

# Gut-directed guided affective imagery as an adjunct to dietary modification in irritable bowel syndrome

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## Abstract

This work aimed to study the effect of guided affective imagery on the irritable bowel syndrome. A total of 15 irritable bowel syndrome patients received guided affective imagery and 19 patients served as controls. Symptom severity and irritable bowel syndrome quality of life were measured at baseline and 8 weeks. Symptom severity decreased following guided affective imagery compared to controls ( $-1.5 \pm 1.9$  vs  $0.1 \pm 1.6$ ,  $p=0.04$ ). Irritable bowel syndrome quality of life increased following guided affective imagery compared to controls ( $12.1 \pm 12.5$  vs  $-0.7 \pm 16.2$ ,  $p<0.01$ ). Guided affective imagery predicted reduced symptom severity (odds ratio=5.71,  $p=0.02$ ) and increased irritable bowel syndrome quality of life (odds ratio=17.88,  $p=0.01$ ). Guided affective imagery combined with dietary modification may be beneficial in the management of irritable bowel syndrome, however larger studies are required.

## Keywords

acute illness, affect, cognitive behavior therapy, health psychology, physical symptoms

## Introduction

Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder, characterized by abdominal pain and altered bowel habits (Thompson et al., 1999). IBS affects 10 percent of Western populations and leads to significant disability, impaired quality of life, and health-care costs (Sandler et al., 2002). Patients with IBS demonstrate visceral hypersensitivity to painful stimuli, abnormal central processing of pain (Tillisch et al., 2011), and higher levels of psychological comorbidity compared with healthy controls without IBS (Whitehead et al., 2002). Treating IBS is a challenge for the

physician, and often involves combining diet and lifestyle modifications with psychological and drug therapies (Whitehead et al., 2004).

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Brief psychodynamic therapy (Guthrie et al., 1991), cognitive behavior therapy (Craske et al., 2011), biofeedback (Chiarioni and Whitehead, 2008), and stress management interventions (Ljótsson et al., 2011) are among the psychological treatments which have been adopted for IBS; however, gut-directed hypnotherapy probably has the best evidence base (Wilson et al., 2006).

Guided affective imagery (GAI) is a form of psychotherapy which involves focusing on mental images to induce relaxation. The principle behind GAI is the interruption of stress-provoking thoughts with a relaxing image, thereby inducing relaxation (Eller, 1999). GAI has been evaluated in an array of gastrointestinal disease, including inflammatory bowel disease (Mizrahi et al., 2012), functional abdominal pain (Van Tilburg et al., 2009), and following colorectal surgery (Tusek et al., 1997). In all of these settings GAI was found to be efficacious.

There are currently no published reports of GAI in the setting of IBS. In this pilot study, we aimed to examine the effect of GAI on IBS symptom severity and quality of life when combined with lifestyle modification in patients with IBS.

## Materials and methods

### Patient enrollment

Between August 2010 and August 2012, consecutive patients aged over 18 years, referred to the neurogastroenterology clinic, were screened for eligibility during an in-depth interview with one of the study physicians. Participants fulfilling the Rome III diagnostic criteria for IBS were recruited from this clinic, on a voluntary basis (Drossman, 2006). Exclusion criteria included (a) patients with a *Diagnostic and Statistical Manual of Mental Disorders* (DSM) IV/V diagnosis of schizophrenia or other psychotic disorder; (b) untreated, unstable, or recent onset (<3 months) of anxiety or depression; (c) patients receiving ongoing psychiatric care; (d) participation in any form of psychotherapy; (e) prior gastrointestinal surgery; and (f) major concomitant disease (including active

malignancy, hepatic failure, and renal insufficiency). Patients with anxiety or depression receiving anxiolytic or antidepressant medication at a stable dose for more than 3 months were included. Antidiarrheal and antispasmodic medications, as well as over-the-counter fiber supplements, were permitted. The study was conducted in accordance with the principles of the Declaration of Helsinki and Good Clinical Practice (GCP) and was approved by the Human Subjects Protection Program at our hospital.

