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## Rates and correlates of study enrolment and use of a chatbot aimed to promote mental health services use for eating disorders following online screening

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### Abstract

**Objective:** We developed a chatbot aimed to facilitate mental health services use for eating disorders (EDs) and offered the opportunity to enrol in a research study and use the chatbot to all adult respondents to a publicly available online ED screen who screened positive for clinical/subclinical EDs and reported not currently being in treatment. We examined the rates and correlates of enrolment in the study and uptake of the chatbot.

**Method:** Following screening, eligible respondents (≥ 18 years, screened positive for a clinical/subclinical ED, not in treatment for an ED) were shown the study opportunity. Chi-square tests and logistic regressions explored differences in demographics, ED symptoms, suicidality, weight, and probable ED diagnoses between those who enrolled and engaged with the chatbot versus those who did not.

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#### AUTHOR CONTRIBUTIONS

**Laura D'Adamo:** conceptualisation, formal analysis, writing – original draft & review/editing; **Anne Claire Grammer:** writing – original draft & review/editing; **Gavin N. Rackoff:** writing – review & editing; **Jillian Shah:** writing – review & editing; **Marie-Laure Firebaugh:** writing – review & editing; **C. Barr Taylor:** funding acquisition, investigation, writing – review/editing; **Denise E. Wilfley:** funding acquisition, investigation, writing – review/editing; **Ellen E. Fitzsimmons-Craft:** funding acquisition, investigation, writing – review/editing.

#### CONFLICT OF INTEREST STATEMENT

Dr. Fitzsimmons-Craft receives royalties from UpToDate, is on the Clinical Advisory Board for Beanbag Health, and is a consultant for Kooth.

#### ETHICS APPROVAL STATEMENT

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

**Results:** 6747 respondents were shown the opportunity (80.0% of all adult screens). 3.0% enrolled, of whom 90.2% subsequently used the chatbot. Enrolment and chatbot uptake were more common among respondents aged ≥ 25 years old versus those aged 18–24 and less common among respondents who reported engaging in regular dietary restriction.

**Conclusions:** Overall enrolment was low, yet uptake was high among those that enrolled and did not differ across most demographics and symptom presentations. Future directions include evaluating respondents' attitudes towards treatment-promoting tools and removing barriers to uptake.

### Keywords

chatbot; digital intervention; eating disorders; mental health services utilization; mental health treatment; screening

## 1 | INTRODUCTION

There is a significant gap between those who need and those who receive treatment for eating disorders (EDs) (Kazdin et al., 2017), with documented rates of lifetime ED treatment uptake around 20% (Hart et al., 2011). Barriers to treatment-seeking and uptake (e.g., stigma, few accessible treatments, low motivation to change) are commonly reported among those with EDs (Ali et al., 2017; Regan et al., 2017) and may contribute to delayed treatment and prolonged illness duration (Austin et al., 2021). We disseminated an online screening tool in partnership with the National Eating Disorders Association (NEDA) that provides treatment referral options to ~200,000 individuals annually who screen as high risk or positive for an ED (Fitzsimmons-Craft et al., 2019). In a previous study, our team found that only 16% of those who screened positive for an ED on the screening tool had initiated treatment (Fitzsimmons-Craft, Balantekin, et al., 2020), and treatment uptake at 2-month follow-up was less common among certain underserved groups, including racial minority, Hispanic, and lower income individuals (Grammer et al., 2022). These data highlight the need for novel methods to address barriers to treatment-seeking and bolster treatment uptake following ED screening.

