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Examination of Mask Disturbance Behavior during a Carbon Dioxide-Enriched Air Challenge

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Abstract

Background and Objectives—The present investigation examined mask disturbance behavior in the context of a biological challenge.

Method—Participants included 128 adults (63.3% women; $M_{age} = 23.2$, $SD = 8.9$) who underwent a 10% carbon dioxide-enriched air challenge.

Results—Mask disturbance behavior, including complete or partial mask removal, was common during the challenge. Moreover, mask removal behavior during the challenge was significantly related to a greater increase in anxiety pre- to post-challenge, as well as greater levels of self-reported avoidance of a future challenge administration. However, mask touching and lifting behaviors were not related to other challenge criterion variables.

Limitations—The current study consisted primarily of young adults and did not include individuals with a panic disorder diagnosis. Replication and extension of the current findings is recommended.

Conclusions—Results suggest that mask removal behavior during the challenge may represent a possible behavioral marker of panic-relevant risk, although further work is necessary to determine its usefulness as a challenge measure.

Keywords

panic attacks; avoidance; anxiety; biological challenge

1. Introduction

Laboratory-based biological challenge studies, such as carbon dioxide (CO₂)-enriched air paradigms, have proven to be valuable in regard to better understanding vulnerability processes for panic attacks and panic disorder (PD; Abrams, Schruers, Cosci, & Sawtell, 2008). The vast majority of challenge studies have employed dependent measures that include self-report of anxiety or bodily states and panic attacks, as well as psychophysiological responsivity. Although a few investigations have examined fear-induced escape behavior in panic relevant laboratory challenges (Zvolensky, Lejuez, & Eifert, 1998; Lejuez, O'Donnell, Wirth, Zvolensky, & Eifert, 1998; Feldner et al., 2006),

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there has been little scientific attention focused on overt behavior during the challenge. This limitation is unfortunate as behavioral impairment is a common phenomenological feature of panic psychopathology (e.g., tendency to actively avoid contexts that elicit physiologically aversive sensations; Barlow, 2002).

Mask disturbance behavior in CO₂-enriched air studies that utilize a C-PAP mask represents a potential opportunity for investigating panic-relevant behavioral responses in investigations providing continuous air administration. There is indirect evidence for the use of task disruption and discontinuation as an index of vulnerability in affective science. Lower pain tolerance during laboratory tasks is related to increased levels of emotional distress during such tasks (Dannecker & George, 2009; Feldner et al., 2006). Similarly, duration of engagement in a voluntary hyperventilation is related to self-reported individual differences in tolerance for physical discomfort (Marshall et al., 2008). A few studies have utilized challenge discontinuation as an outcome measure (Abrams et al., 2008), although empirical study of the usefulness of this type of measure has not been conducted. This work provides an indirect empirical basis for the exploration of behavioral mask disturbances in response to a CO₂-enriched air biological challenge procedure.

In the current study, it was hypothesized that: (1) mask disturbance behaviors (i.e., mask removal, mask-lifting, and mask-touching) would be relatively common and significantly related to one another, as well as to measures of anxious responding during the challenge; and (2) individuals who did versus did not engage in mask disturbance behaviors would significantly differ on pre-challenge indices of 'traditional' panic-relevant risk factors (i.e., recent history of panic attacks, past month axis I psychopathology, neuroticism, and anxiety sensitivity).

2. Method

2.1 Participants

Participants were 128 adults (63.3% women; $M_{age} = 23.2$, $SD = 8.9$; 92.8% Caucasian) recruited from the greater Burlington, Vermont community via fliers and newspaper advertisements placed throughout various community and university settings. With regard to psychopathology, 50.0% ($n = 64$) of the participants met criteria for a recent (past two years) history of nonclinical, unexpected panic attacks, and 45.3% of the sample met criteria for current (past month) psychopathology. The most frequently endorsed disorders were: Generalized Anxiety Disorder (14.1%), Social Anxiety Disorder (13.3%), and Alcohol Abuse (9.4%).

The current study data were collected as part of a larger laboratory investigation examining panic-relevant responding to a biological challenge among adults with and without a recent (past two years) history of nonclinical, unexpected panic attacks. Inclusionary criteria were: (1) being between the ages of 18–65, and (2) endorsing either a recent (past 2 years) history of nonclinical, unexpected panic attacks or no lifetime history of panic attacks. Exclusionary criteria were: (1) current psychotropic medication use; (2) alcohol or substance dependence in the last 6 months; (3) lifetime panic disorder diagnosis; (4) psychosis; (5) current suicidal ideation; (6) prior participation in a CO₂-enriched air challenge, and (7) limited mental competency and/or the inability to provide informed, written consent. The present data have not been previously reported.

