PD/AG, multiple hierarchical regression analyses were conducted across the PAS-subscales (hypotheses 1-5, Table 1). To account for the potential overlap of anxiety, AS and depressive symptoms the BDI-II was added into the equation first, followed by the ASI and the AAQ-II (model 1). To rule out order effects, order of entering ASI and AAQ-II was reversed in model 2. STATA 11.0 and SPSS 17.0 were used for running the statistical analyses.

Results

Descriptive characteristics

Means and standard deviations of all variables are presented in Table 2. ASI-total scores were similar to those reported previously in PD/AG samples. AAQ-II scores were relatively low, indicating high levels of EA and according to the authors of the scale

clinically relevant. The mean PAS-total severity score was comparable to previous reports for PD/AG samples. The mean BDI-II score was clinically relevant. Internal consistencies for all scales and subscales were acceptable (α = .77-.95).

TABLE 2. Means and standard deviations of all predictor and criterion variables.

Variable	*M*	*SD*
ASI total	31.31	11.57
AAQ-II	45.42	10.48
BDI-II total	16.71	8.83
PAS total	27.78	9.75
Panic Attacks	1.48	1.01
Agoraphobic Avoidance	2.09	1.05
Anticipatory Anxiety	2.60	.95
Disability	1.62	.95
Health Worries	1.75	1.16

Note. ASI: Anxiety Sensitivity Index (possible range: 0-64); AAQ-II: Acceptance and Action Questionnaire-II (possible range: 10-70); BDI-II: Beck Depression Inventory-II (possible range: 0-63); PAS: Panic and Agoraphobia Scale (possible range: 0-40); PAS-subscales Panic Attacks, Agoraphobic Avoidance, Anticipatory Anxiety, Disability, Health Worries possible range (0-4).

Relationship and overlap of AS and EA, core features of PD/AG (PAS subscales) and depressivity

The ASI- and the AAQ-II-total scores correlated moderately negative (different scoring schemes, Table 3). The PAS-total-score correlated moderately with the ASI-total and the BDI-II-score but only mildly with the AAQ-II-total-score (all $p < .01$). Correlations of PAS-subscales with the ASI-total were low to moderate ($p < .01$), correlations of PAS-subscales with AAQ-II were generally lower and only significant for the PAS-Disability ($p < .05$) and PAS-Health-Worries ($p < .01$). The BDI-II correlated mildly to moderately with PAS-subscales and moderately with AAQ-II and ASI (all $p < .01$).

TABLE 3. Zero-order-correlations among predictor and criterion variables.

Variable	*ASI-total*	*AAQ-II*	*BDI-II*	*PAS-total*	*PAS-Panic-Attacks*	*PAS-Agoraphobic-Avoidance*	*PAS-Anticipatory-Anxiety*	*PAS-Disability*	*PAS-Health Worries*
ASI-total	-								
AAQ-II	-.50**	-							
BDI-II	.40**	-.51**	-						
PAS-total	.38**	-.18**	.32**	-					
Panic Attacks	.19**	-.09	.13*	.70**	-				
Agoraphobic Avoidance	.13*	-.10	.17**	.67**	.23**	-			
Anticipatory Anxiety	.26**	-.10	.22**	.75**	.41**	.45**	-		
Disability	.27**	-.13*	.32**	.82**	.45**	.56**	.55**	-	
Health Worries	.53**	-.21**	.25**	.55**	.26**	.17**	.33**	.26**	-

Note. ASI: Anxiety Sensitivity Index; AAQ-II: Acceptance and Action Questionnaire-II; BDI-II: Beck Depression Inventory-II; PAS: Panic and Agoraphobia Scale
* $p < .05$., two-tailed; ** $p < .01$., two-tailed; N=368 (due to missing values in the AAQ-II).

TABLE 4. Pearson-correlation-coefficients of all 16 ASI-items with AAQ-II-total score.

	ASI-4	*ASI-5*	*ASI-15*	*ASI-16*	*ASI-14*	*ASI-3*	*ASI-2*	*ASI -12*	*ASI-1*	*ASI-11*	*ASI-13*	*ASI-6*	*ASI-8*	*ASI-10*	*ASI-7*	*ASI-9*
AAQ-II total	-.42	-.42	-.42	-.37	-.36	-.34	-.33	-.29	-.28	-.28	-.28	-.25	-.20	-.20	-.19	-.12

Note. ASI: Anxiety Sensitivity Index (exact wording of items is copy right protected by IDS Publishing Corporation).

