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Preliminary Web-Based Measures Development for GHB: Expectancies, Functions, and Withdrawal

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Abstract

Background—Much of what is understood regarding gamma hydroxybutyrate (GHB) treatment is based on hospital case studies for overdose and withdrawal, and there are currently no measures developed specifically for GHB or its analogs (e.g., gamma butyrolactone and 1,4-butanediol) to assess drug effect expectancies, reasons for starting use, withdrawal effects, and knowledge and opinions about use.

Objectives—This pilot study (N = 61) was conducted to begin measures development to assess experiences, functions of use, and opinions regarding use as indicated by respondents taking a Web-based survey.

Methods—Minimum average partial correlation and parallel analysis procedures are employed to create scales.

Results—Scales were developed to assess expectancies, reasons for use, withdrawal, and knowledge/opinions of use with median α = .79 and that account for 8.69–24.17% of the variance.

Conclusion—Scales have relatively good psychometric properties and replication is needed.

Scientific Significance—GHB-specific measures may greatly assist in furthering our understanding of protective and risk factors for use, and withdrawal phenomena.

Keywords

GHB; club drugs; Web-based study; addiction; psychometrics; survey

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

BACKGROUND AND HISTORY

Gamma hydroxybutyrate (GHB) was developed in the early 1960s and was initially used as an anesthetic (1). The earliest popular use of GHB began in the 1980s and 1990s, with over-the-counter products sold for purported health benefits (2). Abuse of GHB for recreational purposes followed, with reports of adverse events and subsequent limits on accessibility of GHB (3,4). Consequently, GHB analogs (gamma butyrolactone and 1,4-butanediol, or GBL and BD) were marketed, first as "dietary supplements" and then spuriously sold as "cleaning products," when dietary supplements were recalled (5). When ingested, GBL and BD are rapidly metabolized to GHB, thereby producing the same clinical effects (5,6). More recently, a pharmaceutical formulation of GHB (Xyrem®) was approved by the Federal Drug Administration for treatment of narcolepsy with cataplexy and/or excessive daytime sleepiness (see 7). In addition, GHB has been studied in Europe for the treatment of alcohol and other addictive disorders with mixed results (for a brief summary, see 8). Although "supplements" are no longer sold, Xyrem®, industrial BD and GBL, street supplies, home-synthesized GHB, and some limited "cleaning" type products are available (see 9).

POPULAR USE

Recreational reasons for GHB use include euphoria, enhanced sexuality, relaxation, and sociability (10). Purported health benefits include increased muscle mass (2), fat reduction (5), increased energy (10), and improved concentration (11). Similarly, analogs were initially marketed as supplements to improve athletic performance, reduce depression, prolong life (6), reduce wrinkles, reverse baldness, restore hair color, improve vision, and more (5). One Web-based survey (12) found that GHB was consumed to alter consciousness and to enhance enjoyment of dancing and music; further, principal components analysis of responses were conducted in order to examine experiences reported by users. Two of the six components that were created reflected previously mentioned reasons for use: positive sexual effects (e.g., enhanced sense of touch) and positive intoxication effects (e.g., relaxation), whereas other components reflected negative experiences.

Research has identified a number of negative experiences reported by GHB (and analog) users, including hallucinations, involuntary muscle jerking (13), oversedation, incoordination, dizziness, nausea (14), confusion, amnesia (10), blurred vision, and hot/cold flushes (15). The Web-based survey mentioned above found the following four components: general intoxication (restlessness), negative intoxication (dizzy), negative sexual effects (hard to achieve orgasm), and negative physiological effects (irregular heart beat). Cases of impaired driving have been documented in relation to GHB use (16). Although widely recognized as a "date-rape" drug (13), the widespread use of GHB (or analogs) in commission of sexual assaults has recently been questioned (17).

