Interpretive Biases for Ambiguous Information in Body Dysmorphic Disorder

By Ulrike Buhlmann, MS, Sabine Wilhelm, PhD, Richard J. McNally, PhD, Brunna Tuschen-Caffier, PhD, Lee Baer, PhD, and Michael A. Jenike, MD

ABSTRACT

Anxiety-disordered patients and individuals with high trait anxiety tend to interpret ambiguous information as threatening. The purpose of this study was to investigate whether interpretive biases would also occur in body dysmorphic disorder (BDD), which is characterized by a preoccupation with imagined defects in one's appearance. We tested whether BDD participants, compared with obsessive-compulsive disorder participants and healthy controls, would choose threatening interpretations for ambiguous body-related, ambiguous social, and general scenarios. As we hypothesized, BDD participants exhibited a negative interpretive bias for body-related scenarios and for social scenarios, whereas the other groups did not. Moreover, both clinical groups exhibited a negative interpretive bias for general scenarios.

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INTRODUCTION

Most individuals experience some concerns about their appearance. Yet, some people experience such high levels of distress over their appearance that these concerns interfere with daily life. Such individuals may qualify for a diagnosis of body dysmorphic disorder (BDD), according to the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (*DSM-IV*) criteria.[1] Individuals with BDD are preoccupied with an imagined or slight defect in appearance (eg, that the nose is too big). If the individual has a slight physical defect, the concern has to be extreme in order to qualify for a diagnosis of BDD. Currently, the prevalence of BDD is unknown. However, preliminary data suggest that the prevalence rate of BDD might be about 2% in the general population.[2]

Although currently classified as a somatoform disorder,[1] BDD shares many features with anxiety disorders. For example, fear of negative evaluation in social situations is associated with both BDD and social phobia.[3] However, unlike the fear of BDD patients, concerns of individuals with social phobia are unrelated to their appearance.

There is also a link between BDD and obsessive-compulsive disorder (OCD). Like OCD, BDD is characterized by intrusive thoughts that are difficult to control or resist. In addition, about 90% of individuals with BDD suffer from ritualistic, repetitive behaviors,[4] including checking one's appearance in mirrors, skin-picking, or frequently asking for reassurance. Moreover, both disorders have a similar age of onset and course, and a high comorbidity.[5]

Patients with anxiety disorders and individuals with high trait anxiety tend to selectively process threatening information, a bias that might contribute to the development or maintenance of emotional disorders.[6,7] Investigating attentional processes in BDD, we found that individuals with BDD, in contrast to healthy controls, selectively attended to appearance-related information and emotional appearance-unrelated information.[8] Selective attention to appearance-related information, for example, might partly explain why individuals with BDD have to think about their imagined defect over and over again.

The purpose of the current study was to test whether BDD patients, like anxious patients, are have a tendency to interpret ambiguous information as threatening. Specifically, given the similarities betwee BDD and social phobia, we explored whether BDD patients exhibit negaitve BDD-related interpretive biases as well as negative biases for general social information. We also investigated whether these phenomena are specific to BDD or characterictic to a broader spectrum of psychiatric disorders, including OCD.

METHOD

Participants

The BDD group comprised 19 outpatients (14 women, 5 men) who met *DSM-IV*[1] criteria for BDD. The following comorbid diagnoses were present in the BDD group: major depression (n=7), agoraphobia without panic disorder (n=1), specific phobia (n=1), trichotillomania (n=1), and kleptomania (n=1).

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The OCD group comprised 20 outpatients (9 women, 11 men) who met *DSM-IV*[1] criteria for OCD. The following comorbid diagnoses were present in the OCD group: alcohol abuse (n=1), panic disorder without agoraphobia (n=1), and chronic motor tics (n=1). Diagnoses in the patients' groups were determined by structured clinical interviews (Structured Clinical Interview for *DSM-IV*–Outpatient Version).[13]

The healthy control group consisted of 22 participants (15 women and 7 men). The Structured Clinical Interview for *DSM-IV*–Outpatient Version interviews confirmed the absence of current or past psychiatric disorders.

As is evident from the Table, the healthy control group was matched with the BDD group and OCD group with respect to age [$F_{2,57}$= .09, P=.92], education [$F_{2,57}$=.05, P=.95], verbal IQ [$F_{2,57}$=1.45, P=.24], and gender [$\chi^2_{2,0.95}$=3.92, P=.14]. All participants were native English speakers.

Measures

Participants completed the Beck Depression Inventory (BDI),[14] the Yale-Brown Obsessive-Compulsive Scale Modified for BDD (BDD-YBOCS),[15] the Fear of Negative Evaluation Scale (FNE),[16] and the Shipley Institute of Living Scale.[17]

The BDI is a 21-item inventory that measures the severity of depression. Each item has a series of four self-evaluative statements that indicate the severity of a particular symptom.

The BDD-YBOCS is a modified version of the YBOCS.[18] It consists of 12 items that measure the severity of BDD symptoms during the past week.

The FNE measures the expectation and fear of negative evaluation. The short version consists of 12 items. Each item assesses a particular symptom of social phobia.