Despite increasing popularity of digital tools (e.g., chatbots) to address mental health problems for their potential to address the treatment gap, few digital interventions are broadly implemented, and studies rarely report on the reach or uptake of these interventions (D'Adamo et al., 2023). Yet, leveraging digital tools may be a promising method to mobilise mental health care utilization if they are implemented on a large scale (Torous et al., 2021). Chatbots, or computerised conversational agents that simulate human conversation with users (Torous et al., 2021), have demonstrated preliminary efficacy in improving mental health outcomes (Abd-Alrazaq et al., 2020; Fitzsimmons-Craft et al., 2022; Gaffney et al., 2019). Although research on chatbots in mental health is nascent, a recent study found that a chatbot aimed to improve body image was deemed acceptable by young people and caregivers in focus groups (Beilharz et al., 2021), and recent reviews have found generally favourable perceptions of mental health chatbots among patients (Abd-Alrazaq et al., 2021; Vaidyam et al., 2019). To date, the capability for chatbots to facilitate help-seeking for mental health problems remains unexplored. We developed a chatbot with theoretically-

informed components for facilitating mental health services use (i.e., psychoeducation, motivational interviewing, repeated administration, and personalised recommendations) among adults with EDs following completion of the NEDA screening tool. In a usability study with adults who screened positive for clinical/subclinical EDs, the chatbot showed preliminary feasibility and acceptability (Shah et al., 2022). Following usability testing, we collaborated with NEDA to implement the chatbot within the online screen. The opportunity to participate in a research study testing the chatbot was made available for adult respondents to the screen who screened positive for clinical/subclinical EDs and reported not currently being in treatment.

Given the high number of annual respondents to the NEDA screen, integrating the chatbot into the screen has the potential to provide a large population of individuals with probable EDs with a tool that could promote treatment uptake. First, however, there is a need to examine rates of enrolment in research evaluating the chatbot and rates of chatbot uptake among those who enrol in the study, as this could inform further refinement of the tool and its implementation. A systematic review on mental health chatbots found that one included study reported low chatbot uptake, and numerous others reported widely variable rates of dropout and engagement (Gaffney et al., 2019). It is also important to characterise those who utilise mental health chatbots. For example, in ED research, previous studies have found differences in treatment-seeking rates for EDs by demographics, with lower rates of treatment-seeking found in men, racial/ethnic minority individuals, and those with lower socioeconomic status (Coffino et al., 2019; Griffiths et al., 2015; Grillot & Keel, 2018; Sonnevile & Lipson, 2018). In addition, greater ED symptom severity, presence of other mental health symptoms, and health concerns have been associated with greater treatment-seeking for EDs (Ali et al., 2017; Lipson et al., 2017; Regan et al., 2017). These data suggest that similar predictors may influence use of a treatment-promoting chatbot.

This study aimed to: (a) Examine the rates of study enrolment and chatbot use (i.e., initiation of a conversation via SMS with the chatbot) among adults who screened positive for clinical/subclinical EDs on the NEDA online ED screen and reported not currently being in treatment; and (b) Explore differences in demographic characteristics, suicidal ideation, ED psychopathology, and probable ED diagnoses between respondents who did and did not enrol and use the chatbot. Due to the paucity of data on chatbots specific to samples of individuals with EDs, this study was exploratory with no a priori hypotheses, and we selected all available variables to examine as correlates of study enrolment and chatbot uptake to generate hypotheses for future studies.

## 2 | METHODS

### 2.1 | Participants and procedures

Data were collected during two waves of recruitment from March 9–16, 2021 and July 19–August 9, 2021 (32 days in total) from NEDA's online ED screen ([www.nationaleatingdisorders.org/screening-tool](http://www.nationaleatingdisorders.org/screening-tool)) (National Eating Disorders Association). During these periods, an opportunity to participate in a research study testing the chatbot was presented to eligible screen respondents as part of a randomized pilot trial ([Clinicaltrials.gov](https://clinicaltrials.gov) identifier [NCT04806165](https://clinicaltrials.gov/ct2/show/study/NCT04806165)). Two waves of data collection were conducted

to assess if technical aspects of chatbot implementation were functioning optimally, as well as to ensure capacity to conduct follow-up assessments of participants following initial use of the chatbot. The current study examined data from all screen respondents who were eligible and shown the chatbot study opportunity.