### Clinical assessment

Prior to randomization, all patients were assessed at a dedicated neurogastroenterology clinic by a study physician. Demographic and clinical data were obtained during a personal interview. All patients had negative celiac serology, normal stool microscopy and culture, and negative stool *Clostridium difficile* antigen and toxin assay. All patients over age 50 years, as well as patients with iron deficiency anemia, underwent colonoscopy in order to exclude malignancy or inflammatory bowel disease. IBS was diagnosed according to the Rome III Diagnostic Questionnaire for IBS (Drossman, 2006). This self-assessed standardized and validated questionnaire was developed by the Rome Foundation Board to identify functional gastrointestinal disease. For the diagnosis of IBS, patients must have recurrent abdominal pain or discomfort for at least 3 months in the previous 6 months, with two or more of the following symptoms: (a) relief with defecation, (b) onset associated with a change in frequency of stool, and (c) onset associated with a change in form (appearance) of stool. All screened subjects completed a validated Hebrew language Rome III Diagnostic Questionnaire for IBS (Sperber et al., 2007). Following completion of the questionnaire, the diagnosis of IBS was confirmed by the study physician.

### Intervention

All patients were referred to a dietician specializing in IBS (S.F.), for tailored dietary and

lifestyle intervention. Recommendations were individualized in accordance with guidelines during a 1-hour session (Burden, 2001). Patients were then randomly assigned (in parallel) by using concealed blocks of four, obtained from a computer-generated sequence, to receive short-duration psychotherapy with GAI, or no psychotherapy (control). The study physician and dietician were blinded to group allocation.

Psychotherapy using GAI was performed by a single, board-certified therapist who is experienced in gut-directed psychotherapy in adults with IBS. Treatment was administered during eight, 3-hour, one-on-one sessions, at intervals of 1 week.

The first session included education regarding the physiological and psychological basis of IBS, developing mutually acceptable expectations regarding “homework” between sessions and negotiating treatment goals. The second session included education regarding the theoretical basis for GAI and its practical application in IBS. During this session, stressors were identified. From the third session onwards, relaxation training was taught using guided imagery exercises and instructions on how to use at least one exercise daily. Guided imagery exercises had a duration of approximately 30 minutes and consisted of relaxation techniques, music, positive imagery, and elements specifically designed for pain management (e.g. the instruction “now imagine that you leave all the pain you experience at the beach”).

### *Data collection and follow-up*

All patients were reviewed at the neurogastroenterology clinic by the study dietician again at 8 weeks to assess for adherence to diet and lifestyle changes. On the same day, patients were reviewed by a blinded study physician to assess for symptom severity. All patients completed the following self-assessed questionnaires at two points: at enrollment (pre-treatment) and following 8 weeks (post-treatment).

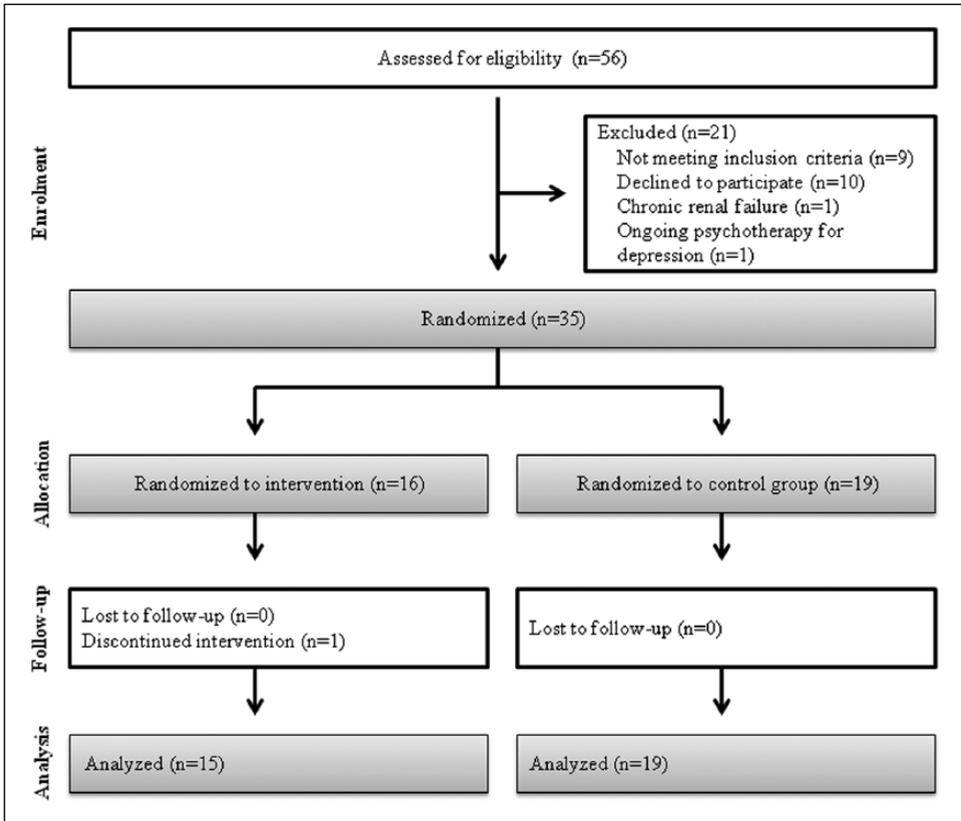
**Symptom severity.** Symptom assessment was undertaken using a self-administered questionnaire adapted from the IBS-severity scoring