SEVERE ADVERSE EVENTS

GHB appears to have a steep dose–response curve (2), and this is significant in terms of both clinical effects and dosing. Onset of effects such as loss of consciousness, vomiting, and cognitive/psychomotor impairment are abrupt, and there is a narrow margin between dose used for recreational effects and that which results in adverse events, such as abrupt loss of

consciousness. In case reports, symptoms of overdose include coma, abrupt sleep onset, sleep paralysis, sleep walking, hallucinations, enuresis, unconsciousness, nausea, seizurelike activity, respiratory depression, dizziness, irregular heartbeat, sweating (2), and extreme combativeness (18). Fatalities have been associated with GHB, GBL, and BD overdose with and without co-intoxicants (see 4,7,9,19). Zvosec et al. (5) found that BD overdose is associated with vomiting, incontinence, agitation, combativeness, labile consciousness, respiratory depression, and death. These authors concluded that health risks including acute toxicity (which can be fatal), addiction, and withdrawal for BD are similar to those of GHB and GBL.

GHB is often used with alcohol and other drugs (20), and the combination of alcohol and GHB appears to have a synergistic or additive effect (21, see also 22). In addition, overdose with even small doses of GHB/analogs may be possible for persons using protease inhibitors since these compounds alter the metabolism of GHB (see 22,23).

ADDICTION AND WITHDRAWAL

GHB/analog withdrawal has features similar to alcohol and benzodiazepine withdrawal (24). Symptoms may include anxiety, restlessness, insomnia, tremor, confusion, delirium, hallucinations (tactile, visual, auditory), rapid heart rate, elevated blood pressure, vomiting, sweating (11), lability, paranoia, agitation and fatigue (8). Case reports indicate that withdrawal usually begins within 1–8 hours of last use and usually lasts for 3–15 days (8,11). In addition to acute withdrawal, prolonged withdrawal (characterized by dysphoria, anxiety, memory problems, and insomnia) can last for 3–6 months (see 23,24). Addiction can develop over a very short period of 1–4 months (8), with intermittent dosing escalating to every 1–3 hours around the clock (11). However, in some cases, the duration of regular use prior to the development of tolerance and dependence has been 4 years (8). Withdrawal can be lethal (11). There has been at least one case study of permanent neurologic damage from chronic use, with symptoms including dysarthria and gait instability (25).

THE CURRENT STUDY

There are currently few empirically developed GHB-specific measures for the assessment of drug effect expectancies, reasons for starting use, withdrawal effects, and users' knowledge and opinions about use. The current pilot study aims to develop measures in these areas using a Web-based assessment. Web-based assessment is viable (26) and has many advantages such as decreased costs, increased data accuracy, increased survey accessibility, decreased time for participants and research staff, and greater customized feedback tailored to the participants' responses (27). Web-based surveys of illegal drug use have found this method to be feasible and to show little evidence of response bias (28,29). Furthermore, studies of reliability have found no significant differences between paper-based assessments and Web-based assessments (27,30). To create the current measures, minimum average partial correlation (MAP) and parallel analysis (PA) procedures were used due to their superiority to traditional approaches such as the Kaiser rule and the scree plot (31,32).

As stated above, regulations have made access to GHB/analogs more difficult; however, it is important to develop measures assessing GHB/analog expectancies, reasons for starting use,

withdrawal, and knowledge/opinions about use for those persons still using these substances. Although some drug-use constructs may apply generally across drug types (e.g., confidence to resist use, 33), other constructs such as drug effect expectancies appear to be more drug-specific (see 34–36). These measures offer an initial step toward the development of interventions tailored to persons experiencing abuse, adverse effects, or dependence related to GHB/analogs.

METHODS

Participants

The study received Institutional Review Board approval. The sample was recruited using the Internet. A brief advertisement was sent out to various Web sites for posting, including a link to the study Web site. The advertisement was sent to Web sites that had been previously identified as containing information about GHB. Targeted sites included pro-use sites that touted benefits, anti-use sites that provided warnings, and neutral sites that were primarily informational. The study Web site provided a description of procedures and information regarding the anonymity of responses, and it indicated the neutrality of the investigators with respect to legalizing GHB. A consent form was provided, with agreement indicated by clicking, “Yes, I have read the above and agree to participate.”