Eligible respondents were 18 years of age, screened positive for a probable clinical/subclinical ED, and reported not currently being in treatment for an ED. Respondents who were currently in treatment for an ED were not included because the chatbot was designed to promote treatment uptake. Immediately following screening, eligible respondents were shown a web page with details about a research study evaluating a chatbot aimed to promote mental health services use. Specifically, the page described that the study would investigate if a chatbot can help individuals who have disordered eating. The page included the option to click “Learn more,” which directed respondents to a survey with additional eligibility questions (i.e., endorsement of smartphone ownership, U.S. residency), or an option to see other resources typically displayed on the NEDA screen end page. Those who were eligible following the additional screener questions were shown the study consent form and subsequently a baseline questionnaire, which included questions about mental health treatment and psychiatric medication use over the past year, readiness for change, knowledge about EDs, and willingness to use various help-seeking options. Enrolled participants were provided with the chatbot’s SMS number and prompted to initiate a conversation by text messaging a study-provided ID number to the chatbot (Shah et al., 2022).

## 2.2 | Chatbot

The chatbot in the parent study aimed to promote mental health services use by improving motivation for treatment and self-efficacy using four theoretically-informed components: (a) Psychoeducation about EDs; (b) Motivational interviewing, which highlighted discrepancies between users’ health goals and ED behaviours; (c) Personalised recommendations, which provided users with treatment resources from the NEDA website that were tailored to their treatment preferences; and (d) Repeated administration, which provided up to three check-ins to users over 2 weeks to assess whether users had sought treatment since their initial conversation (Shah et al., 2022). The chatbot was developed using a user-centred design approach and preliminarily tested for feasibility and acceptability with 21 adults with clinical/subclinical EDs who were recruited via social media, flyers, and emails (Shah et al., 2022). More information about the chatbot design can be found in Shah et al. (2022). A factorial trial evaluating the efficacy of the chatbot at increasing motivation for treatment, self-efficacy, and help-seeking for EDs is currently underway.

## 2.3 | Ethical considerations

As part of our partnership with NEDA to disseminate the online screening tool via NEDA’s website, NEDA provided approval to our research team to analyse the de-identified screen data from screen respondents. Approval was also granted by the Institutional Review Board at Washington University in St. Louis to analyse the screen data (IRB ID: 201707076). Given that the parent study only included adult NEDA screen respondents, the sample of the current study was limited to adults. Informed consent to participate in the study

was obtained from all enrolled participants prior to providing access to use the chatbot. Participants received \$5 Amazon gift cards for completing the baseline survey for the study.

## 2.4 | National Eating Disorders Association screen measures

All available variables in the NEDA screen were examined as correlates of study enrolment and chatbot uptake.

**2.4.1 | Demographics**—Participants reported on age, gender identity, race, ethnicity, income, and partnership status on the NEDA online screen.

**2.4.2 | Eating disorder psychopathology and probable diagnosis**—Eating disorder psychopathology and probable ED diagnoses were assessed via the Stanford-Washington Eating Disorders screen (SWED) included on the NEDA online screen (Graham et al., 2019). The SWED has been validated to identify DSM-5 ED diagnoses with good sensitivity (0.68 to 0.90) and specificity (0.79 to 0.99) (Graham et al., 2019). Participants were categorised into one of the following probable diagnostic categories based on their responses: (a) anorexia nervosa (AN); (b) clinical/subclinical bulimia nervosa (BN); (c) clinical/subclinical binge eating disorder (BED); (d) purging disorder (PD); or (5) unspecified feeding or eating disorder (UFED). A probable AN diagnosis was determined by a score of  $\geq 9$  on the Weight Concerns Scale (included in the SWED) and BMI  $\geq 18.45$  based on self-reported height and weight. Other probable clinical/subclinical ED diagnoses were determined by meeting one or more of the following cut-offs: 6+ binge eating episodes, 6+ vomiting episodes, or 6+ laxative/diuretic use episodes over the past 3 months (Graham et al., 2019). Probable UFED diagnoses were determined by endorsing 3 or more binge eating episodes or 3 or more compensatory behaviour episodes over the past 3 months for individuals who did not meet criteria for AN, BN, BED, or PD (Graham et al., 2019). Probable diagnoses were examined as predictors of study enrolment and chatbot uptake following screen completion.