The Shipley Institute of Living Scale measures general intelligence and consists of a vocabulary test and a test of abstract thinking. Its correlation to the Full Scale intelligence quotient as measured by the Wechsler Adult Intelligence Scale–Revised[19] is high (r=.74). We only used the vocabulary test in this study.

To investigate interpretive biases, we designed an interpretation questionnaire which was modeled after the interpretation questionnaire developed by Butler and Mathews.[20] It consisted of 33 ambiguous scenarios (11 BDD-related, 11 social, and 11 general scenarios; Figure 1). Each scenario consisted of a short description of the scenario and was followed by the question, "What thoughts occur to you?" Moreover, participants were provided with three possible thoughts and were asked to rate each thought on a scale from 0 (very unlikely) to 4 (very likely) in terms of their likelihood of coming to mind. Furthermore, Cronbach's coefficient α-values were calculated for each of the categories. Reliability analyses yielded α-values ranging from 0.74–0.93, with only two values falling below 0.80.

PROCEDURE

Participants first completed the Interpretation Questionnaire followed by the BDI, BDD-YBOCS, FNE, and Shipley Institute of Living Scale. They were then paid and debriefed about the purpose of the study.

RESULTS

Psychometric data

The mean scores for the questionnaires at the time of experimental testing are presented in the Table.

Analyses of variance confirmed differences among groups on the BDD-YBOCS [$F_{2,56}$=80.80, P< .001], BDI [$F_{2,56}$=28.45, P<.001], and FNE [$F_{2,56}$=27.64, P<.001]. However, data of one patient were missing. Post hoc Bonferroni-corrected t-tests indicated the differences between the groups, as shown in the Table.

INTERPRETATION QUESTIONNAIRE

We predicted that BDD participants, compared with OCD participants and healthy controls, are characterized by BDD-related and social anxiety-related negative interpretive biases. Furthermore, we hypothesized that both patient groups show a general negative interpretive bias, whereas control participants ought not show this bias. To examine this issue, we first submitted the data to a 3 (Group: BDD, OCD, Healthy Control) X 6 (Category: BDD-related negative, BDD-related neutral, social anxiety-related negative, social anxiety-related neutral, general negative, general neutral) analysis of variance with repeated measurements on the last factor. This analysis yielded significant main

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BDD-related scenario
While talking to some colleagues, you notice that some people take special notice of you.
What thoughts occur to you?
a) I am sure they are judging the way I look.
b) They probably agree with my opinion.
c) They are interested in our conversation.

Social anxiety-related scenario
You are having a conversation with some friends. You say something and the conversation stops.
What thoughts occur to you?
a) They are thinking about what I just said.
b) There was nothing more to say about this topic.
c) I must have said something foolish or insulting.

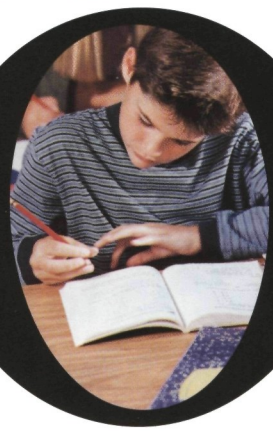
General scenario
A letter marked "URGENT" arrives.
What thoughts occur to you?
a) It is probably an ad designed to attract my attention.
b) Maybe I forgot to pay a bill.
c) Somebody must have died or is seriously ill.

FIGURE 1. Examples of BDD-related, social anxiety-related, and general scenarios.

BDD=body dysmorphic disorder.

Buhlmann U, Wilhelm S, McNally RJ, et al. *CNS Spectrums.* Vol 7, No 6. 2002.