The study included individuals with knowledge of GHB/analogs acquired through personal use or through exposure to others’ use. During recruitment, no exclusions were attempted because respondents could easily misreport certain exclusion criteria, such as age or citizenship, in order to participate. For those persons who eventually elected to participate, age and citizenship were tracked as part of data collection. Information that could be linked to identity was not collected; the information obtained was anonymous, answers were not linked to identity, and firewalls were used for security. Persons who desired assistance or more information related to GHB use were referred to professionally recognized Web sites or their healthcare provider.

To track multiple questionnaire submissions, participants were directed to create a unique code consisting of parts of their mother’s name and their social security number. In 2003, over a 5-month period, 61 respondents participated in the study. Fluctuations in the sample size are noted in the Results section and are a result of some respondents leaving some items blank. Items may be left blank due to refusal to answer, or because the question applies to only someone who used GHB/analogs (as compared to having only been exposed to others’ use).

The sample (N = 61) is described as follows: 90.2% White/Europeans; mean (M) age = 31.85, standard deviation (SD) = 9.80; 18.0% completed the measures outside of the United States; 80.3% male; 88.5% completed at least some college; 93.4% had used GHB/analogs in the last year; and 41.0% qualified for a use disorder in the last year. Median use level in the last year was ≤3 times per month. A majority of respondents (N = 56) completed 75% or more of the study questions; no significant differences were found between completers and non-completers on basic demographics. Of the 61 respondents, 53 reported that they did not know anyone else in the study (86.9%).

Procedures

Assessment—Questionnaires were part of a larger set of questionnaires assessing GHB/analog use. The entire assessment took between 1 and 1.5 hours to complete. Response format for most items consisted of two to several fixed choices. For some questions, respondents were asked to type in a number. Participants were permitted to stop at any time and sign in again later in order to complete the questionnaires; however, no participants utilized this option. To facilitate completing the assessment, a pop-up screen of chemical names for GHB, GBL, and BD was provided to participants, including, for example, Georgia Home Boy (GHB), Renewtrient (GBL), and NRG3 (BD).

Measures

Items for several measures below (e.g., GHB/Analog Opinions and Knowledge (GAOK), Reasons for Using GHB/Analogs (RUGA), GHB/Analog Expectancy Questionnaire (GAEQ), and Withdrawal/Long-Term Effects of GHB/Analogs (WDLTE-GA)) were developed after reviewing information covering both scientific reports and anecdotal Internet reports (e.g., from Web sites such as Lycaeum, Erowid, New Blue Light, Project GHB, and the National Institute on Drug Abuse site). Scientific publications prior to about 2002 were reviewed, and Internet review spanned approximately 2000–2002.

GHB/Analog General Information Form—This questionnaire gathers descriptive data including age, gender, education, and racial background.

GHB/Analog Opinions and Knowledge—This questionnaire assesses opinions and knowledge of GHB/analog dangers. Most items are rated on two 5-point Likert scales (disagree strongly = 1 to agree strongly = 5; versus do not know = 0, entirely harmless = 1 to very dangerous = 4). Areas assessed include general opinions about GHB/analogs (GHB should be entirely legal), knowledge regarding dangers of mixing GHB/analogs with other substances, and knowledge regarding use of GHB/analogs with certain medical conditions. Prior to psychometric analyses, this part of the questionnaire consisted of 30 items. In addition, a series of nine items addresses when respondents began taking GHB/analogs and whether there were government warnings about these substances when they began use (these nine items were irrelevant to components analyses and were excluded).

Reasons for Using GHB/Analogs—This questionnaire assesses the reasons for starting use of these substances (e.g., to “reduce aging effects” or “improve sex”). Respondents answer using a 4-point Likert scale (disagree strongly = 1 to agree strongly = 4). It comprised 14 items prior to psychometric analysis.

GHB/Analog Expectancy Questionnaire—This was modeled after the Marijuana Effect Expectancy (35), Cocaine Effect Expectancy (35), and Alcohol Expectancy (34) Questionnaires. Participants rate how much they agree/disagree with statements such as “GHB/analogs increase muscle and reduce fat.” Response options comprised a 5-point Likert scale (disagree strongly = 1 to agree strongly = 5). It comprised 38 items prior to psychometric analysis.