Eating disorder behaviours and attitudes assessed with the SWED were also examined as predictors of study enrolment and chatbot uptake. These included frequency of binge eating and compensatory weight control behaviours (i.e., fasting, vomiting, laxative/diuretic use, excessive exercise) over the past 3 months, presence of regular dietary restriction ( $<1200$  kcal/day), and severity of weight/shape concerns based on the WCS, which is included in the SWED (Killen et al., 1994). The SWED demonstrates good sensitivity (0.68–0.90) and specificity (0.79–0.99) (Graham et al., 2019) for DSM-5 EDs (American Psychiatric Association, 2013).

**2.4.3 | Suicidal ideation**—Item 9 from the Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001) was used to assess self-reported suicidal ideation over the past 2 weeks. This item detects suicide risk with excellent sensitivity (0.88) and acceptable specificity (0.66) (Na et al., 2018). Responses were coded as a binary variable indicating presence or absence of suicidal ideation.

**2.4.4 | Weight status**—Body mass index (kg/m<sup>2</sup>) was calculated from respondents' self-reported height and weight on the SWED.

## 2.5 | Statistical analyses

Analyses were conducted using R version 4.1.3. We calculated the proportion of NEDA screen respondents who consented to participate and initiated a conversation with the chatbot from the number of eligible respondents. Study enrolment and chatbot uptake was coded as 0 if the respondent did not consent and 1 if the participant consented and initiated at least one SMS conversation with the chatbot. To preserve power, we recoded race (White, non-White) and suicidal ideation (any ideation, no ideation) as binary variables. In models adjusting for age, age was recoded as binary ( $\leq$  Mdn 24 years,  $>$ Mdn 24 years).

Holm-corrected chi-square tests examined demographic and probable ED diagnosis differences between chatbot users compared to respondents who did not consent to use the chatbot. Significant results were followed with post-hoc comparisons. Fisher's exact tests were used to assess the relation between age and enrolment and chatbot uptake. Separate logistic regressions were used to examine the relations between predictor variables (i.e., ED behaviours and attitudes, suicidal ideation, weight status) and enrolment and chatbot uptake, adjusting for significant demographic predictors. The sample size for the parent study ( $n = 205$ ) was based on achieving at least 80% power to detect a moderate effect size assuming 5% alpha, which required a sample of 128. Therefore, we were adequately powered to conduct the current analyses.

## 3 | RESULTS

### 3.1 | Study enrolment and chatbot uptake

During the recruitment periods, 8432 adults completed the NEDA online screen. 6747 (80.0%) of these individuals screened positive for clinical/subclinical EDs and reported not currently being in treatment, all of whom were shown the opportunity to use the chatbot following completion of the screen. Of those invited to use the chatbot, 210 respondents consented to use the chatbot, of whom 5 were excluded due to ineligibility, resulting in 205 (3.0%) eligible respondents who enrolled. Of those who enrolled, 185 (90.2%) subsequently initiated a conversation with the chatbot.

### 3.2 | Preliminary analyses

A small number of respondents ( $n = 20$ ) consented to participate in the study but did not initiate a conversation with the chatbot. Preliminary analyses tested for differences in demographics and predictor variables between these respondents and those who did use the chatbot ( $n = 185$ ) and found no significant differences ( $P$ s  $> 0.08$ ). Subsequent analyses compared characteristics between chatbot users ( $n = 185$ ) and respondents who did not consent to use the chatbot ( $n = 6535$ ).

### 3.3 | Relations of demographics to study enrolment and chatbot uptake

As shown in Table 1, age was significantly associated with enrolment and chatbot uptake, such that respondents aged  $\geq 25$  showed greater rates of enrolment and uptake relative to younger respondents ( $p < 0.001$ , Cramer's  $V = 0.07$ ). There were no significant differences in enrolment and chatbot uptake by gender identity, race, ethnicity, income, or partnership status ( $P$ s  $> 0.20$ , Cramer's  $V$ s  $< 0.05$ ).



