Online social platform engagement by young treatment seekers in a digital vaping cessation intervention: Effects on confidence in the ability to quit vaping and vaping abstinence

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ABSTRACT

Background: The evidence-based vaping cessation program, This is Quitting (TIQ), has been found to be effective in promoting abstinence among young people who use e-cigarettes.
Purpose: To estimate acceptability and engagement with Discord among treatment seeking youth and young adults and assess the benefit of adding an online social platform via Discord to TIQ.
Methods: Between February and March 2023, 527 TIQ participants (aged 13–24 years) were invited to join Discord with other TIQ users (TIQ Discord). Participants completed two online surveys, at baseline and 1-month post study enrollment. Descriptive statistics were used to describe acceptability and engagement with TIQ Discord. Chi-square, Fisher's exact, and *t*-tests were used to compare changes in confidence in ability to quit and vaping abstinence across those who joined and engaged with TIQ Discord, compared to those receiving TIQ only.
Results: Among the $n = 319$ who were invited to TIQ Discord and provided follow-up data, 57.4 % joined. Among those who joined ($n = 183$), 61.7 % engaged with TIQ Discord by contributing at least one message or reaction. The mean number of contributed messages was 4.0 (median = 1, range = 1 to 51) and reactions was 0.31 (median = 0, range = 0 to 14). Engaging with TIQ Discord was positively associated with increased confidence in quitting at follow-up (*p*-value = 0.02), but vaping abstinence at follow-up did not differ (*p*-value = 0.87).
Discussion: Over half of participants who were invited to TIQ Discord joined – indicating high acceptability and an uptake rate that is higher than what is typically observed for online cessation communities. Engagement was positively associated with proximal outcomes, but self-selection prevents causal attribution. Pilot study results suggest acceptability of Discord for providing digital cessation support to young people in combination with a text-message cessation intervention.

1. Introduction

Six years after the United States (US) Surgeon General's declaration of a youth vaping epidemic in 2018, current use rates among young people remain high, with 10 % of high school students (Birdsey, 2023) and 14.5 % of young adults ages 18–24 (Sanford et al., 2024) reporting past 30-day use. Young people who vape have reported interest in quitting (Dai et al., 2023), with a quarter of current e-cigarette users reporting having made a quit attempt in 2020 (Graham et al., 2020; Smith et al., 2021). However, there are few vaping cessation programs available to youth and young adults, and even fewer evaluations of those programs (Amin et al., 2023). Cessation treatment that is effective, accessible, and appealing is critical to reducing prevalence rates among the millions of youth and young adults who want to quit but continue to vape (Cuccia et al., 2021).

This is Quitting® ("TIQ") was launched in 2019 to meet the need for vaping cessation programs for young people (Graham et al., 2021). TIQ is a free and nationally available automated, tailored, interactive text

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message intervention for vaping cessation designed for teens and young adults (aged 13 to 24 years). The TIQ program is anchored in social cognitive theory, with a key focus on creating a sense of social support by building the program with user-created content. TIQ has been found to be effective in promoting abstinence among young adult and adolescent e-cigarette users. A randomized clinical trial of 18- to 24-year-olds demonstrated a 24.1 % abstinence rate at 7 months post-randomization among participants assigned to TIQ and 18.6 % among participants assigned to an assessment-only control group (Graham et al., 2020). A recent analysis of randomized clinical trial results among 13–17 year olds demonstrated abstinence rates of 37.8 % among participants randomized to TIQ and 28.0 % among assessment-only control participants (Graham et al., 2024). To date, >800,000 young people have enrolled in TIQ, suggesting that TIQ is an appealing, effective vaping cessation program for young people.

One of the key components of treatment for nicotine dependence, as recommended by the US Public Health Services Clinical Practice Guidelines, is social support (Clinical Practice Guideline Treating Tobacco Use and Dependence 2008 Update Panel, Liaisons, and Staff, 2008). Central to the TIQ program are messages that are submitted by young people and designed to address the social isolation that young people often experience while quitting. Messages are interactive and tailored by age, quit date, and product used and mention keywords that can be used for automated on-demand support (Graham, 2020). While the existing TIQ program does include user-generated content to create a sense of social support, it is an automated program with no real-time interactions.