TABLE 5. Pearson-correlation-coefficients of all AAQ-II-items with ASI-total score.

	AAQ-II-4[d]	*AAQ-II-3*[c]	*AAQ-II-8*[h]	*AAQ-II-9*[j]	*AAQ-II-7*[g]	*AAQ-II-2*[b]	*AAQ-II-5*[e]	*AAQ-II-1*[a]	*AAQ-II-6*[f]	*AAQ-II-10*[i]
ASI-total	.48	.45	.40	.38	.36	.29	.26	-.20	-.18	.08

Note. AAQ-II: Acceptance and Action Questionnaire-II, AAQ-II total scores could be calculated for n=368
[a] "Its OK if I remember something unpleasant." [b]"My painful experiences and memories make it difficult for me to live a life that I would value." [c] "I'm afraid of my feelings." [d] "I worry about not being able to control my worries and feelings." [e] "My painful memories prevent me from having a fulfilling life." [f] "I am in control of my life." [g] "Emotions cause problems in my life." [h] "It seems like most people are handling their lives better than I am." [I] "Worries get in the way of my success." [j] "My thoughts and feelings do not get in the way of how I want to live my life."

The AAQ-II-total score correlated highest (-.42) with the three ASI-items 4 (fear of feeling faint), 5 (importance of control of emotions) and 15 (fear of becoming mentally ill)[3]. Further noteworthy associations in descending order (.35 > *r* > .40) were ASI-item 16 (fear of being nervous, no significant difference to highest correlations, $p = .098$) and 14 (fear of unusual body sensations, significant difference to highest correlations, $p = .047$). ASI-items correlating lowest with AAQ-II total score were ASI-item 9 (being afraid of getting a heart attack), 7 (embarrassment due to normal body symptoms), 8 and 10 (being afraid of panic symptoms). In ascending order the fifth lowest item-scale-correlation (ASI-item 6, fear of rapid heart beat) differed significantly from the fourth lowest item-scale-correlation-coefficient ($p = .029$, all results in Table 4).

The highest item-scale-correlations of the AAQ-II items with the ASI-total score were found for AAQ-II-item 3 («I'm afraid of my feelings»), 4 («I worry about not being able to control my worries and feelings»), and 8 («It seems like most people are handling their lives better than I am»). In descendent order a further noteworthy (.35 > *r* >.40) correlation was found for AAQ-II-item 7 («Emotions cause problems in my life», no significant difference to third highest correlation, $p = .292$). Lowest item-scale-correlations were found for AAQ-II-item 10 («My thoughts and feelings do not get in the way of how I want to live my life»), 6 («I am in control of my life») and 1 («It's OK if I remember something unpleasant»). In ascending order the next lowest item-scale-correlation-coefficient was found for AAQ-II-item 5 («My painful memories prevent me from having a fulfilling life», significant difference from third lowest item-scale-correlation of AAQ-II-item 1, $p = .001$; all results in Table 5).

Differential contribution of EA and ASI

Hypothesis 1/PAS-Panic-Attacks: Consistent with a-priori-predictions, the ASI-total-score correlated significantly ($p < .001$) higher with the PAS-Panic-Attacks than did the AAQ-II (Table 3), although the overall-strength of association was weak. The ASI was found to be a significant predictor, independently of whether it was added to the model before or after the AAQ-II (all results Table 6), while the AAQ-II did not account for additional variance in any step. The amount of explained variance in both final models was small.

Hypothesis 2/PAS-Agoraphobic-Avoidance: Contrary to predictions, the ASI-total score correlated significantly ($p = .006$) higher than the AAQ-II with PAS-Agoraphobic-Avoidance (Table 3). Contrary to predictions the AAQ-II did not explain additional variance in either model and independently of whether it was added to the model after or before the ASI. It is noteworthy, that the BDI-II was a significant predictor of PAS-Agoraphobic-Avoidance. The amount of explained variance in both final models was small (Table 6).

Hypothesis 3/PAS-Anticipatory-Anxiety: Compared to the AAQ-II the ASI-total correlated significantly higher ($p < .001$) with PAS-Anticipatory-Anxiety. Both correlations were low (Table 3). Thus, a-priori-assumptions were not met. Consistent with predictions,

[3] Specific items of the ASI can not be listed due to copyright.