### 3.4 | Predictors of enrolment and chatbot uptake

As shown in Table 2, respondents who endorsed regular dietary restriction showed lower rates of enrolment and chatbot uptake, controlling for age (OR: 0.63, 95% CI: -0.78, -0.16,  $p = 0.003$ ). There were no significant differences in enrolment and chatbot uptake by probable ED diagnosis, severity of weight/shape concerns, frequency of binge eating, frequency of compensatory weight control behaviours, suicidal ideation, or weight status ( $P > 0.06$ ).

## 4 | DISCUSSION

This study examined the rates and correlates of study enrolment and uptake of a chatbot aimed to promote mental health services use for EDs following online screening. By implementing the chatbot within the NEDA online screen, we offered the opportunity to use the chatbot to all 6747 adults who screened positive for clinical/subclinical EDs on the NEDA online ED screen and reported not currently being in treatment, which comprised 80% of the total screens completed by adults during the recruiting period. 205 (3.0%) of 6747 respondents shown the study opportunity enrolled, of whom 185 (90.2%) subsequently initiated a conversation with the chatbot. Study enrolment and chatbot uptake was significantly more common among respondents aged 25 years and older versus young adults and less common among individuals who reported engaging in regular dietary restriction.

Overall enrolment among screen respondents shown the study opportunity was relatively low (3.0%). Although participants in this study voluntarily completed an ED screen, it is plausible that many were not interested in seeking treatment resources at the time of screening. A previous study of NEDA screen respondents found that only 16% of respondents with probable EDs reported initiating treatment (Fitzsimmons-Craft, Balantekin, et al., 2020). In addition to structural barriers to treatment uptake, individuals with EDs frequently report that stigma, low motivation, unfavourable attitudes towards seeking treatment, and denial of the severity of their symptoms prevent them from seeking help (Ali et al., 2017). In another study, participants with ED symptoms had high knowledge about their symptoms and treatment resources, yet most reported not seeking treatment due to low urgency/perceived need (Lipson et al., 2017). Another explanation is that appeal of digital ED programs more broadly is low, as numerous studies have also found that digital interventions for EDs have poor engagement (Linardon et al., 2020). Moreover, chatbots also have unique features relative to those of other digital treatments (Abd-Alrazaq et al., 2021) that may influence likelihood of utilization. Given that the use of chatbots in mental health services is relatively new, previous research has found that hesitancy to use chatbots (e.g., due to concerns about the quality and security of the services) is likely to worsen engagement (Nadarzynski et al., 2019). Thus, hesitancy may have influenced uptake in this study. Alternatively, it is possible that the focus of our chatbot was not appealing to screen respondents (i.e., it was described as a chatbot to help individuals with disordered eating). Finally, because screen respondents were not informed that they would be offered the chatbot study opportunity before beginning the NEDA screen, the opportunity may have been surprising or off-putting to some respondents. The initial information provided about

the chatbot may have also been insufficient to generate interest. Nonetheless, among those who enrolled in the current study, initiation of a conversation with the chatbot was high (90%). In addition to the favourable user feedback during preliminary usability testing (Shah et al., 2022), this finding supports that most enrolled participants were willing to use the chatbot.

Study enrolment and chatbot uptake was more common among adults aged  $\geq 25$  versus younger adults (18–24 years old), which is consistent with research that has found that older adults show greater treatment-seeking for EDs and more favourable attitudes towards mental health treatment (Bohrer et al., 2017; Mackenzie et al., 2006; Regan et al., 2017). Further, because younger generations report feeling inundated with technology (Smith et al., 2021), the novelty of the chatbot may have spurred greater interest among older participants. It is also possible that prior experience with or attitudes towards digital health tools or interest in participating in mental health treatment research influenced this relationship. We also found that respondents who reported engaging in regular dietary restriction were less likely to use the chatbot relative to those without restriction. This finding may suggest that factors associated with restrictive ED presentations may lead to lower treatment-seeking. For instance, restriction may be associated with lower motivation to recover or greater feelings of shame, which have predicted lower treatment-seeking and worse treatment outcomes (Fitzsimmons-Craft, Eichen, et al., 2020; Gregertsen et al., 2019; Regan et al., 2017; Vall & Wade, 2015). Further, the ego-syntonic nature of EDs characterised by restriction (e.g., AN) may be associated with ambivalence towards treatment-seeking (Marzola et al., 2016). However, additional research is needed to replicate and further explore this finding.