system (Francis et al., 1997), designed specifically for the current study. The questionnaire comprised 10 visual analog scales (VAS) (0–10) evaluating the following parameters over the previous 7 days: pain, bloating, satisfaction with stool frequency, satisfaction with stool form, distress caused by diarrhea, distress caused by hard stools, straining, stool urgency, completeness of evacuation, and impairment in activities of daily living due to bowel dysfunction.

**IBS-Quality of Life Questionnaire.** The IBS-Quality of Life (IBS-QoL) Questionnaire is a highly valid tool ( $\alpha=0.96$ ) consisting of 34 items with 5-point response scales (0–4) (Andrae et al., 2013). The IBS-QoL is scored for eight subscales: dysphoria (8 items), interference with activity (7 items), body image (4 items), health worry (3 items), food avoidance (3 items), social reaction (4 items), sexual concerns (2 items), and relationships (3 items). Higher values indicate better QoL after converting the raw score on the IBS-QoL into 0–100 points (Patrick et al., 1998).

### *Statistical analyses*

Data analysis was carried out using SPSS Version 21 statistical analysis software (SPSS Inc., Chicago, IL, USA). Continuous variables such as age and duration of illness were reported as mean  $\pm$  standard deviation (*SD*) or median (min–max) as appropriate. Normality of distribution of continuous variables was assessed using the Kolmogorov–Smirnov test (cut off at  $p=0.01$ ). Categorical variables such as sex and the presence of comorbidities were described using frequency distributions and were presented as frequency ( $n$  (%)). Baseline categorical variables were compared across groups using the chi square test (exact as necessary). Depending on the distribution, continuous variables were compared using repeated measures analysis of variance (ANOVA) or the Kruskal Wallis test. Pair wise, post hoc comparisons for significance across differences were assessed by Bonferroni’s test or the Mann–Whitney *U*. Stepwise multinomial logistic regression analysis using independent variables (age,



**Figure 1.** CONSORT study flowchart.

gender, ethnicity, education, body mass index, comorbidity, smoking, alcohol, and medications) was employed to identify predictors of outcome measures (change in symptom severity score and IBS-QoL). The Pearson’s correlation coefficient was used to test correlation between variables. Odds ratios (ORs) were estimated with 95 percent confidence intervals (CIs). All tests were two-sided and considered significant at  $p < 0.05$ .

**Results**

**Patients**

A total of 56 patients were assessed for eligibility, of whom 35 with IBS were enrolled and submitted to dietary intervention (see Figure 1). Of them, 16 patients were randomized to receive short-term psychotherapy using GAI (treatment group) and 19 patients served as controls. Following the

initial GAI treatment session, 1 patient (6%) withdrew consent and was excluded from all statistical analyses. Patients in the treatment group were younger than controls ( $39.9 \pm 13.9$  vs  $53.1 \pm 14.5$  years, respectively), were more often single (47% vs 16%, respectively), and less likely to be retired (0% vs 32%, respectively). No other differences in demographic characteristics were observed between the groups (see Table 1). At baseline, no difference was observed in symptom severity scores between the treatment group and controls. Similarly, no differences were observed in baseline health-related quality of life as measured by IBS-QoL.