2.2 Pre-Challenge Measures

The *Structured Clinical Interview for DSM-IV Axis I Disorders- Non-Patient Edition* (SCID-NP; First, et al., 1994) is a well-established diagnostic interview. The SCID-NP was

administered to assess a past 2-year history of nonclinical, unexpected panic attacks and past-month axis I psychopathology.

The *Big Five Inventory* (BFI; John & Srivastava, 1999) is a 44-item self-report measure assessing the Big Five personality traits. The current study utilized the Neuroticism subscale of the BFI (e.g., “is depressed, blue”) to index participants’ general tendency to experience negative mood states ($\alpha = .89$).

The *Anxiety Sensitivity Index - III* (ASI-III; Taylor et al., 2007) is an 18-item self-report measure, which assesses sensitivity to, and discomfort with, physical sensations (e.g., “It scares me when my heart beats rapidly”). The current study utilized the global ASI-III total score ($\alpha = .94$).

2.3 Challenge Measures

The *Subjective Units of Distress Scale* (SUDS; Wolpe, 1958) was used to index self-reported anxiety. This Likert-type scale ranges from 0 (“no anxiety”) to 100 (“extreme anxiety”). Participants completed the SUDS before and after the challenge procedure.

The *Diagnostic Sensations Questionnaire* (DSQ; Sanderson, Rapee, & Barlow, 1988) was used to assess DSM-IV panic attack symptoms immediately post-challenge. This measure is frequently employed in biological challenge work (e.g., Zvolensky, Lejuez, & Eifert, 1998). In the current study, continuous physical, cognitive, and total panic attack symptoms were utilized [rated on a 9-point Likert type scale (0 = *not at all* to 8 = *very strongly felt*)], as well as dichotomous post-challenge panic attack status (panic attack = 3 or more physical symptoms, 1 or more cognitive symptoms, and a “sensation of panic,” all rated “moderate” or greater; Marshall et al., 2008).

Self-Report Avoidance Ratings—As in past work (Eifert & Heffner, 2003), participants’ willingness to participate in another perceived-to-be-possible CO₂ administration was evaluated by self-report on a 100-point Likert-style scale (0 = “not at all willing;” 100 = “definitely willing”) at the end of the recovery phase.

Mask Disturbance—In the current study, the experimental session was video-recorded, and behavioral mask disturbances were coded: (1) “mask removal” behavior [i.e., (a) whether the participant pulled the mask off their face completely (dummy coded: 0, 1); and (b) the latency to removal (number of seconds)]; (2) “mask-lifting” behavior [i.e., (a) whether the participant lifted the mask during the challenge to breathe room air (dummy coded: 0, 1); (b) the number of times the participant lifted the mask during the challenge; and (c) the total duration of time the participant breathed room air during the procedure (in seconds)]; and (3) “mask-touching” behavior [i.e., (a) whether the participant touched the mask during the challenge (dummy coded: 0, 1); (b) the number of times the participant touched the mask during the challenge; and (c) the total duration of time the participant touched the mask during the challenge]. “Mask-lifting” and “mask-touching” behaviors were mutually exclusive (i.e., if the participant lifted the mask, “lifting” but not “touching” was coded). Approximately 15% of the videos were randomly sampled and then cross-checked by an independent rater. No cases of disagreement were noted.

2.4 Physiological Assessment

A J&J Engineering I-330-C2 system was used to digitally record physiological data online at a sample rate of 1024 samples per second across channels using J&J Engineering Physiolog Software. Two physiological variables were measured: skin conductance level and heart rate. Skin conductance level was assessed in micromhos by using a Coulbourn S71-23

isolated skin conductance coupler. Raw electrocardiogram data were collected with disposable Ag/AgCl electrodes placed in a standard bilateral configuration on the palmar side of each wrist. Data were processed through a 1–100 Hz bandpass filter designed to maximize R-wave frequency.