Table 6. Multiple Hierarchical Regression Analyses with BDI-II, ASI-total and AAQ-II predicting PAS-Panic PAS-Attacks, PAS-Agoraphobic Avoidance, PAS-Anticipatory Anxiety, PAS-Disability and PAS-Health Worries.

	Criterion Variable (PAS-subscales)														
	PAS-Panic-Attacks			*PAS-Agoraphobic-Avoidance*			*PAS-Anticipatory-Anxiety*			*PAS-Disability*			*PAS-Health-Worries*		
Predictor	*β*	*p*	*Δ in R^2 (p)*	*β*	*p*	*Δ in R^2 (p)*	*β*	*p*	*Δ in R^2 (p)*	*β*	*p*	*Δ in R^2 (p)*	*β*	*p*	*Δ in R^2 (p)*
Model 1: ASI-total entered prior to AAQ-II															
1.BDI-II	.13	.010	.02(.010)	.18	.001	.03(.001)	.23	.000	.05(.000)	.33	.000	.11(.000)	.26	.000	.07(.000)
1.BDI-II	.07	.207		.15	.007		.15	.008		.27	.000		.06	.260	
2.ASI-total	.16	.005	.02(.005)	.06	.252	.00(.255)	.20	.000	.04(.000)	.16	.003	.02(.003)	.51	.000	.21(.000)
1.BDI-II	.09	.147		.16	.010		.19	.001		.31	.000		.10	.064	
2.ASI	.18	.004		.07	.253		.25	.000		.21	.000		.55	.000	
3.AAQ-II	.05	.460	.00(.460)	.01	.823	.00(.823)	.12	.049	.01(.049)	.13	.030	.11(.030)	.12	.038	.00(.038)
Model 2: AAQ-II total entered prior to ASI															
1.BDI-II	.13	.010	.02(.010)	.18	.001	.03(.001)	.23	.000	.05(.000)	.33	.000	.11(.000)	.26	.000	.07(.000)
1.BDI-II	.12	.043		.17	.004		.24	.000		.36	.000		.20	.001	
2.AAQ-II	-.02	.697	.00(.697)	-.14	.821	.00(.821)	.02	.685	.00(.685)	.05	.397	.00(.397)	-.10	.075	.00(.075)
1.BDI-II	.09	.147		.16	.010		.19	.001		.32	.000		.10	.064	
2.AAQ-II	.05	.460		.01	.823		.12	.049		.13	.030		.12	.038	
3.ASI-total	.18	.004	.02(.004)	.07	.253	.00(.253)	.25	.000	.04(.000)	.21	.000	.03(.000)	.55	.000	.22(.000)

Note. ASI: Anxiety Sensitivity Index; AAQ-II: Acceptance and Action Questionnaire-II; BDI-II: Beck Depression Inventory-II; PAS: Panic and Agoraphobia Scale.

the AAQ-II was found to be a significant predictor above and beyond the BDI-II and the ASI. Noteworthy, the AAQ-II was only significant when the ASI was entered into the equation. The amount of explained statistical variance was relatively small in both models (Table 6).

Hypothesis 4/PAS-Disability: Contrary to predictions, the ASI correlated significantly higher (p <.001) with PAS-Disability than did the AAQ-II (Table 3). Consistent with predictions, the AAQ-II was a significant predictor of PAS-Disability when BDI-II and ASI were controlled for, but was not when the ASI was not statistically controlled. The amount of explained variance in both final models was with 14% higher than in the previous variables, but still low (Table 6).

Hypothesis 5/PAS-Health-Worries: Consistent with predictions, the ASI correlated significantly higher (p < .001) with PAS-Health-Worries than did the AAQ-II. Inconsistent with predictions, the AAQ-II did not account for additional variance, independent of order. The amount of the total explained variance in both final models was with 29% relatively high (Table 6).