**Symptom severity**

In patients treated with GAI, the mean pre-treatment and post-treatment symptom severity scores were  $6.1 \pm 1.4$  and  $4.6 \pm 1.7$ , respectively

**Table 1.** Baseline patient characteristics.

	GAI	Control	<i>p</i>
N	15 (100)	19 (100)	
Age, years (SD)	38.9 (13.9)	53.1 (14.5)	0.03
Male, <i>n</i> (%)	4 (26.7)	4 (21.1)	0.15
BMI, kg/m <sup>2</sup>	23.2 (3.5)	25.0 (5.3)	0.63
Employment, <i>n</i> (%)			
Employed	10 (66.7)	9 (47.4)	0.26
Unemployed	5 (33.3)	4 (21.1)	0.65
Retired	0 (0)	6 (31.6)	0.02
Education, <i>n</i> (%)			
Primary	9 (60.0)	8 (42.1)	0.49
Secondary	6 (40.0)	8 (42.1)	0.99
Tertiary	0 (0)	3 (15.8)	0.24
Ethnicity, <i>n</i> (%)			
Israeli	10 (66.7)	15 (78.9)	0.42
East Europe	2 (13.3)	2 (10.5)	0.80
West Europe	0 (0)	0 (0)	NA
North Africa	0 (0)	1 (5.3)	0.37
Asia/Near East	3 (20.0)	1 (5.3)	0.19
Marital status, <i>n</i> (%)			
Single	7 (46.7)	3 (15.8)	0.05
Married	7 (46.7)	12 (63.2)	0.34
Divorced	1 (6.7)	3 (5.3)	0.41
IBS subtype, <i>n</i> (%)			
Diarrhea	8 (53.3)	8 (42.1)	0.99
Constipation	3 (20.0)	7 (36.8)	0.45
Mixed	4 (26.7)	4 (21.1)	0.99
Comorbid depression, <i>n</i> (%)	4 (26.7)	8 (42.1)	0.48
Comorbid anxiety, <i>n</i> (%)	2 (13.3)	5 (26.3)	0.43
Medications, <i>n</i> (%)			
Antidiarrheal	1 (6.7)	0 (0)	0.44
Antispasmodic	2 (13.3)	3 (5.3)	0.99
Fiber supplement	2 (13.3)	5 (26.3)	0.43
TCA/SSRI	2 (13.3)	8 (42.1)	0.13
Symptom severity score (baseline)	6.1 (1.4)	5.8 (1.5)	0.76
IBS-QoL score (baseline)	57.6 (15.4)	63.3 (18.0)	0.27

GAI: guided affective imagery; SD: standard deviation; BMI: body mass index; IBS: irritable bowel syndrome; TCA: tricyclic antidepressants; SSRI: selective serotonin reuptake inhibitor; IBS-QoL: irritable bowel syndrome quality of life.

( $p < 0.01$ ) (see Table 2). In controls, symptom severity did not significantly change following treatment. The magnitude of change in symptom

severity was greater in patients subjected to GAI compared to controls ( $-1.5 \pm 1.9$  vs  $0.1 \pm 1.6$ ,  $p = 0.04$ ). Multivariate logistic regression analysis identified treatment with GAI as the only independent predictor of symptom improvement (OR: 5.71; 95% CI: 1.16–28.07,  $p = 0.02$ ). No clinical or demographic variables were found to correlate significantly with symptom improvement.

### Quality of life

In patients treated with GAI, the pre-treatment and post-treatment IBS-QoL scores were  $57.6 \pm 15.4$  and  $69.7 \pm 18.3$ , respectively ( $p < 0.01$ ) (see Table 3). In controls, IBS-QoL did not significantly change following treatment. The magnitude of change in IBS-QoL was greater in patients subjected to GAI compared to controls ( $12.1 \pm 12.5$  vs  $-0.7 \pm 16.2$ ,  $p < 0.01$ ). Multivariate logistic regression analysis identified treatment with GAI as the only independent predictor of improved quality of life (OR: 17.88; 95% CI: 1.93–165.99,  $p = 0.01$ ).

### Discussion

In this prospective, randomized, controlled, pilot study we demonstrated that short-term psychotherapy with GAI improves symptoms and quality of life in IBS patients. Post-treatment symptom scores were lower, and IBS-related quality of life was higher, in patients treated with GAI and dietary modification, compared to dietary modification alone.