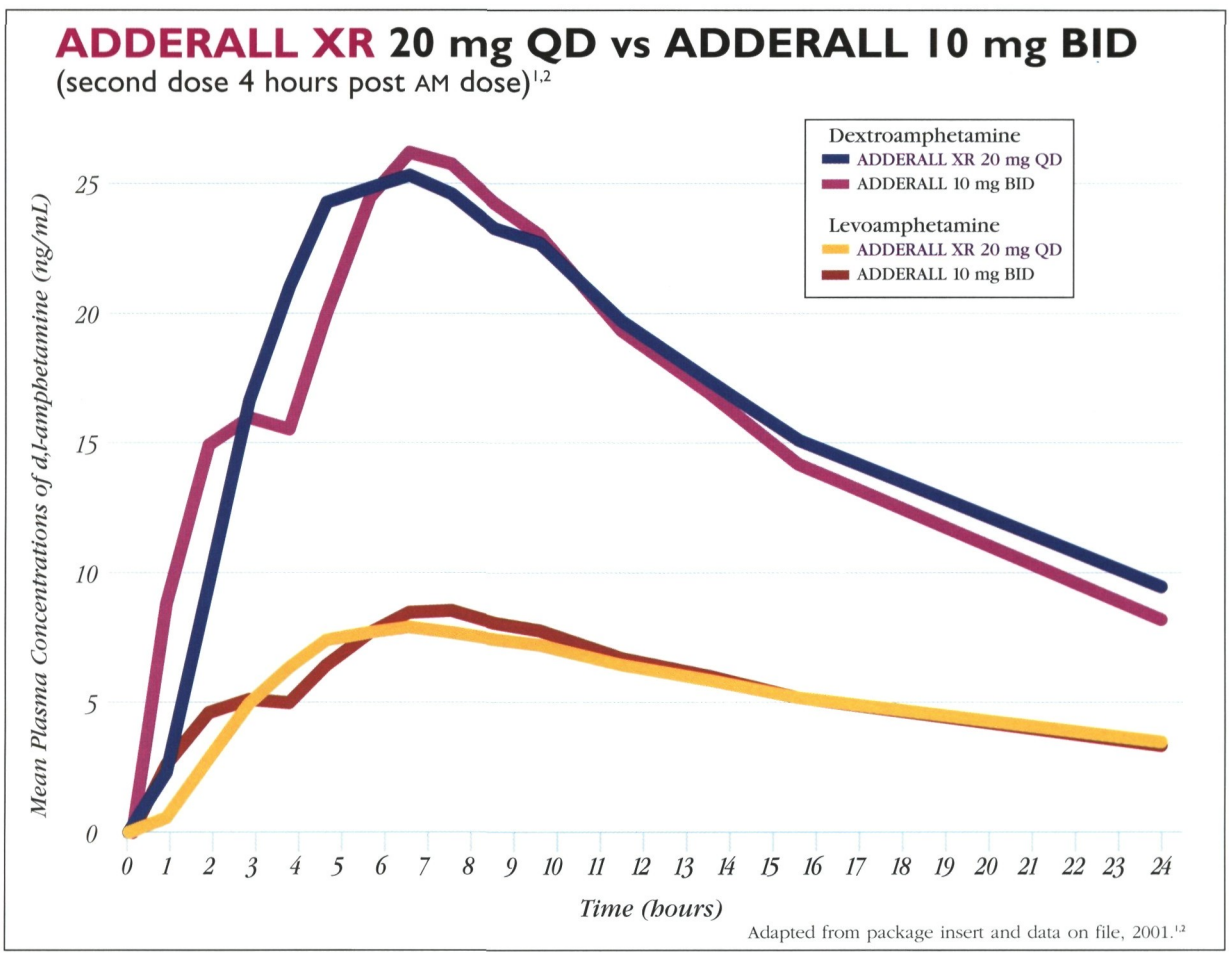
One dOse, One full Day



ADDERALL XR™

Designed to Extend the Duration of Effect Compared to Conventional Adderall®[1,2]

The time to peak concentration for ADDERALL XR is about 7 hours—which is 4 hours longer than ADDERALL (immediate-release, QD)[2]



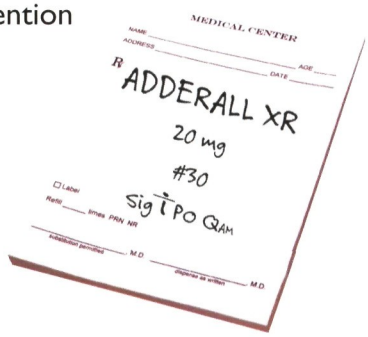
ADDERALL XR was generally well tolerated in clinical trials of pediatric patients. The most common adverse events include loss of appetite, insomnia, abdominal pain, and emotional lability.

As with other psychostimulants indicated for ADHD, there is a potential for exacerbating motor and phonic tics and Tourette's syndrome. A side effect seen with the amphetamine class is psychosis. Administration of amphetamine may exacerbate symptoms of behavior disturbances and thought disorder in psychotic patients.

One dose, one *full* day

Rapid Onset[1-3]

—Significant improvement in morning teacher assessment of attention and behavior compared to placebo ($P<.001$)[1-3]



Full-Day Efficacy[1-3]

—Significant improvement observed by both teachers and parents—in school and at home[1-3]

Well Tolerated[1,3,4]

—Low 2.4% discontinuation rate due to adverse events in clinical trials[2-4]

Get the Proven Efficacy of Adderall® Plus the Full-Day Benefits of ADDERALL XR[1-4]

—The efficacy and safety profile you expect[2-4]

—**ADDERALL XR** provides effective full-day symptom control in a single morning dose[1-3]

ADDERALL XR is contraindicated in patients with symptomatic cardiovascular disease, moderate to severe hypertension, hyperthyroidism and glaucoma, known hypersensitivity or idiosyncrasy to sympathomimetic amines, agitated states, history of drug abuse, or within 14 days of administration of a MAO inhibitor. The possibility of growth suppression warrants monitoring of patients receiving long-term therapy. **Prolonged use of amphetamines may lead to drug dependence.** **ADDERALL XR** should be prescribed with close physician supervision as part of a multimodal treatment program for ADHD.

ONE DOSE DAILY

ADDERALL XR™ CII

10 mg, 20 mg, 30 mg CAPSULES

(Mixed Salts of a Single-Entity Amphetamine Product)
Dextroamphetamine Sulfate Dextroamphetamine Saccharate
Amphetamine Aspartate Monohydrate Amphetamine Sulfate

Please see references and a brief summary of prescribing information on next page.
ADDERALL® is registered in the United States Patent and Trademark Office.