Barring differences in age and dietary restriction, results indicate that there was equal representation between those who used versus did not use the chatbot. Notably, previous research has found that men with EDs have lower rates of treatment-seeking relative to women (Griffiths et al., 2015; Grillot & Keel, 2018). Lower rates of treatment-seeking and perceived need for treatment have been documented in individuals belonging to racial/ethnic minority groups and those with lower socioeconomic status (Coffino et al., 2019; Sonnevile & Lipson, 2018). The comparable rates of enrolment and chatbot uptake in these groups observed in this study suggest that the chatbot had similar appeal across groups and may have utility for promoting treatment-seeking among diverse populations.

A strength of this study was the creation of a pipeline from ED screening to treatment resources by embedding the opportunity to engage with the chatbot on NEDA's online screen website, which has potential to widely increase reach of the chatbot. Additionally, it is important to note that most research does not examine overall uptake of interventions within a representative sample of the intended population (e.g., after mass screening), making this a strength of the current study. Prior health research using comparable recruitment approaches has had similarly low overall enrolment rates, which may still be of significance at-scale. For example, one such study using targeted social media advertising to recruit found that 0.1% of users shown the opportunity expressed interest in participating (Fenner et al., 2012). This study also had limitations. The process of enrolling in a research study, which was required to interact with the chatbot in this study, was likely a barrier to participation. For instance, this process may have increased burden, and some respondents



may not have wanted to participate in research. Future studies should evaluate methods for implementing digital tools that minimise barriers to participation, as it is plausible that uptake rates of the chatbot would be different in a non-research setting. Another limitation was that we did not assess attitudes towards digital mental health interventions or previous experiences with conversational agents, which may have influenced uptake and provided context for our findings (e.g., the finding that older participants were more likely to use the chatbot). We also did not assess users' reasons for using or not using the chatbot (e.g., low interest in the chatbot's focus, lack of interest in treatment). Additionally, the self-selecting nature of the sample may limit the generalisability of study findings to individuals with EDs who are ready to pursue treatment. Additional research should elucidate individuals' attitudes towards and experiences with treatment-promoting digital tools, which could inform tool development and implementation strategies. For instance, such work may inform future tools that are sensitive to various stages of readiness for change and provide personalised resources. Future studies should also evaluate novel approaches to increasing help-seeking, particularly among young adults and those with dietary restriction. Finally, additional work is needed to identify predictors of engagement with the chatbot (e.g., number of chats), in addition to initial uptake. Following a factorial trial to evaluate efficacy of the chatbot, our future work will focus on identifying areas for chatbot refinement or optimal strategies for implementing the chatbot using conclusions drawn from the current study.

Taken together, findings from this study indicate that chatbot refinement or implementation strategies to increase interest in the chatbot opportunity may be needed to increase uptake. Results also indicate a need to better engage adults with EDs who are younger and those who report regular dietary restriction. If the chatbot demonstrates efficacy at improving motivation for treatment, self-efficacy, and help-seeking, improving uptake could have potential for increasing treatment-seeking and uptake among a large population of adults with EDs.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the National Eating Disorders Association, but restrictions apply to the availability of these data, which were used under approval for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the National Eating Disorders Association.

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### Highlights

- Overall enrolment in the study opportunity was low, suggesting that novel implementation strategies are needed to drive use of treatment-promoting chatbots. However, chatbot uptake was high among those that enrolled.
- Study enrolment and chatbot uptake did not differ across most demographics and symptom presentations.
- Study enrolment and chatbot uptake was more common among respondents aged > 25 years old versus those aged 18–24 and less common among respondents who reported engaging in regular dietary restriction.