2.5 Procedure

Individuals who responded to advertisements completed an initial session to determine eligibility and collect baseline data. Participants were compensated \$10 for participating in the baseline session. Eligible participants completed a laboratory session. Upon arrival to session 2, participants were seated in an experimental room, and electrodes and C-PAP mask were attached by the experimenter. Participants underwent a 10-minute adaptation period (baseline SUDS completed at minute 8 of baseline), followed by a 4-minute 10% CO₂-enriched air administration (SUDS and DSQ completed immediately post-challenge), and a 10-minute recovery period. Participants were not given any information concerning the CO₂ delivery (onset or offset time points) or instructed regarding any mask-relevant behavior (e.g., to touch or adjust the mask). The experimenter remained behind a one-way mirror during the procedure and instructed participants to complete measures via an intercom. Physiological data were gathered continuously across the pre-challenge, challenge, and recovery phases of the investigation. At the end of the challenge, the participants were unhooked, debriefed, and compensated \$20 for their participation.

Participants who indicated that they wished to stop the CO₂ administration prematurely had the mask completely removed by the experimenter, with the option of completing the post-challenge and recovery measures with the mask off or stopping the session. Of the 17 participants (14.4%) who removed the mask completely, 3 participants (2.3% of total sample) chose not to continue.

3. Results

3.1 Manipulation Check

Paired samples *t*-tests were conducted between pre-challenge (i.e., last minute of baseline) and post-challenge (i.e., last minute of challenge) heart rate, skin conductance level, and SUDS ratings. Results indicated that post-challenge levels were significantly greater than pre-challenge levels with regard to heart rate ($M = 91.58$, $SD = 14.16$; and $M = 78.77$, $SD = 11.81$, respectively; $t(107) = 9.05$, $p < .001$), skin conductance level ($M = 3.28$, $SD = 1.76$; and $M = 1.65$, $SD = 1.27$, respectively; $t(107) = 11.83$, $p < .001$), and SUDS ratings ($M = 54.78$, $SD = 27.68$; and $M = 21.50$, $SD = 21.25$, respectively; $t(124) = 12.55$, $p < .001$), indicating that the challenge sufficiently elicited anxiety.

3.2 Descriptive Statistics: Base Rates of Mask Disturbance Variables

See Table 1. 37.6% of the sample engaged in mask disturbance behavior. Approximately 14% of the sample removed the mask during the challenge, with the latency to mask removal averaging 124.7 ($SD = 41.1$) seconds. Approximately 9% of the sample lifted the mask during the challenge to breathe regular room air, with participants lifting the mask an average of 2.6 ($SD = 1.8$) times and breathing room air for a total of 6.7 ($SD = 4.9$) seconds. Approximately 32% of the sample touched the mask during the challenge, with participants touching the mask an average of 2.1 ($SD = 1.3$) times for a total of 10.6 ($SD = 22.1$) seconds.

3.3 Zero-Order Correlations (Mask Disturbance and Challenge Variables)

See Table 1. Mask removal (yes/no) was significantly positively related to mask-lifting (yes/no; $r = .29$, $p < .01$) and mask-touching (yes/no; $r = .33$, $p < .01$). Mask-lifting also was significantly positively related to mask-touching ($r = .45$, $p < .01$). Mask removal was

significantly negatively related to self-reported avoidance ratings ($r = -.25, p < .01$) and positively related to change in SUDS ($r = .40, p < .01$). Any mask disturbance behavior (yes/no) was significantly positively related to change in SUDS ($r = .23, p < .05$). None of the mask disturbance variables were significantly related to panic attack symptoms post-challenge or changes in physiological variables (p 's $> .05$).

3.4 Group Differences in Pre-Challenge Variables

See Table 2 for group differences in pre-challenge variables based on mask removal (yes/no) and mask-touching (yes/no) status. Due to the low base rate of mask-lifting (8.7%, $n = 11$), group differences based on that behavior were not examined.

Individuals who removed the mask during the challenge were significantly more likely than those who did not remove the mask to be women (88.2% vs. 59.4%, respectively; $\chi^2 = 5.22, p < .05$) and reported significantly higher Neuroticism scores ($M_{BFI-N} = 27.59$ vs. 23.81, respectively; $t(114) = -1.92, p = .05$). There was a statistical trend for group differences in panic attack group status, with mask removers being more likely to have a recent history of panic attacks than the mask non-removers (70.6% vs. 46.5%, respectively; $\chi^2 = 3.37, p = .07$).