The theoretical basis for using relaxation techniques in IBS stems from the understanding that visceral pain sensation is heightened by emotional stress (Phillips et al., 2003). Second, active patient participation in treatment strategies may lead to a sense of empowerment and yield superior outcomes (Tusek et al., 1997). As distinct from other relaxation techniques, GAI encourages patients to invite specific images to enter the mind, allowing patients to gain insight into their symptoms, including precipitating and perpetuating factors, which may lead to solutions. Despite its high cost in resources and time, GAI is acceptable to patients as evidenced

**Table 2.** Effect of guided affective imagery on symptom severity score.

Subscore	GAI, <i>n</i> (SD)			Control, <i>n</i> (SD)			<i>p</i> <sup>a</sup>
	Baseline	8 weeks	<i>p</i>	Baseline	8 weeks	<i>p</i>	
Abdominal pain	6.1 (2.5)	4.9 (2.0)	0.10	6.7 (2.8)	6.1 (2.8)	0.47	0.91
Bloating	7.1 (1.9)	5.1 (2.7)	0.03	4.3 (3.0)	6.0 (3.1)	0.03	<0.01
Stool frequency	6.8 (2.0)	6.0 (3.1)	0.31	6.1 (2.8)	6.2 (2.9)	0.85	0.16
Stool form	5.9 (2.8)	5.8 (3.0)	0.94	6.4 (3.3)	7.1 (2.6)	0.35	0.40
Distress from diarrhea	3.5 (3.1)	3.2 (3.6)	0.74	3.4 (3.6)	3.3 (3.1)	0.94	0.70
Distress from hard stools	4.8 (3.4)	2.2 (2.6)	0.02	5.0 (3.6)	5.2 (3.4)	0.74	0.10
Straining	5.6 (3.5)	3.8 (2.8)	0.04	6.4 (3.4)	6.5 (3.3)	0.92	0.16
Urgency	6.0 (3.0)	4.9 (3.0)	0.19	6.8 (2.9)	5.8 (2.9)	0.24	0.87
Completeness of evacuation	7.4 (2.6)	5.2 (3.2)	0.02	6.8 (3.2)	7.1 (2.8)	0.67	0.06
Impaired ADL	7.5 (2.1)	4.5 (2.9)	<0.01	6.4 (2.9)	5.8 (3.3)	0.48	0.03
Overall symptom severity	6.1 (1.4)	4.6 (1.7)	<0.01	5.8 (1.5)	5.9 (1.5)	0.83	0.04

GAI: guided affective imagery; SD: standard deviation; ADL: activities of daily living.

<sup>a</sup>Compares change in symptom severity scores ( $\Delta$ ) between groups.

**Table 3.** Effect of guided affective imagery on quality of life (IBS-QoL).

IBS-QoL subscale <sup>a</sup>	GAI, <i>n</i> (SD)			Control, <i>n</i> (SD)			<i>p</i> <sup>b</sup>
	Baseline	8 weeks	<i>p</i>	Baseline	8 weeks	<i>p</i>	
Dysphoria	53.3 (22.4)	67.4 (20.1)	<0.01	59.0 (24.6)	57.9 (28.1)	0.82	<0.01
Interference with activity	56.4 (20.5)	68.4 (22.9)	0.02	59.0 (23.8)	57.7 (23.9)	0.79	0.02
Body image	61.2 (26.6)	73.7 (24.5)	0.04	73.0 (22.4)	70.4 (14.1)	0.51	0.01
Health worry	56.5 (17.0)	74.4 (25.6)	0.01	55.2 (14.4)	54.7 (15.0)	0.69	<0.01
Food avoidance	33.3 (24.5)	44.0 (25.8)	0.15	43.0 (26.8)	38.8 (24.7)	0.36	0.05
Social reaction	65.2 (27.5)	78.1 (19.6)	0.02	70.7 (24.8)	74.7 (24.8)	0.39	0.07
Sexual	73.2 (28.9)	73.2 (30.2)	0.99	75.0 (23.9)	82.9 (20.1)	0.03	0.29
Relationships	69.6 (24.8)	81.0 (22.0)	0.13	78.1 (15.8)	75.4 (23.5)	0.59	0.04
Overall IBS-QoL	57.6 (15.4)	69.7 (18.3)	<0.01	63.3 (18.0)	62.5 (19.4)	0.85	<0.01

IBS-QoL: irritable bowel syndrome quality of life; GAI: guided affective imagery; SD: standard deviation.