**TABLE 1**  
Demographic and probable eating disorder (ED) diagnosis differences in study enrolment and chatbot uptake.

Age	18–24	25–34	35–44	45–54	55–64	65+	Results	Pairwise comparison
<i>n</i> (%)	55/3328 (1.7%)	66/1850 (3.6%)	28/795 (3.5%)	23/397 (5.8%)	10/257 (3.9%)	3/91 (3.3%)	$p < 0.001, V = 0.07$	25–34 > 18–24 35–44 > 18–24 45–54 > 18–24 55–64 > 18–24
<b>Gender</b>	<b>Female</b>	<b>Male</b>	<b>Non-binary</b>	<b>Prefer not to say</b>	<b>Self-described</b>			
<i>n</i> (%)	165/5965 (2.8%)	11/459 (2.0%)	7/186 (3.8%)	2/67 (3.0%)	0/26 (0%)		$p = 0.80, V = 0.02$	Not significant
<b>Race</b>	<b>White</b>	<b>Non-white</b>						
<i>n</i> (%)	145/5128 (2.8%)	40/1533 (2.6%)						
Income <i>n</i> (%)	<\$20k	\$20k–59,999	\$60k–99,999	\$100k–149,999	\$150k+			
<b>Ethnicity</b>	<b>Hispanic/Latino</b>	<b>Not hispanic/Latino</b>						
<i>n</i> (%)	16/804 (2.0%)	169/5879 (2.9%)						
<b>Marital status</b>	<b>Single</b>	<b>Divorced/separated</b>	<b>Widowed</b>	<b>Living with partner</b>	<b>Partnered, living separately</b>	<b>Married</b>		
<i>n</i> (%)	74/3167 (2.3%)	11/233 (4.7%)	3/33 (9.1%)	25/797 (3.1%)	16/907 (1.8%)	56/1544 (3.6%)	$X^2 = 0.14, p = 0.71, V = 0.01$ $X^2 = 9.13, p = 0.17, V = 0.04$ $X^2 = 1.74, p = 0.19, V = 0.02$	Not significant Not significant Not significant
<b>ED diagnosis</b>	<b>AN</b>	<b>BN</b>	<b>BED</b>	<b>PD</b>	<b>UFED</b>			
<i>n</i> (%)	12/464 (2.6%)	77/2768 (2.8%)	37/1013 (3.7%)	1/159 (0.6%)	58/2316 (2.5%)		$X^2 = 18.4, p = 0.002, V = 0.05$ $X^2 = 6.33, p = 0.18, V = 0.03$	Not significant Not significant

Note: Percentages reflect the proportion of eligible screen respondents shown the study opportunity who enrolled and used the chatbot. Pairwise comparisons included were significant at  $p < 0.05$ . The relations of chatbot uptake to age and gender were examined using Fisher's exact tests due to small cell sizes; all other associations were examined with chi-square tests.

Abbreviations: AN, anorexia nervosa; BN, atypical/subclinical bulimia nervosa; BED, atypical/subclinical binge eating disorder; PD, purging disorder; UFED, unspecified feeding or eating disorder. Craver's *V* interpretation: small 0.2; medium = 0.2–0.6; large >0.6.

<sup>a</sup>No longer significant after applying Holm corrections.



**TABLE 2**

Predictors of study enrolment and chatbot uptake.

Independent variables	Enrolment and Chatbot Uptake			
	Odds ratio	95% CI	Wald's $\chi^2$	<i>P</i>
Weight and shape concerns	1.00	-0.01, 0.01	0.06	0.80
Objective binge eating episodes	1.00	-6.84, 6.66	0.00	0.98
Presence of regular dietary restriction	0.63	-0.78, -0.16	8.68	0.003
Vomiting	0.99	-0.02, -0.00	1.54	0.22
Laxative/diuretic use	1.00	-0.02, 0.01	0.04	0.85
Fasting	0.99	-0.02, -0.00	1.64	0.20
Excessive exercise	1.00	-0.01, 0.00	0.59	0.44
Weight status	1.01	-0.00, 0.03	3.43	0.06
Presence of suicidal ideation	0.79	-0.55, 0.07	2.20	0.14

*Note:* Analyses adjusted for age based on findings presented in Table 1.