Substance Abuse/Dependence for GHB/Analogs—To develop 12-month abuse and dependence diagnoses for GHB/analogs, a checklist of 13 items was created based on the Diagnostic and Statistical Manual-IV (DSM-IV; 37).

Withdrawal/Long-Term Effects of GHB/Analogs—Items were based on the Clinical Institute Withdrawal Assessment for Alcohol based on DSM-III-R (38) and the non-alcohol withdrawal symptoms for Structured Clinical Interview for DSM-IV (39). In addition, these items were based on scientific reports regarding possible long-term effects and Internet testimonials indicating effects lasting over 2 weeks. Participants are asked to report symptoms as a result of reducing/stopping use, rather than symptoms due to some other disorder (e.g., having anxiety, taking GHB to relieve anxiety, and then having anxiety re-emerge when GHB is stopped). Respondents are asked to report the time period over which the symptom lasted (<1 day, 1–6 days, 1–3 weeks, 1–4 months, 5–11 months, ≥1 year, and did not occur), whether GHB/analogs were taken again to relieve the symptoms, and whether two or more symptoms adversely impacted important aspects of social/work life (yes, no, not applicable – effects did not occur). The questionnaire comprised 27 items prior to psychometric analysis.

Analytic Plan

Data were checked for distributional assumptions commensurate with analyses employed; no transformations were needed. Number of participants (*N*) per analyses varies due to respondents leaving some answers blank. In addition, *N* varies because some participants needed to be removed prior to some analyses: for example, persons who did not use GHB/analogs regularly (≥1×/week) or who never reduced use were removed from analyses involving withdrawal from GHB/analogs.

To develop measures, principal components analysis was used. A decision was made a priori to utilize loadings of ≥.40, since this is a typical lower limit utilized (40) and utilizing loadings of .60 or more may overly limit number of items per scale. PA and MAP were utilized to determine the number of components to retain, since they are superior to traditional approaches such as the scree plot and Kaiser rule (31,32). When MAP/PA differed in terms of components suggested, psychometrics (in terms of variance accounted, internal consistencies, higher loadings) and parsimony were compared between the two techniques to make a final decision (41). Items with complex loadings were removed (i.e., loading at ≥.40 on more than one component). Data presented below are for the final components chosen (for information on excluded items, contact the first author). Varimax-rotated loadings are presented for ease of interpretation.

RESULTS

Data reduction procedures were utilized for GAOK (opinions/knowledge). MAP suggested four whereas PA suggested five components. MAP was chosen because psychometrics between the two procedures were similar but MAP produced fewer scales. Table 1 shows the loadings and summarizes the psychometric properties. Components 1, 2, 3, and 4 are “dangerous with medical conditions,” “legalization/free access,” “dangerous with alcohol and other drugs,” and “use carefully/under medical supervision,” respectively.

In analyzing GAEQ, MAP and PA each indicated four components. Table 2 presents relevant statistics for the four-component solution. Components 1, 2, 3, and 4 are “negative psychological/somatic effects,” “psychomotor retardation,” “energy/improved health,” and “improved sociability,” respectively.

For RUGA, MAP and PA indicate two and three components, respectively. PA was chosen because its components evidenced superior psychometrics in terms of variance, internal consistencies, and loadings (see Table 3). Components 1, 2, and 3 are “psychological/health benefits,” “enhance party experience,” and “assist sleep/medical opinion,” respectively.

For WDLTE-GA, MAP and PA indicated four and three components, respectively. PA was chosen because its components evidenced superior psychometrics in terms of variance, internal consistencies, loadings, and parsimony (see Table 4). Components 1, 2, and 3 are “general malaise/cognitive symptoms,” “restlessness/agitation,” and “fatigue/somatic symptoms,” respectively.