Individuals who touched the mask during the challenge, compared to those who did not touch the mask, were significantly younger ($M_{age} = 20.46$ vs. 24.52, respectively; $t(108) = 2.23, p < .05$). There was a statistical trend for group differences in panic attack group status, with mask touchers being more likely to have a recent history of panic attacks than non-touchers (60.0% vs. 42.7%, respectively; $\chi^2 = 2.87, p = .09$). Differences in mask touching and removal were not significantly related to pre-challenge indices of anxiety sensitivity (p 's $> .05$).

4. Discussion

The present study found that mask disturbance behavior was a relatively common occurrence (37% of the current sample engaged in mask disturbance). There was no direct or formal instruction to engage or not engage in mask behavior in the directional set. Thus, there was a relatively high overall frequency of mask disturbance behavior in the context of a 'typical' provocation paradigm. Moreover, mask disturbance behaviors --- removal, lifting, touching, or any disturbance --- were significantly interrelated (observed r range: .29–.96 [8% – 92% shared variance]; see Table 1). Thus, different forms of mask behavior tended to covary with one another.

Mask removal was significantly related to a greater increase in challenge anxiety, as well as greater levels of self-reported avoidance of a future challenge administration. These results suggest that *in vivo* mask removal behavior is associated with anxiety focused on bodily sensations and willingness to be exposed to a challenge in the near future. Mask removal, however, was not related to panic attack symptoms during the challenge. It is possible that participants who removed the mask did not persist in the challenge long enough (i.e., were hypersensitive to early symptoms) to experience dramatic elevations in panic symptoms. In contrast to *a priori* prediction, mask-lifting and mask-touching behaviors were not significantly related to any challenge outcomes. Similarly, no mask disturbance behaviors were significantly related to physiological arousal. Thus, mask removal, but not lifting or touching, was more apt to be related to other panic-relevant challenge variables.

Partially in line with prediction, group differences between those who did and did not disturb the mask during the challenge were apparent on a number of pre-challenge factors. It is important for future challenge studies with larger sample sizes to investigate such

relations further. Such findings have practical utility in that challenge investigations that exclude ‘non-completers’ from study analyses may possibly be removing persons at greater risk for panic vulnerability.

There are limitations of the current study worth noting. First, the sample consisted of individuals without a PD diagnosis. It would be worthwhile to investigate mask disturbance behavior in a clinical PD sample. Second, the current sample consisted primarily of Caucasian young adults. Future work would benefit from replicating the findings in more diverse samples. Third, there was no measure to indicate whether participants actually believed that an additional challenge was possible. Future studies assessing willingness to complete an additional challenge would benefit from assessing this variable. Fourth, the current study did not include measures of external validity. It is important for future studies of mask disturbance behavior to examine how lab behavior relates to real-world outcomes. Fifth, there were few significant correlations between the mask disturbance variables and other challenge variables (e.g., panic symptoms). Future studies would benefit from exploring these relationships in other samples. Finally, as is typical in CO₂ studies in this laboratory, participants were not given instructions related to mask disturbance behavior. It is unclear how direct instruction not to touch the mask might affect individuals’ behavior in this setting.

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References

- Abrams K, Schruers K, Cosci F, Sawtell S. Biological challenge procedures used to study co-occurring nicotine dependence and panic disorder. *Addictive Behaviors*. 2008; 33:1463–1469.10.1016/j.addbeh.2008.02.018 [PubMed: 18400413]
- Barlow, DH. *Anxiety and its disorders: the nature and treatment of anxiety and panic*. 2. New York: Guilford Press; 2002.
- Dannecker EA, George SZ. A comparison of laboratory measures of escape and avoidance behavior. *The Journal of Pain*. 2009; 10:53–59.10.1016/j.jpain.2008.07.007 [PubMed: 18774344]
- Eifert GH, Heffner M. The effects of acceptance versus control contexts on avoidance of panic-related symptoms. *Journal of Behavior Therapy and Experimental Psychiatry*. 2003; 34:293–312.10.1016/j.jbtep.2003.11.001 [PubMed: 14972675]
- Feldner MT, Hekmat H, Zvolensky MJ, Vowles KE, Secrist Z, Leen-Feldner EW. The role of experiential avoidance in acute pain tolerance: A laboratory test. *Journal of Behavior Therapy and Experimental Psychiatry*. 2006; 37:146–158.10.1016/j.jbtep.2005.03.002 [PubMed: 15882839]
- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. *Structured Clinical Interview for DSM-IV patient edition (SCID-N/P, Version 2.0)*. New York: Biometrics Research Department; 1994.
- John, OP. Towards a taxonomy of personality descriptors. In: Buss, DM.; Cantor, N., editors. *Personality psychology: Recent trends and emerging directions*. New York: Springer; 1989. p. 261-271.
- John, OP.; Srivastava, S. The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In: Pervin, LA.; John, OP., editors. *Handbook of Personality: Theory and Research*. 2. New York: Guilford; 1999. p. 102-138.
- Lejuez CW, O'Donnell J, Wirth O, Zvolensky MJ, Eifert GH. Avoidance of carbon dioxide-enriched air in humans. *Journal of the Experimental Analysis of Behavior*. 1998; 70:79–86. 10.1901/jeab.1998.70-79 [PubMed: 9684345]