Shire US Inc.
...your ADHD support company
1-800-536-7878

February 2002 AXJA312

Shire

References: 1. Data on file, Shire US Inc., 2001. **2.** ADDERALL XR package insert, Shire US Inc., 2001. **3.** Biederman J. Once-daily dosed SLI381 for pediatric ADHD. Platform presentation at: 154th Annual Meeting of the American Psychiatric Association; May 9, 2001; New Orleans, La. **4.** McCracken JT, Biederman J, Greenhill LL, et al. Analog classroom assessment of SLI381 for the treatment of ADHD. Poster presented at: 47th Annual Meeting of the American Academy of Child and Adolescent Psychiatry; October 26, 2000; New York, NY.

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(Mixed Salts of a Single-Entity Amphetamine Product)
Dextroamphetamine Sulfate Dextroamphetamine Saccharate
Amphetamine Aspartate Monohydrate Amphetamine Sulfate

BRIEF SUMMARY: Consult the full prescribing information for complete product information.

ADDERALL XR™ CAPSULES **CII Rx Only**

AMPHETAMINES HAVE A HIGH POTENTIAL FOR ABUSE. ADMINISTRATION OF AMPHETAMINES FOR PROLONGED PERIODS OF TIME MAY LEAD TO DRUG DEPENDENCE. PARTICULAR ATTENTION SHOULD BE PAID TO THE POSSIBILITY OF SUBJECTS OBTAINING AMPHETAMINES FOR NON-THERAPEUTIC USE OR DISTRIBUTION TO OTHERS AND THE DRUGS SHOULD BE PRESCRIBED OR DISPENSED SPARINGLY.

INDICATIONS

ADDERALL XR™ is indicated for the treatment of Attention Deficit Hyperactivity Disorder (ADHD).
The efficacy of ADDERALL XR™ in the treatment of ADHD was established on the basis of two controlled trials of children aged 6 to 12 who met DSM-IV criteria for ADHD, along with extrapolation from the known efficacy of ADDERALL®, the immediate-release formulation of this substance.

CONTRAINDICATIONS

Advanced arteriosclerosis, symptomatic cardiovascular disease, moderate to severe hypertension, hyperthyroidism, known hypersensitivity or idiosyncrasy to the sympathomimetic amines, glaucoma. Agitated states. Patients with a history of drug abuse.
During or within 14 days following the administration of monoamine oxidase inhibitors (hypertensive crises may result).

WARNINGS

Psychosis: Clinical experience suggests that, in psychotic patients, administration of amphetamine may exacerbate symptoms of behavior disturbance and thought disorder.
Long-Term Suppression of Growth: Data are inadequate to determine whether chronic use of stimulants in children, including amphetamine, may be causally associated with suppression of growth. Therefore, growth should be monitored during treatment, and patients who are not growing or gaining weight as expected should have their treatment interrupted.