<sup>a</sup>Higher scores represent higher IBS-related QoL.

by the high compliance in our study (94% of patients completed all treatment sessions).

The use of GAI in IBS has not been reported in the medical literature except as an extended abstract (Boxwell and Eichler, 2005). Here, Boxwell et al. described a cohort of 56 IBS subjects, of whom 20 self-selected to undergo GAI. Details of the GAI protocol are not provided. IBS-QoL was the only outcome measure assessed, and significant differences were found for all the subscales and overall scores. These results are consistent with our findings that GAI improves quality of life in IBS patients.

Hypnotherapy is another relaxation modality, whereby a trance-like state is induced and attention is directed toward control of the intestinal smooth muscle. Hypnotherapy differs from GAI in that the focus is entirely on the bowel without exploring the patient's state of mind (Whorwell et al., 1987). A systematic review of mainly uncontrolled studies showed that in the majority of studies (10/18), hypnotherapy is effective in IBS management (Wilson et al., 2006). Following this publication, a number of high-quality randomized controlled trials have been completed. Mosner et al. (2013)

showed that hypnotherapy is superior to medical treatment for the relief of IBS symptoms and for improvement in psychological well-being. Dobbin et al. (2013) randomized patients to receive treatment with either biofeedback or hypnotherapy, and found that they were equally effective in improving IBS symptoms as well as anxiety and depression. There is evidence that the beneficial effects of hypnotherapy may persist for up to 5 years (Vlieger et al., 2012). Nevertheless, the effectiveness of hypnotherapy may be limited when not applied in a hospital setting (Lindfors et al., 2011).

We found that patients who were randomized to receive dietary intervention alone experienced a significant deterioration in bloating, whereas when combined with GAI, dietary intervention significantly improved bloating (see Table 2). It should be noted that patients in the control group reported a low level of boating at the study outset, compared to the treatment group. However, it is unclear why these patients worsened following dietary intervention. Our findings should be considered in the context of recent data on the role of fermentable carbohydrates in IBS (Shepherd et al., 2008; Silk et al., 2009; Symons et al., 1992). Randomized controlled studies show that fructose, fructans, sorbitol, and transgalactooligosaccharides (trans-GOS) can precipitate bloating in a dose dependent manner (Shepherd et al., 2008; Silk et al., 2009). Similarly, bloating may be alleviated by a low lactose diet in IBS patients with evidence of lactose malabsorption (Böhmer and Tuynman, 2001; Vernia et al., 1995).

Our study is limited in that the standard medical care group did not receive a placebo treatment. Omitting a placebo treatment may lead to overestimation of treatment effects because of greater expectancy of benefit, a variable that we did not measure in this study. The small sample size in our study could have also led to an inflated OR in favor of the intervention. If the sample size were larger, a more accurate representation would likely be possible. The small sample size is also likely responsible for the age difference observed between the two treatment groups. Additional methodological flaws include the

short duration of follow-up, use of a nonvalidated symptom measure, and the lack of specific clinical endpoints or assessment of adherence to dietary recommendations. We cannot exclude that the observed benefit of GAI in IBS is due to nonspecific aspects of treatment such as social support from the therapist. This limitation could be overcome by giving the control group additional practitioner/therapist time for supportive treatment (but not GAI). Alternatively, GAI could be compared head-to-head with other treatments such as hypnotherapy or biofeedback. Nevertheless, this study is a pilot in which we aimed to explore a previously unreported IBS treatment modality. This pilot study will form the basis for a larger study in the future in order to verify our findings. Another limitation of our study is the age disparity between GAI and control groups. Although this does not affect the ability to interpret results within each group, there is concern that older patients might not respond as well to GAI, or that in younger patients, dietary modification might be efficacious. Notably, multivariate logistic regression analysis did not identify age as a predictor of improvement in IBS-related symptoms or quality of life.

In conclusion, GAI combined with dietary modification may be beneficial in the management of IBS. A larger study with a longer period of follow-up and defined clinical endpoints is required to confirm our findings. Future studies might also compare GAI to established psychotherapies such as hypnosis and biofeedback.

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