DISCUSSION

Findings

This pilot study is the first to present a suite of measures to assess GAOK, GAEQ, RUGA, and WDLTE-GA. As noted in tables, median $\alpha = .79$ and components account for 8.69–24.17% of the variance. The array of components obtained regarding opinions of use, drug effect expectancies, and reasons for use reflect dangers, and negative psychological and physical effects, that persons may weigh against perceived benefits such as improved health and energy, sociability, and sleep.

Components found on GAOK suggest that respondents feel that it is dangerous to use GHB/analogs with a variety of medical conditions in general and with other substances, and that medical supervision is warranted. The “Dangerous with Medical Conditions” component may reflect a general cautiousness and likely not specific and accurate knowledge, since, for example, using GHB/analogs when skin is bruised is unlikely to be problematic. The component reflecting that GHB/analogs are dangerous with alcohol/drugs is consistent with other reports in the literature (13,14); however, few studies to date have explored respondents’ feelings that access should be legalized or that use should occur under professional care as was found in this study.

Components on RUGA indicate that respondents began using GHB/analogs for psychological and health benefits, to socialize, and after medical advice (perhaps to assist with sleep). This is consistent with previously reported anecdotal and case reports in the literature regarding reasons for starting use (see Introduction). Respondents’ drug effect expectancies similarly indicate anticipated health benefits and improved sociability; however, respondents also anticipate negative somatic and psychological impact, including psychomotor retardation. Previous work on experiences of use (12) found components reflecting positive intoxication and negative physiological experiences, which are somewhat similar to the expectancy effect components found here reflecting improved sociability and psychomotor slowing, respectively.

When GHB/analog use was reduced, respondents also reported significant negative impact, including cognitive symptoms, restlessness, and somatic symptoms such as fatigue. Note that the components analysis was run on the Likert scale reflecting the length of time the withdrawal symptom lasted (0 = did not occur, 1 = less than 1 day to 6 = a year or more). Judging from the high average scores on these scales, it appears that respondents report that withdrawal lasts several months; this has been described rarely in the literature (23). This suggests the need for more well-controlled studies to better understand the withdrawal process for GHB/analogs or perceptions of withdrawal among users.

Interestingly, although the literature indicates GHB may be used to treat alcohol addiction, no components were found reflecting this use on RUGA or GAEQ, nor were items retained on scales that reflected use to treat addiction (such items were originally placed on both measures). On the other hand, the literature also suggests that GHB can be used to assist with sleep disturbance, and scales do reflect this (RUGA, component 3).

Use of Components

With replication and further validation, these scales may be used to assess dimensions germane to reducing use and abuse of GHB/analogs. For example, if someone scores high on Improved Sociability and on Energy/Improved Health (positive expectancies), but low on Negative Psychological/Somatic Effects and on Psychomotor Retardation (negative expectancies), a discussion may be opened with the respondent to increase negative drug effect expectancies and decrease positive effect expectancies in order to reduce interest in use. Similarly, if a respondent who is contemplating starting to use scores low on Enhance Party Experience and Psychological/Health Benefits, but high on Assist Sleep/Medical Opinion (all from RUGA), then intervention might target medical issues, including sleep, thereby mitigating the allure of illicit GHB/analog use. Assessing symptoms that ensue with reduced use is important in terms of knowing how to manage the discomfort users sometimes experience when use is ceased. Effective management of ongoing withdrawal symptoms is critical for lessening the likelihood of relapse. In addition, if persons who stop or reduce use of GHB/analogs know what to expect in terms of symptoms, they may be less distressed, since they may see their experience as predictable and known.

Limitations and Future Studies

These scales are preliminary and replication is needed with larger *N*. With a sample size of $N \sim 55$, average loadings of about .72, and a general item-to-component ratio (p/m) of about 6across scales, we might expect these components to be relatively stable (40). Given our limitations in *N* and our loadings set at the lower acceptable limit of .40, we likely did not mistakenly include items (Type I error), but we may have missed items that should have been included (Type II error; 40). Even so, the agreement in terms of *K* between our sample findings and those that would be expected in a similar population are in the acceptable to excellent range; and g^2 (the average squared differences between comparable loadings of the sample and population patterns) is likely to be approximately .02 (40).