PRECAUTIONS

General: The least amount of amphetamine feasible should be prescribed or dispensed at one time in order to minimize the possibility of overdosage.
Hypertension and other Cardiovascular Conditions: Caution is to be exercised in prescribing amphetamines for patients with even mild hypertension (see CONTRAINDICATIONS). Blood pressure and pulse should be monitored at appropriate intervals in patients taking ADDERALL XR™, especially patients with hypertension.
Tics: Amphetamines have been reported to exacerbate motor and phonic tics and Tourette's syndrome. Therefore, clinical evaluation for tics and Tourette's syndrome in children and their families should precede use of stimulant medications.
Information for Patients: Amphetamines may impair the ability of the patient to engage in potentially hazardous activities such as operating machinery or vehicles; the patient should therefore be cautioned accordingly.
Drug Interactions: *Acidifying agents*—Gastrointestinal acidifying agents (guanethidine, reserpine, glutamic acid HCl, ascorbic acid, etc.) lower absorption of amphetamines.
Urinary acidifying agents—These agents (ammonium chloride, sodium acid phosphate, etc.) increase the concentration of the ionized species of the amphetamine molecule, thereby increasing urinary excretion. Both groups of agents lower blood levels and efficacy of amphetamines.
Adrenergic blockers—Adrenergic blockers are inhibited by amphetamines.
Alkalinizing agents—Gastrointestinal alkalinizing agents (sodium bicarbonate, etc.) increase absorption of amphetamines. Co-administration of ADDERALL XR™ and gastrointestinal alkalinizing agents, such as antacids, should be avoided. Urinary alkalinizing agents (acetazolamide, some thiazides) increase the concentration of the non-ionized species of the amphetamine molecule, thereby decreasing urinary excretion. Both groups of agents increase blood levels and therefore potentiate the actions of amphetamines.
Antidepressants, tricyclic—Amphetamines may enhance the activity of tricyclic antidepressants or sympathomimetic agents; d-amphetamine with desipramine or protriptyline and possibly other tricyclics cause striking and sustained increases in the concentration of d-amphetamine in the brain; cardiovascular effects can be potentiated.
MAO inhibitors—MAOI antidepressants, as well as a metabolite of furazolidone, slow amphetamine metabolism. This slowing potentiates amphetamines, increasing their effect on the release of norepinephrine and other monoamines from adrenergic nerve endings; this can cause headaches and other signs of hypertensive crisis. A variety of toxic neurological effects and malignant hyperpyrexia can occur, sometimes with fatal results.
Antihistamines—Amphetamines may counteract the sedative effect of antihistamines.
Antihypertensives—Amphetamines may antagonize the hypotensive effects of antihypertensives.
Chlorpromazine—Chlorpromazine blocks dopamine and norepinephrine receptors, thus inhibiting the central stimulant effects of amphetamines, and can be used to treat amphetamine poisoning.
Ethosuximide—Amphetamines may delay intestinal absorption of ethosuximide.
Haloperidol—Haloperidol blocks dopamine receptors, thus inhibiting the central stimulant effects of amphetamines.
Lithium carbonate—The anorectic and stimulatory effects of amphetamines may be inhibited by lithium carbonate.
Meperidine—Amphetamines potentiate the analgesic effect of meperidine.
Methenamine therapy—Urinary excretion of amphetamines is increased, and efficacy is reduced, by acidifying agents used in methenamine therapy.
Norepinephrine—Amphetamines enhance the adrenergic effect of norepinephrine.
Phenobarbital—Amphetamines may delay intestinal absorption of phenobarbital; co-administration of phenobarbital may produce a synergistic anticonvulsant action.
Phenytoin—Amphetamines may delay intestinal absorption of phenytoin; co-administration of phenytoin may produce a synergistic anticonvulsant action.
Propoxyphene—In cases of propoxyphene overdosage, amphetamine CNS stimulation is potentiated and fatal convulsions can occur.
Veratrum alkaloids—Amphetamines inhibit the hypotensive effect of veratrum alkaloids.
Drug/Laboratory Test Interactions: Amphetamines can cause a significant elevation in plasma corticosteroid levels. This increase is greatest in the evening.
Amphetamines may interfere with urinary steroid determinations.
Carcinogenesis/Mutagenesis and Impairment of Fertility: No evidence of carcinogenicity was found in studies in which d,l-amphetamine (enantiomer ratio of 1:1) was administered to mice and rats in the diet for 2 years at doses of up to 30 mg/kg/day in male mice, 19 mg/kg/day in female mice, and 5 mg/kg/day in male and female rats. These doses are approximately 2.4, 1.5, and 0.8 times, respectively, the maximum recommended human dose of 30 mg/day on a mg/m^2 body surface area basis.
Amphetamine, in the enantiomer ratio present in ADDERALL® (immediate-release)(d- to l- ratio of 3:1), was not clastogenic in the mouse bone marrow micronucleus test *in vivo* and was negative when tested in the *E. coli* component of the Ames test *in vitro*. d,l-Amphetamine (1:1 enantiomer ratio) has been reported to produce a positive response in the mouse bone marrow micronucleus test, an equivocal response in the Ames test, and negative responses in the *in vitro* sister chromatid exchange and chromosomal aberration assays.
Amphetamine, in the enantiomer ratio present in ADDERALL® (immediate-release)(d- to l- ratio of 3:1), did not adversely affect fertility or early embryonic development in the rat at doses of up to 20 mg/kg/day (approximately 5 times the maximum recommended human dose of 30 mg/day on a mg/m^2 body surface area basis).
Pregnancy: Pregnancy Category C. Amphetamine, in the enantiomer ratio present in ADDERALL® (d- to l- ratio of 3:1), had no apparent effects on embryofetal morphological development or survival when orally administered to pregnant rats and rabbits throughout the period of organogenesis at doses of up to 6 and 16 mg/kg/day, respectively. These doses are approximately 1.5 and 8 times, respectively, the maximum recommended human dose of 30 mg/day on a mg/m^2 body surface area basis. Fetal malformations and death have been reported in mice following parenteral administration of d-amphetamine doses of 50 mg/kg/day (approximately 6 times the maximum recommended human dose of 30 mg/day on a mg/m^2 basis) or greater to pregnant animals. Administration of these doses was also associated with severe maternal toxicity.
A number of studies in rodents indicate that prenatal or early postnatal exposure to amphetamine (d- or d,l-), at doses similar to those used clinically, can result in long-term neurochemical and behavioral alterations. Reported behavioral effects include learning and memory deficits, altered locomotor activity, and changes in sexual function.
There are no adequate and well-controlled studies in pregnant women. There has been one report of severe congenital bony deformity, tracheo-esophageal fistula, and anal atresia (vater association) in a baby born to a woman who took dextroamphetamine sulfate with lovastatin during the first trimester of pregnancy. Amphetamines should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.
Nonteratogenic Effects: Infants born to mothers dependent on amphetamines have an increased risk of premature delivery and low birth weight. Also, these infants may experience symptoms of withdrawal as demonstrated by dysphoria, including agitation, and significant lassitude.
Usage in Nursing Mothers: Amphetamines are excreted in human milk. Mothers taking amphetamines should be advised to refrain from nursing.
Pediatric Use: ADDERALL XR™ is indicated for use in children 6 years of age and older.
Use in Children Under Six Years of Age: Effects of ADDERALL XR™ in 3-5 year olds have not been studied. Long-term effects of amphetamines in children have not been well established. Amphetamines are not recommended for use in children under 3 years of age.
Geriatric Use: ADDERALL XR™ has not been studied in the geriatric population.

