



## THEORETICAL REVIEW

## Behavioral economics strategies for promoting adherence to sleep interventions



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## SUMMARY

Cognitive-behavioral treatment for insomnia and continuous positive airway pressure therapy for obstructive sleep apnea are among the most efficacious sleep interventions. Unfortunately, adherence levels are disappointingly low for these interventions. Behavioral economics offers a promising framework for promoting adherence, often through relatively brief and straightforward strategies. The assumptions, goals, and key strategies of behavioral economics will be introduced. These strategies include providing social norms information, changing defaults, using the compromise effect, utilizing commitment devices, and establishing lottery-based systems. Then, this review will highlight specific behavioral economic approaches to promote patient adherence for three major sleep interventions: 1) behavioral treatment for pediatric insomnia, 2) cognitive-behavioral treatment for adult insomnia, and 3) continuous positive airway pressure for obstructive sleep apnea. Next, behavioral economic strategies will be discussed as ways to improve health care provider adherence to clinical practice guidelines regarding appropriate prescribing of hypnotics and ordering sleep-promoting practices for hospitalized inpatients. Finally, possible concerns that readers may have about behavioral economics strategies, including their efficacy, feasibility, and sustainability, will be addressed.

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## Introduction

Cognitive-behavioral treatment (CBT) for insomnia and continuous positive airway pressure (CPAP) therapy for obstructive sleep apnea (OSA) are among the most efficacious sleep interventions [1–3]. Unfortunately, adherence levels are disappointingly low for these interventions [4,5]. Comprehensive frameworks have been proposed to increase adherence to sleep interventions [6–8]. However, interventions based upon these frameworks often require multiple sessions of health care provider time and therefore sometimes are not feasible for large-scale dissemination to the substantial portion of the population with sleep difficulties.

Behavioral economics (BE) offers an alternative framework for promoting adherence, often through relatively brief and straightforward strategies. This review has four major parts. First, the assumptions, goals, and key strategies of BE will be introduced.

Second, this review will highlight specific BE approaches to promote patient adherence for three major sleep interventions: a) behavioral treatment for pediatric insomnia, b) CBT for adult insomnia, and c) CPAP for obstructive sleep apnea. Third, BE strategies will be discussed as ways to improve health care provider adherence to clinical practice guidelines for sleep. Fourth, possible concerns that readers may have regarding BE will be addressed.

## A brief overview of behavioral economics (BE)

Behavioral economics features two critical assumptions. First, while traditional economics presumes consumers are rational decision makers who make well-informed and appropriate choices, BE often views consumers as irrational decision makers who make poorly informed and maladaptive choices. Second, BE advocates have proposed simple interventions that promote more adaptive decision making yet do not mandate individual change. The titles of two of the most popular books on BE—Dan Ariely's *Predictably Irrational* [9] and Richard Thaler and Cass Sunstein's *Nudge* [10]—highlight these two underlying assumptions.

Considering that BE has deep roots in economics and marketing, it may be best known for helping consumers make better financial

Abbreviations: BE, behavioral economics; CBT, cognitive behavioral therapy; CPAP, continuous positive airway pressure; OSA, obstructive sleep apnea; EMR, Electronic Medical Record.

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### Glossary of terms

Behavioral economics (BE)	An interdisciplinary field based upon knowledge from marketing, psychology, and economics that assumes consumers often make maladaptive choices that can be overcome by brief and straightforward interventions.
Commitment devices	An approach to promote adherence that features an individual setting aside a tangible item such as money at the beginning of a health-focused program that must be forfeited if goals are not met by the end of the program.
Compromise effect	The impact of offering three options that may promote selection of a middle option.
Defaults	The initial option with which consumers are presented that often holds considerable weight in decision making, even if it is not in the best interest of consumers or society as a whole.
Descriptive norms	The frequency with which similar individuals hold a particular view or display a particular behavior relative to the attitudes and behavior of a specific person.
Injunctive norms	The frequency with which high-performing individuals hold a particular view or display a particular behavior relative to the attitudes and behavior of a specific person.
Lottery-based system	A reinforcement approach that features small chances of relatively large rewards as opposed to higher chances of more modest rewards.

decisions, such as increasing retirement savings or decreasing home energy bills. However, BE's relevance for improving decision making has expanded to health care. Numerous governmental and philanthropic agencies, including the United States National Institute of Health [11], the United States Department of Agriculture [12], the Bill and Melinda Gates Foundation [13], and the Robert Wood Johnson Foundation [14], have had funding announcements calling for BE interventions to address common health problems. While BE has been featured prominently for many health behaviors, including nutrition, contraception, and substance use [15–17], its relevance for promoting sleep remains largely unexplored in the scientific literature. Below are five BE strategies that have been used to influence decision making in non-sleep domains. These non-sleep domains are featured in this section because they feature leading examples of BE applications in case these approaches are eventually considered for sleep purposes.

### Providing social norms information

Because people sometimes lack information to compare their attitudes and behaviors to those of their peers, this BE strategy features providing such feedback. For example, providing positive information on what groups thought about a particular product has led to more subsequent purchases relative to withholding this information [18]. Descriptive norms and injunctive norms are two types of social norms [19]. The former refers to how often comparable individuals hold a particular view or display a particular behavior. In contrast, the latter refers to how often high-performing individuals hold a particular view or display a particular behavior.

The benefit of social norms has been demonstrated in the area of energy conservation. Because people generally have no idea how they compare to their peers in terms of household energy use, Schultz and colleagues gave low performing individuals (high energy users) descriptive norms for their neighborhood and found subsequent decreases in usage among this energy-inefficient subgroup [20]. They also found giving high-performing individuals (low energy users) emotional-laden feedback in the form of happy-face icons prevented this energy-efficient subgroup from increasing its energy usage. If this energy-efficient subgroup had increased its energy usage, it would have gravitated to the overall neighborhood mean and negated the benefits of providing social norms.

### Changing defaults

This BE strategy suggests that the initial option (“the default”) with which consumers are presented often holds considerable weight in decision making, even if the default may not be in the best interest of consumers or society as a whole. Company-sponsored retirement savings plans provide a classical example of how different defaults can influence individual decisions. When the default is not to participate and employees must opt-in to such initiatives through completing paperwork indicating their agreement to participate, employee contribution rates are disappointingly low. However, interventionists have found that changing from opt-in programs to opt-out programs—in which employees must explicitly complete paperwork indicating their refusal to participate—can greatly increase contribution rates for retirement savings programs [21]. Opt-out programs have also been found to increase cadaveric organ donation [22].

### Using the compromise effect

Individuals are often unwilling to make extreme decisions. Therefore, the compromise effect suggests that offering three options that differ on some type of dimension (e.g., price, time commitment) may promote selection of a middle “compromise” option whereas offering just two options may promote the least demanding choice [23]. For example, offering three cars priced in the inexpensive, moderately expensive, and highly expensive ranges respectively may promote consumers' selecting the moderately expensive automobile while offering just the inexpensive and moderately expensive options might promote purchases of the inexpensive automobiles. In terms of health behavior, this BE strategy of offering three levels of lifestyle changes – no change, moderate change, huge change – might promote selection of a healthy behavior in the moderate range. In contrast, offering just two treatment options – no change, moderate change – may make the latter option look unduly demanding or difficult and hence may facilitate the selection of the status quo.

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