Potential limitations of the study include the self-report nature of the data. However, self-report is one of the most sensitive indicators of substance use. Evidence generally supports

the accuracy of self-reports (42) and indicates that respondents often report more substance use than is detected in urinalysis (43). In addition, although we guided respondents to develop a unique identifier (ID) so that we could track multiple submissions, it is possible that they purposely created more than one ID for multiple submissions. However, because respondents likely did not know records would be eliminated based on multiple submissions, we feel this possibility is unlikely. Also, although we cannot eliminate the possibility that they mistyped the ID when they re-entered, we feel that this would be a relatively infrequent event.

As with many studies, it is possible that collecting data via the Web and posting on Web sites may lead to sample selection bias (e.g., in education level, demographics, exposure to GHB/analogs). However, education, demographics, and use-levels are comparable to those found in similar (Web and non-Web) survey studies (see 10,12–15). Further, one non-Web-based study (14) reported that the second most common source of information on GHB was the Web (41%); therefore, for this particular substance, Web recruitment may be optimal. Although the sample is representative, and although the components appear stable, the withdrawal measure developed here may benefit from future studies with a more well-defined group of problematic users.

CONCLUSION

GHB/analogs are drugs of abuse. Measures were developed to reliably assess opinions and knowledge, drug effect expectancies, and reasons to begin use, as well as withdrawal symptoms. Replication is advised given the small sample size; however, given the relatively high loadings, components should be fairly stable. Development of components is a first and important step in developing quantifiable measures reflecting case reports and other survey data as found in the literature. These components can be used to assess protective and risk factors regarding starting and continuing use. Protective factors may include holding opinions regarding risks of use and negative expectancies of, for example, physical and/or cognitive impairment. Conversely, risk factors may include holding opinions that access to GHB/analogs should be free and legal, having positive expectancies (e.g., increased energy), and/or specific reasons for use (e.g., sleep enhancement). The withdrawal measure suggests a prolonged syndrome lasting several months, which has been reported, albeit infrequently, in the literature and deserves further investigation.

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TABLE 1

Components analyses for opinions and knowledge.

	Component			
	1	2	3	4.
Item				
GHB should be entirely illegal[1]		−.491		
GHB should be available over-the-counter		.828		
The public should be made more aware of the potential dangers		−.597		
I have purchased these products from legitimate sources and assumed they were safe				.414
When people have a bad reaction to GHB, it is because they do not know how to use it		.493		
GHB should be used for medical reasons and not for recreation				.668
If someone were unresponsive after using GHB/analogs, I would call for medical help				.720
If someone were unresponsive after using GHB/analogs, I would let them sleep it off				−.677
Due to government restrictions, impure forms cause bad reactions		.567		
The best way to protect the public is by legal manufacture and distribution		.815		
GHB should be prescribed and taken under medical supervision				.442
Minor tranquilizers[2]			.759	
Major tranquilizers			.726	
Pain killers			.851	
Over-the-counter allergy and sleep aids			.581	
Alcohol			.595	
Ritonavir or Saquinavir	.604			
Methamphetamine (MDMA)	.469			
Epilepsy	.622			
Heart problems	.658			
Cushing’s syndrome	.851			
Hypertension	.758			
Prior history of addiction		−.540		
Liver disease	.757			
Bruising	.769			
Psychometric indicator				
N	55	57	55	53
α	.85	.47	.78	.63
M	9.73	23.25	15.82	15.89
SD	8.55	4.78	4.75	4.32
Minimum possible score	8	7	5	5
Maximum possible score	32	34	20	25
Variance (%)	15.95	12.37	12.26	9.09

Notes: GHB, gamma hydroxybutyrate.

1 = dangerous with medical conditions; 2 = legalization/free access; 3 = dangerous with alcohol and other drugs; 4 = use carefully/under medical supervision.

[1] Likert for this item and those below is 1–5;

[2]Likert for this item and those below is 1–4.

TABLE 2

Components analyses for drug effect expectancies.