ADVERSE EVENTS

The premarketing development program for ADDERALL XR™ included exposures in a total of 685 participants in clinical trials (615 patients, 70 healthy adult subjects). These participants received ADDERALL XR™ at daily doses up to 30 mg. The 615 patients (ages 6 to 12) were evaluated in two controlled clinical studies, one open-label clinical study, and one single-dose clinical pharmacology study (N=20). Safety data on all patients are included in the discussion that follows. Adverse reactions were assessed by collecting adverse events, results of physical examinations, vital signs, weights, laboratory analyses, and ECGs.
Adverse events during exposure were obtained primarily by general inquiry and recorded by clinical investigators using terminology of their own choosing. Consequently, it is not possible to provide a meaningful estimate of the proportion of individuals experiencing adverse events without first grouping similar types of events into a smaller number of standardized event categories. In the tables and listings that follow, COSTART terminology has been used to classify reported adverse events.
The stated frequencies of adverse events represent the proportion of individuals who experienced, at least once, a treatment-emergent adverse event of the type listed.
Adverse events associated with discontinuation of treatment: In two placebo-controlled studies of up to 5 weeks duration, 2.4% (10/425) of ADDERALL XR™ treated patients discontinued due to adverse events (including 3 patients with loss of appetite, one of whom also reported insomnia) compared to 2.7% (7/259) receiving placebo. The most frequent adverse events associated with discontinuation of ADDERALL XR™ in controlled and uncontrolled, multiple-dose clinical trials (N=595) are presented below. Over half of these patients were exposed to ADDERALL XR™ for 12 months or more.

Adverse event	% of patients discontinuing (N=595)
Anorexia (loss of appetite)	2.9
Insomnia	1.5
Weight loss	1.2
Emotional lability	1.0
Depression	0.7

Adverse events occurring in a controlled trial: Adverse events reported in a 3-week clinical trial of pediatric patients treated with ADDERALL XR™ or placebo are presented in the table below.
The prescriber should be aware that these figures cannot be used to predict the incidence of adverse events in the course of usual medical practice where patient characteristics and other factors differ from those which prevailed in the clinical trials. Similarly, the cited frequencies cannot be compared with figures obtained from other clinical investigations involving different treatments, uses, and investigators. The cited figures, however, do provide the prescribing physician with some basis for estimating the relative contribution of drug and non-drug factors to the adverse event incidence rate in the population studied.

Table 1 Adverse Events Reported by More Than 1% of Patients Receiving ADDERALL XR™ with Higher Incidence Than on Placebo in a 584 Patient Clinical Study

Body System	Preferred Term	ADDERALL XR™ (N=374)	Placebo (N=210)
General	Abdominal Pain (stomachache)	14%	10%
	Accidental Injury	3%	2%
	Asthenia (fatigue)	2%	0%
	Fever	5%	2%
	Infection	4%	2%
	Viral Infection	2%	0%
Digestive System	Loss of Appetite	22%	2%
	Diarrhea	2%	1%
	Dyspepsia	2%	1%
	Nausea	5%	3%
	Vomiting	7%	4%
Nervous System	Dizziness	2%	0%
	Emotional Lability	9%	2%
	Insomnia	17%	2%
	Nervousness	6%	2%
Metabolic/Nutritional	Weight Loss	4%	0%

The following adverse reactions have been associated with amphetamine use:
Cardiovascular: Palpitations, tachycardia, elevation of blood pressure. There have been isolated reports of cardiomyopathy associated with chronic amphetamine use.
Central Nervous System: Psychotic episodes at recommended doses, overstimulation, restlessness, dizziness, insomnia, euphoria, dyskinesia, dysphoria, tremor, headache, exacerbation of motor and phonic tics and Tourette's syndrome.
Gastrointestinal: Dryness of the mouth, unpleasant taste, diarrhea, constipation, other gastrointestinal disturbances. Anorexia and weight loss may occur as undesirable effects.
Allergic: Urticaria.
Endocrine: Impotence, changes in libido.

DRUG ABUSE AND DEPENDENCE

ADDERALL XR™ is a Schedule II controlled substance.
Amphetamines have been extensively abused. Tolerance, extreme psychological dependence, and severe social disability have occurred. There are reports of patients who have increased the dosage to many times that recommended. Abrupt cessation following prolonged high dosage administration results in extreme fatigue and mental depression; changes are also noted on the sleep EEG. Manifestations of chronic intoxication with amphetamines may include severe dermatoses, marked insomnia, irritability, hyperactivity, and personality changes. The most severe manifestation of chronic intoxication is psychosis, often clinically indistinguishable from schizophrenia.

OVERDOSAGE

Individual patient response to amphetamines varies widely. Toxic symptoms may occur idiosyncratically at low doses.
Symptoms: Manifestations of acute overdosage with amphetamines include restlessness, tremor, hyperreflexia, rapid respiration, confusion, assaultiveness, hallucinations, panic states, hyperpyrexia and rhabdomyolysis. Fatigue and depression usually follow the central nervous system stimulation. Cardiovascular effects include arrhythmias, hypertension or hypotension and circulatory collapse. Gastrointestinal symptoms include nausea, vomiting, diarrhea, and abdominal cramps. Fatal poisoning is usually preceded by convulsions and coma.
Treatment: Consult with a Certified Poison Control Center for up-to-date guidance and advice. Management of acute amphetamine intoxication is largely symptomatic and includes gastric lavage, administration of activated charcoal, administration of a cathartic and sedation. Experience with hemodialysis or peritoneal dialysis is inadequate to permit recommendation in this regard. Acidification of the urine increases amphetamine excretion, but is believed to increase risk of acute renal failure if myoglobinuria is present. If acute severe hypertension complicates amphetamine overdosage, administration of intravenous phentolamine has been suggested. However, a gradual drop in blood pressure will usually result when sufficient sedation has been achieved. Chlorpromazine antagonizes the central stimulant effects of amphetamines and can be used to treat amphetamine intoxication.
The prolonged release of mixed amphetamine salts from ADDERALL XR™ should be considered when treating patients with overdose.
Dispense in a tight, light-resistant container as defined in the USP.
Store at 25° C (77° F). Excursions permitted to 15-30° C (59-86° F) [see USP Controlled Room Temperature]