- Marshall EC, Zvolensky MJ, Vujanovic AA, Gregor K, Gibson LE, Leyro TM. Panic reactivity to voluntary hyperventilation challenge predicts distress tolerance to bodily sensations among daily cigarette smokers. *Experimental and Clinical Psychopharmacology*. 2008; 16(4):313–321.10.1037/a0012752 [PubMed: 18729685]
- Sanderson WC, Rapee RM, Barlow DH. Panic induction via inhalation of 5.5% CO2 enriched air: a single subject analysis of psychological and physiological effects. *Behaviour Research and Therapy*. 1988; 26(4):333–335.10.1016/0005-7967(88)90086-1 [PubMed: 3145734]
- Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley Roth D, Abramowitz JS, Holaway RM, Sandin B, Stewart SH, Coles M, Eng W, Daly ES, Arrindell WA, Bouvard WA, Cardenas SJ. Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3 (ASI-3). *Psychological Assessment, Psychological Assessment*. 2007; 19:176–188.10.1037/1040-3590.19.2.176
- Wolpe, J. *Psychotherapy by reciprocal inhibition*. Stanford University Press; Stanford, CA: 1958.
- Zvolensky MJ, Eifert GH. A review of psychological factors/processes affecting anxious responding during voluntary hyperventilation and inhalations of carbon dioxide-enriched air. *Clinical Psychology Review*. 2000; 21:375–400.10.1016/S0272-7358(99)00053-7 [PubMed: 11288606]
- Zvolensky MJ, Lejuez CW, Eifert GH. The role of control in anxious responding: An experimental test using repeated administrations of 20% CO2-enriched air. *Behavior Therapy*. 1998; 29:193–209.10.1016/S0005-7894(98)80002-6

Table 1
Descriptive Statistics and Zero-Order Correlations (Mask Disturbance and Challenge Variables)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	Mean (SD) or %
1. Mask Removal	1	.29**	.33**	.53**	.40**	.11	.12	.06	.12	.03	.00	-.25**	14.4%
2. Mask Lifting		1	.45**	.47**	.14	.07	.05	.12	.10	.12	.01	-.11	8.7%
3. Mask Touching			1	.96**	.11	.04	.03	.05	.01	-.10	-.07	.11	31.8%
4. Mask Disturbance (Any)				1	.23*	.05	.05	.04	.04	-.07	-.06	-.18	37.6%
5. Change in SUDS					1	.37**	.38**	.25**	.21*	.31**	.24*	-.40**	17.49 (19.07)
6. DSQ – Total						1	.99**	.85**	.62**	.42**	.30**	-.60**	48.99 (29.31)
7. DSQ – Physical							1	.74**	.54**	.42**	.31**	-.61**	40.31 (23.28)
8. DSQ – Cognitive								1	.77**	.33**	.22*	-.45**	8.68 (7.55)
9. PA during Challenge									1	.27**	.23*	-.25*	30.1%
10. Change in HR										1	.49**	-.32**	12.80 (14.70)
11. Change in SC Level											1	-.17	1.63 (1.43)
12. Self-report Avoidance Rating												1	47.18 (30.52)

Note:

**
 $p < .001$,

*
 $p < .01$;

¹Mask Removal = Did participant remove mask during challenge? (0 = no, 1 = yes);

²Mask Lift = Did participant lift mask during challenge? (0 = no, 1 = yes);

³Mask Touch = Did participant touch mask during challenge? (0 = no, 1 = yes);