Discussion

This study examined the relationship between Anxiety Sensitivity and Experiential Avoidance and their differential association to symptomatic measures of PD/AG while controlling for depressive symptomatology. Consistent with theoretical assumptions (Eifert and Forsyth, 2005; Zvolensky and Forsyth, 2002) and empirical findings (*e.g.* Kelly and Forsyth, 2009) this study found that AS and EA are related but not identical constructs. The main findings of this examination are: 1) AS and EA share about 25% of variance. Item explorations showed that highest correlations were found for items targeting importance of controlling emotions (*i.e.* AAQ-II total with ASI-4; ASI-15; ASI-5; ASI-total with AAQ-II-4, AAQ-II-3, AAQ-II-8). Further, from correlations of PAS-subscales with ASI-total and AAQ-II, the highest value was found for PAS-Health-Worries. This suggests that two common domains of both constructs are a) interpreting diffuse bodily symptoms (*e.g.* nervousness, weakness) as detrimental, scary or damaging for health and necessity b) to control feelings. However, item content and psychometric comparisons also reveal that both tap into domains that seem notably different. The lowest correlations between ASI-total scale and AAQ-II items suggest that acceptance (AAQ-II-1), control of life (AAQ-II-6), and how feelings become a barrier for valued living (AAQ-II-10) are facets only targeted by EA. Furthermore, concerns about specific bodily symptoms such as stomach growling or rapid heart beating (ASI-7, ASI-9, ASI-10) play a less prominent role in the AAQ-II. 2) Both AS and EA were marginally to moderately related with measures of psychopathology, with the ASI-total sharing 14% variance and the AAQ-II total sharing 3% variance with a measure of panic severity (PAS-total). This holds consistent across the core facets of PD/AG (PAS-subscales), with rates of shared variance between 0% and 28%. Both ASI-total and AAQ-II-total share moderate amounts of variance with depressive symptomatology (BDI-II–ASI: 16%, BDI-II–AAQ-II: 26%). Furthermore, AS and EA revealed no impressive differential specificity with regard to predicting different facets of PD/AG symptomatology. However,

in accordance with the contradictory findings on the specific relationship of EA, AS and anxiety related measures (*e.g.* Berman *et al.,* 2010; Gloster, Klotsche, Chaker, Hummel, and Hoyer, in press; Karekla *et al.,* 2004; Kelly and Forsyth, 2009; McCracken and Koeogh, 2009; Wheaton *et al.,* 2010) our analyses suggest that the relationship is complex for at least two reasons: We found that the AAQ-II yields incremental explanatory value for at least two PAS-subscales, namely PAS-Anticipatory-Anxiety and PAS-Disability, only after controlling for the ASI. This suggests that the ASI, if not statistically controlled for, statistically suppresses the predictive value of the AAQ-II. This supports the assumption that AS leads to Anticipatory Anxiety and Disability only in a context of EA. That is, in which a) extensive efforts are made to avoid the AS-belief that anxiety related bodily symptoms could lead to negative consequences, and b) in which these avoidance efforts become a barrier to living a valued life. This would be consistent with mediational studies in non PD/AG samples which showed that EA mediated the association between AS-cognitive concerns subscale and depression (Tull and Gratz, 2008); coping/ emotion regulation and AS (Kashdan, Barrios, Forsyth, and Steger, 2006), between AS and coping-motivated drinking (Stewart, Zvolensky, and Eifert, 2002) and results on AS and affect regulatory strategies, which showed that participants who scored high in AS, had increased scores in anxious arousal and worry in the presence of less acceptance of emotional distress (Kashdan, Zvolensky, and McLeish, 2008).

The differential role of the AAQ-II in predicting facets of PD/AG severity was only partly supported, however. The AAQ-II did not explain unique variance above and beyond the BDI-II and ASI-total in PAS-Panic-Attacks (consistent with hypothesis 1), did not explain unique variance in PAS-Agoraphobic-Avoidance (inconsistent with hypothesis 2), explained unique variance in PAS-Anticipatory-Anxiety (consistent with hypothesis 3) and PAS-Disability (consistent with hypothesis 4), but not in PAS-Health-Worries (consistent with hypothesis 5). Further, contrary to hypotheses 3 and 4, the sign of the Beta-coefficients was positive suggesting that higher scores in the AAQ-II (*i.e.* less EA) were related to higher anticipatory anxiety and disability after controlling for BDI-II and ASI. This finding is contrary to zero-order correlations, theoretical assumptions and preceding empirical findings (*e.g.* Berman *et al.,* 2010; Hayes *et al.,* 2006) and occured most likely as a statistical confound (due to relatively high negative correlations of AAQ-II with BDI-II and ASI).