Manufactured by Catalytica Pharmaceuticals Inc., Greenville, North Carolina 27835. Distributed and marketed by Shire US Inc., Florence, KY 41042

For more information call 1-800-536-7878 or visit www.adderallxr.com

ADDERALL® is registered in the US Patent and Trademark Office

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effects for Group [$F_{2,58}$=3.61, P=.03] and Category [$F_{5,290}$=46.81, P<.001]. Moreover, it yielded a significant Category X Group interaction [$F_{10,290}$=16.63, P<.001]. As evident from Figures 2 and 3, post hoc Tukey multiple comparisons revealed the following effects:

BDD-related Scenarios

When presented with BDD-related scenarios, BDD participants rated the likelihood of negative thoughts as significantly higher compared with control (P<.001) and OCD participants (P<.001). Moreover, they rated the likelihood of neutral thoughts as significantly lower compared with control (P<.001) and OCD participants (P=.002). OCD participants and controls did not differ with respect to the ratings for negative thoughts (P=.54) and neutral thoughts (P=.84).

Social Scenarios

In the social anxiety category, a similar pattern was obtained. BDD participants rated the likelihood of negative thoughts as significantly higher, compared with control participants (P<.001) and OCD participants (P=.002). BDD participants also rated the likelihood for neutral thoughts as significantly lower, compared with controls (P=.002) and OCD groups (P=.009). Again, no significant differences occurred between the OCD participants and controls with respect to the ratings for negative thoughts (P=.50) and for neutral thoughts (P=.67).

General Scenarios

In the general category, BDD participants rated the likelihood for negative thoughts as significantly higher, compared with controls (P=.04). As we predicted, there was no difference between the BDD group and OCD group in their ratings of the likelihood for negative thoughts in general scenarios (P=.88). Furthermore, OCD participants rated the likelihood for negative thoughts significantly higher than controls (P=.01). With respect to neutral thoughts, BDD participants rated them as less likely than controls. However, this difference was only marginally significant (P=.06). Furthermore, as we predicted, no difference was obtained between the BDD and OCD groups (P=.39). The difference between the OCD group and controls was also nonsignificant (P=.61).

Comorbidity of Depression

To estimate the effects of depression on interpretation, we further conducted simple t-tests between the BDD participants who met criteria for comorbid depression and those who did not using an α-level of .01. There were no significant differences between the two groups [BDD-negative: t^{17}=–.77, P=.45; BDD-neutral: t^{17}=.69, P=.50; Social anxiety-negative: t^{17}=–1.23, P=.24; Social anxiety-neutral: t^{17}=.95, P=.36; General-negative: t^{17}=–.50, P=.63; General-neutral: t^{17}=3.51, P=.73].

In summary, both BDD and OCD participants rated negative thoughts in general scenarios as significantly more likely and neutral thoughts as significantly less likely compared with control participants. Furthermore, BDD participants rated negative thoughts in BDD-related scenarios as significantly more likely and neutral thoughts as significantly less likely than did OCD participants and controls. The same effect was found in social anxiety-related scenarios indicating that BDD participants show a negative interpretive bias for BDD-related and social anxiety-related information, whereas this effect was not found in the OCD group and the control group.

CONCLUSION

Both BDD and OCD participants showed a negative interpretive bias in general situations, which may indicate a general but not disorder-specific vulnerability. However, consistent with previous research in anxiety-disordered patients, BDD participants revealed a disorder-specific negative interpretive bias. In other words, they rated the likelihood that they would experience negative body-related interpretations as significantly higher than did participants without BDD. For example, an individual with BDD is more likely to interpret somebody laughing behind him as a negative response to his or her appearance than people who do not have BDD.

TABLE. PSYCHOMETRIC DATA

Variable	BDD Group M*	BDD Group SD	OCD Group M*	OCD Group SD	Control Group M*	Control Group SD
BDD-YBOCS	25.42_a	6.26	5.83_b	7.24	4.14_b	3.75
BDI	17.00_a	8.39	8.22_b	6.62	2.55_c	2.30
FNE	49.84_a	7.59	41.67_b	9.84	29.45_c	9.02
Age	30.68_a	10.18	31.37_a	10.37	32.09_a	11.66
Education	16.58_a	2.55	16.68_a	2.06	16.45_a	2.15
Verbal IQ	60.53_a	4.83	60.37_a	3.44	62.32_a	3.96

* For each variable, means sharing subscripts do not differ (P>.05).