⁴Mask Disturbance (Any) = Did participant remove, lift, or touch the mask during the challenge? (0 = no, 1 = yes);

⁵Change in SUDS = Subjective Units of Distress Scale (change from pre- to post-challenge);

⁶DSQ – Total = Diagnostic Sensations Questionnaire – Total Symptoms;

⁷DSQ – Physical = Diagnostic Sensations Questionnaire – Physical Symptoms;

⁸DSQ – Cognitive = Diagnostic Sensations Questionnaire – Cognitive Symptoms;

- ⁹ *PA during Challenge* = Did participant experience panic attack during challenge? (0 = no, 1 = yes);
- ¹⁰ *Change in HR* = Heart Rate (change from pre- to post-challenge);
- ¹¹ *Change in SC Level* = Skin Conductance Level (change from pre- to post-challenge);
- ¹² *Self-report Avoidance Rating* = Self-reported willingness to complete an additional challenge [0 (not at all willing) – 100 (extremely willing)]

Table 2
Group differences in Pre-Challenge Variables based on Mask Removal and Mask-Touching Status

Grouping Variable: Mask Removal (yes/no)					
Pre-Challenge Variable	<i>t</i>	χ^2	<i>p</i>	Mean (SD) or %	Observed Range
Gender (% women)		5.22	< .05	63.6%	
Mask Removers				88.2%	
Mask Non-Removers				59.4%	
Age	.12		ns	23.19 (8.90)	18 – 62
Mask Removers				23.18 (7.84)	18 – 43
Mask Non-Removers				23.46 (9.40)	18 – 62
PA Group (% positive)		3.37	.07	50.0%	
Mask Removers				70.6%	
Mask Non-Removers				46.5%	
Current	.00		ns	47.3%	
Psychopathology (% yes)					
Mask Removers				46.7%	
Mask Non-Removers				47.4%	
BFI-N Total Score	–1.92		.05	24.37 (7.51)	8 – 39
Mask Removers				27.59 (7.60)	11 – 38
Mask Non-Removers				23.81 (7.46)	8 – 39
ASI-III Total Score	.57		ns	17.65 (13.36)	0 – 66
Mask Removers				15.81 (9.70)	4 – 34
Mask Non-Removers				17.86 (13.79)	0 – 66
Grouping Variable: Mask Touching (yes/no)					
Pre-Challenge Variable	<i>t</i>	χ^2	<i>p</i>	Mean (SD) or %	Observed Range
Gender (% women)		.75	ns	63.6%	
Mask Touchers				68.6%	
Mask Non-Touchers				60.0%	
Age	2.23		< .05	23.19 (8.90)	18 – 62
Mask Touchers				20.46 (4.72)	18 – 46

Grouping Variable: Mask Removal (yes/no)					
Pre-Challenge Variable	t	χ^2	p	Mean (SD) or %	Observed Range
Mask Non-Touchers				24.52 (10.29)	18 – 62
PA Group (% positive)		2.87	.09	50.0%	
Mask Touchers				60.0%	
Mask Non-Touchers				42.7%	
Current		.18	ns	47.3%	
Psychopathology (% yes)					
Mask Touchers				52.9%	
Mask Non-Touchers				48.6%	
BFI-N Total Score	-.32		ns	24.37 (7.51)	8 – 39
Mask Touchers				24.61 (7.18)	11 – 38
Mask Non-Touchers				24.11 (7.61)	8 – 39
ASI-III Total Score	1.68		ns	17.65 (13.36)	0 – 66
Mask Touchers				14.24 (12.04)	0 – 46
Mask Non-Touchers				18.89 (13.96)	0 – 66

Note: *Mask Removal* = Did participant remove mask during challenge? (0 = no, 1 = yes); *Mask Touching* = Did participant touch mask during challenge? (0 = no, 1 = yes); *PA Group* = Did participant meet criteria for past 2-year nonclinical, unexpected panic attacks on the SCID-I/NP (1 = no, 2 = yes; First et al., 1994); *Current Psychopathology* = Did participant meet criteria for any past month axis I psychopathology on the SCID-I/NP? (0 = no, 1 = yes; First et al., 1994); *BFI-N Total Score* = Big Five Inventory – Neuroticism subscale (John & Srivastava, 1999); *ASI-III Total Score* = Anxiety Sensitivity Index – III Total Score (Taylor et al., 2007).