	Component			
	1	2	3	4.
Item				
GHB/analogs increase muscle growth or reduce body fat			.762	
GHB/analogs can make someone aggressive	.498			
GHB/analogs make a person more sociable				.785
GHB/analogs are not addictive	−.513			
GHB/analogs can slow your heart rate and breathing		.689		
When using GHB/analogs, your speech may be slurred		.742		
GHB/analogs make a person feel energized the day after use			.602	
GHB/analogs improve sex				.690
GHB/analogs can make a person feel depressed	.566			
GHB/analogs put a person in a good mood				.622
People using GHB/analogs can have difficulty making sense when they think and speak		.644		
GHB/analogs can make dancing feel more joyous				.608
GHB/analogs can make a person quite ill		.648		
GHB/analogs can be used to reduce the effects of aging			.801	
GHB/analogs generally improve a person's health (their vision, organ functions, etc.)			.625	
GHB/analogs can make you lose motivation			−.487	
People can slip into a coma when using GHB/analogs		.485		
People can have seizures or intense twitching/tremors when using GHB/analogs		.647		
GHB/analogs can cause loss of bladder or bowel control	.593			
Even after you have not used GHB/analogs for several weeks, you may still hallucinate	.660			
A person using GHB/analogs can become quite fearful and anxious	.801			
GHB/analogs can cause a person to become very agitated	.832			
GHB/analogs can cause bleeding from the mouth or nose	.646			
A person may become confused on GHB/analogs		.787		
GHB/analogs can impair your memory even if you do not use it anymore	.464			
After prolonged use of GHB/analogs, a person may suddenly pass out while engaged in an activity		.414		
GHB/analogs can hurt how well a person sleeps	.645			
Psychometric indicator				
N	53	53	55	56
α	.85	.83	.75	.76
M	29.36	30.70	16.02	17.00
SD	8.39	6.29	4.37	3.00
Minimum possible score	10	8	5	4
Maximum possible score	50	40	25	20
Variance (%)	15.13	14.40	12.47	8.69

Notes: GHB, gamma hydroxybutyrate.

1 = negative psychological/somatic effects; 2 = psychomotor retardation; 3 = energy/improved health; 4 = improved sociability.

TABLE 3

Components analyses for reasons to begin use.

	Component		
	1	**2**	**3**
Item			
Get high		.747	
Enjoy dancing more		.730	
Reduce depression or anxiety	.664		
Increase muscle mass or lose body fat	.629		
Help me sleep			.676
Boost endurance, feel energized	.799		
Improve my thinking (attention, memory, etc.)	.756		
Reduce effects of aging	.780		
Reduce effects of methamphetamine or MDMA		.790	
Medical doctor suggested it			.689
Medical doctor prescribed it			.748
Psychometric indicator			
N	56	58	58
α	.83	.74	.64
M	12.16	7.62	5.84
SD	4.42	2.86	1.99
Minimum possible score	5	3	3
Psychometric indicator			
Maximum possible score	20	12	12
Variance (%)	24.17	19.70	17.33

Notes: 1 = psychological/health benefits; 2 = enhance party experience; 3 = assist sleep/medical opinion.

TABLE 4

Components analyses for withdrawal/long-term effects.

	Component		
	1	**2**	**3**
Item			
Sweating		.563	
Hand tremor		.761	
Unable to sleep		.558	
Sick to stomach	.492		
Hallucinations		.782	
Agitation (fidgety)		.709	
Very tired			.566
Bad dreams	.662		
Increased appetite	.771		
Irritable, angry	.594		
Poor concentration	.786		
Achy muscles			.698
Fever			.584
Diarrhea			.775
Yawning			.657
Problems with language		.581	
Confusion/fuzzy thinking	.716		
Psychometric indicator			
N	50	54	53
α	.86	.82	.79
M	32.62	32.41	27.96
SD	10.42	9.88	8.56
Minimum possible score	0	0	0
Maximum possible score	36	36	30
Variance (%)	20.35	18.43	14.27

Notes: 1 = general malaise/cognitive symptoms; 2 = restlessness/agitation; 3 = fatigue/somatic symptoms.