BDD-YBOCS=the Yale-Brown Obsessive-Compulsive Scale Modified for Body Dysmorphic Disorder; BDI=Beck Depression Inventory; FNE=Fear of Negative Evaluation Scale; Age=Years of age; Education=Years of Education; Verbal IQ=Shipley Institute of Living Scale.

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Furthermore, just like the social phobic participants in the study by Amin and colleagues,[10] our BDD participants were characterized by a negative interpretive bias for general social information. This effect could not be found in the OCD group or control group. This result is interesting because none of the BDD participants met criteria for comorbid social phobia. Moreover, BDD participants scored significantly higher than the other groups on the inventory measuring social anxiety. Thus, BDD patients do not only seem to share similar clinical features, such as a strong fear of negative evaluation, with social phobic patients, but also seem to have similar information-processing biases. Prevalence studies also indicate that there may be a link between BDD and social phobia because BDD has a high comorbidity with social phobia, and both disorders have a similar age of onset.[21] BDD is also often considered an OCD-spectrum disorder because both individuals with BDD and OCD suffer from obsessions and repetitive behaviors.[22] Moreover, both disorders have a similar age of onset and course, and a high comorbidity.[5,22] However, there are also important differences between BDD and OCD. Eisen and colleagues,[23] for example, found in a recent study that BDD patients had significantly poorer insight and a higher rate of referential thinking than OCD patients.

Taken together, these results show that while BDD is not identical to OCD and social phobia, it shares many features with these anxiety disorders. Given these similarities, BDD might be better classified as an anxiety disorder than a somatoform disorder.

The current study has a number of limitations. First, seven participants in the BDD group met criteria for comorbid depression. It is possible that this affected the way these patients interpreted the information presented to them; however, separate analyses between depressed and nondepressed BDD participants indicated that there were no differences between the two groups with respect to their ratings of the likelihood of thoughts. Second, we failed to include a social phobia control group to test for information-processing similarities among BDD, OCD, and social phobia patients.

What are the clinical implications of this study? BDD patients tend to interpret ambiguous everyday events as threatening, which might, in turn, confirm distorted beliefs about themselves and their body image. As a result, this might lead to even more emotional vulnerability for ambiguous situations. Given that the meaning of a situation is not always obvious, the way individuals interpret it is an important factor of whether a situation is anxiety-provoking or not. For example, an individual with BDD might interpret somebody looking at him or her in a threatening way (eg, "that person was staring at me because I look so hideous"), whereas that person might simply have looked at the BDD sufferer for entirely unrelated reasons.

Our findings support one of the basic concepts underlying cognitive therapy, namely, that individuals with emotional disorders have interpretive biases that cause or maintain anxiety. Indeed, cognitive models that guide BDD treatments have been developed in recent years.[24] These models propose that individuals interpret normal visual input, such as minor flaws, and normal situations in a distorted way. This, in turn, leads to further cognitive, emotional, and behavioral consequences.

If negative interpretive biases might contribute to anxiety, the crucial question is whether they can be modified or changed. Evidence for this has been found by McNally and Foa,[12] who found that these biases are absent in patients who have responded well to cognitive-behavior therapy. Future research in BDD is needed to examine these biases before and after cognitive-behavior therapy. This investigation of the role and nature of interpretive biases in BDD will be beneficial for the development of innovative cognitive and behavior therapies that focus directly on the modification of maladaptive interpretations. CNS

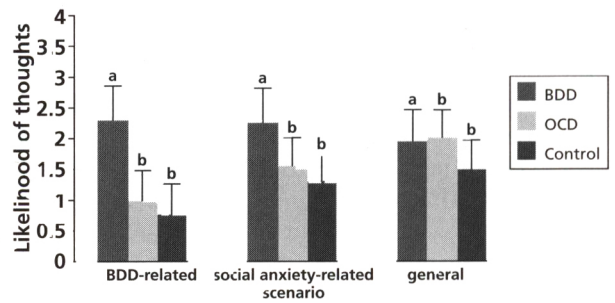

FIGURE 2. Likelihood of negative interpretation of ambiguous BDD-related, social anxiety-related, and general scenarios. Within each scenario type, means sharing letters do not differ ($P>.05$).

BDD=body dysmorphic disorder; OCD=obsessive-compulsive disorder.

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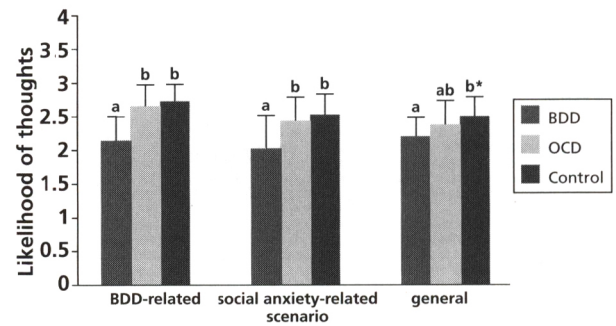

FIGURE 3. Likelihood of neutral interpretation of ambiguous BDD-related, social anxiety-related, and general scenarios. Within each scenario type, means sharing letters do not differ ($P>.05$).

* Difference between BDD group and control group is marginally significant ($P=0.6$); BDD=body dysmorphic disorder; OCD=obsessive-compulsive disorder.

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