Regression analyses revealed the surprising result that only the BDI-II significantly predicted PAS-Agoraphobic-Avoidance. This might be a sign of shared domains of depressive symptomatology and agoraphobic avoidance, namely withdrawal from daily life. But both observations together also might raise concerns about sampling and the issue what type of patients previous studies have studied and what patients were studied in the present study. We included patients with PD/AG with a broad spectrum of comorbid disorders, which to our knowledge is the first kind of study examining this issue with such a diverse sample.

The results of the study need to be considered in light of several limitations. First, only self-report measures were applied. Second, correlations between predictor variables (*i.e* ASI, AAQ-II) and criterion variables (*i.e.* PAS-subscales) were unexpectedly low. While to our knowledge no studies exist that examined the relation of the PAS and the

ASI and the AAQ-II, this finding is inconsistent with the findings that the ASI – a well established predictor of panic – was generally highly correlated with measures of anxiety (Olatunji and Wolitzky-Taylor, 2009; Taylor, 1999) and panic symptomatology (McNally, 2002). Furthermore, comparable studies reported higher correlations between the AAQ-II and anxiety related measures (*e.g.* $r_{AAQ\text{-}II\text{-}BAI}$: -.43; Berman *et al.,* 2010; and $r_{AAQ\text{-}II\text{-}STAI\text{-}trait}$: .65, Olatunji and Wolitzky-Taylor, 2009). Third, the amount of total explained variance in the final regression models was low (4-29% depending on PAS-subscale), compared to similar studies (37% explained variance in the Beck Anxiety Inventory; Berman *et al.,* 2010). These lower correlations and therefore lower predictive value could possibly result from the fact that baseline measurement was conducted across two days in order to prevent patient fatigue. As a fourth limitation, it needs to be considered that the criterion variables were operationalized by the subscales of one single questionnaire, namely the PAS, in order to reduce method variance. However, this increases the chance of mono-operation bias. Therefore the findings reported in the current study could also be a result of properties of the PAS instead of actual conceptual differences of the concepts AS and EA. Fifth, the cross-sectional design of the current study does not allow causal interferences. As a further limitation, we used the original version of the ASI and it is unclear how our results generalize to newer versions of the ASI (Taylor *et al.,* 2007).

Finally, we are aware of the fact that calculation of item-to-scale-correlations for the 16 ASI-items with the AAQ-II total-score, and the 10 AAQ-II-items with the ASI-total score is an unconventional approach and is not without weaknesses (e.g., reduced reliability of single items compared to subscales or total scales). However, we chose this approach in order to best understand exactly where conceptual overlap and uniqueness occurs between the two scales. Furthermore, the literature concerning the number of ASI sub-scales is inconsistent, with values from two to four ASI-subscales (*e.g.* Schmidt and Joiner, 2002; Taylor, 1999; Taylor and Cox, 1998). As such, the use of subscales (which imply further data reduction) would not have allowed us to find the conceptual overlap at the most detailed level.

Ultimately, predictions and analyses are made in a certain context. The prominent context among patients and within traditional CBT (e.g. exposure exercises with implicit goal to decrease anxiety) is a «control-context»- aiming to control symptoms (e.g. decrease anxiety). The goal of ACT on the other hand is to foster an «acceptance-context» in which focus is put on living a valued life by means of acceptance (opposed to EA) of certain symptoms and private experiences (such as thoughts and feelings) as normal human experiences without trying to change/control them. In such an acceptance context arguably different results would be expected: Due to high acceptance, fear of anxiety symptoms and therefore AS itself would be presumably lower. Second, the relationship between AS and avoidance, disability and panic attacks should also be lower as the fear of bodily symptoms (AS) would not keep a person from living according to his/her valued goals. Further studies that alter the contexts experimentally and investigate the relationships of AS and EA at several points of time before, during and after treatment therefore would help elucidate the complex relationship between these constructs.

AS and EA can also be understood as different emotional regulation strategies (Gross, 1998). In this regard, it has been argued that AS is an antecedent strategy of emotional regulation (*i.e.,* before anxiety actually occurs), while EA is a consequential emotional regulation strategy (*i.e.,* after anxiety has occurred) (Hofmann and Asmundson, 2008; Hofmann, Sawyer, and Fang, 2010). Although intriguing, further research is needed before AS and EA can be understood as exclusively applying to antecedent and consequential temporal dimensions.

Further investigation of the relationships between EA and AS and especially the adequate test of the models underlying both constructs would expand the findings of the previous study, namely that EA can add variance – albeit to a small amount in the present study – to PD/AG relevant variables.

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