This pilot study assessed the potential benefits of adding real-time social support on cessation-related behaviors via an online social forum via Discord to TIQ ("TIQ Discord"). Discord (https://discord.com) is an instant messaging system that has expanded into one of the most popular communication methods among young people. The TIQ Discord online social platform was developed to allow users to communicate with others who are former or current e-cigarette users on a Discord "server," where users can have real-time conversations for peer social support. The objectives of this pilot study were to: 1) measure the acceptability of TIQ Discord by TIQ users and 2) determine what impact engagement with the online social platform had on confidence in the ability to quit vaping and vaping abstinence at 1-month post-enrollment in the trial, among those who joined TIQ Discord. Confidence in the ability to quit was chosen as the main outcome, due to previously reported associations with cessation (Krishnan et al., 2022).

2. Materials and methods

2.1. Sample recruitment

Individuals who enrolled in This is Quitting (TIQ) between February and March 2023 were invited to participate in a pilot study. To be eligible to participate, respondents had to: have enrolled in TIQ, be between the ages of 13 and 24 years, reside in the United States, report use of e-cigarettes in the past 30 days, and provide consent and/or assent to participate. The following study invitation was sent on a TIQ user's second day of enrolling in the TIQ program: "*TIQ: The humans who created me want to learn more about how an exclusive new feature can help you on your quitting journey. You'll get up to $40 for 2 short surveys *cha-ching*, and you might get some extra quitting insight. Click the link for more info.*"

Participants were asked to complete a baseline survey, randomized into one of two groups (e.g., "TIQ + Discord," the treatment group receiving an invitation to join the TIQ Discord community, and "TIQ-only," the control group that only received TIQ), and complete a follow-up assessment at 1-month post-enrollment. Participants were randomized to the TIQ + Discord vs. TIQ-only groups at a rate of 3:1. This recruitment strategy was intentionally designed to achieve roughly equal sample sizes for our primary, planned comparison groups of those

who engaged with TIQ Discord ("Engaged-with-Discord") vs TIQ-only. Based on our experience only about a third of those invited to Discord were expected to actually join, an important consideration to ensure adequate power for those planned comparisons in this pilot study. Data from surveys were collected online using the Qualtrics platform. Randomization was implemented using Qualtrics' randomizer function. All study procedures were reviewed and approved by Advarra Institutional Review Board (IRB) and were conducted in accordance with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

2.2. Measures

Sample characteristics were obtained from the baseline survey, which included measures on sociodemographic characteristics; nicotine dependence, history, and other related behaviors; and psychological distress. Cessation outcome measures were obtained from the 1-month post-enrollment (follow-up) survey and intervention engagement metrics. Details are described below.

2.2.1. Sociodemographic characteristics

Sociodemographic characteristics included age ("How old are you?"; responses categorized into: 13–17, 18–20, 21–24), gender identity ("How do you gender-identify?"; responses categorized into: male, female, non-binary/another gender identity), race ("What race(s) do you consider yourself to be?"; responses were categorized into: Non-White, inclusive of American Indian or Alaskan Native, Asian American, Black or African American, Native Hawaiian or Pacific Islander, and another race/ethnicity, prefer not to say, or missing vs. White, due to sample sizes), ethnicity ("Are you of Hispanic, Latino/a, or Spanish origin?"; responses were: Hispanic/Latino/Spanish origin, Not Hispanic/Latino/Spanish origin, prefer not to say or missing), sexual orientation ("Which of the following best describes you?"; responses were: straight/heterosexual, gay or lesbian, bisexual, queer/another sexual orientation, prefer not to say or missing), and perceived financial situation ("Considering all income earners in your family, how would you describe your family's overall financial situation, would you say you…?"; responses were: live comfortably, meets needs with a little left over, meets basic expenses with nothing left over, don't meet basic expenses, prefer not to say or missing).

2.2.2. Nicotine dependence, history, and other related behaviors

Nicotine dependence was measured using the E-cigarette Dependence Scale (EDS, 4-item) (Morean et al., 2018) in the baseline and 1-month follow-up survey. The EDS is scored using an average of responses to 4-items: "I find myself reaching for my vape without thinking about it", "I drop everything to go out and buy a vape or e-liquid", "I vape more going into a situation where vaping is not allowed", and "When I haven't been able to vape for a few hours, the craving gets intolerable". Responses to each of these items range from 0 to 4 (never, rarely, sometimes, often, almost always). Perceived addiction to vaping was measured by the item: "Would you say that you are…?" and responses included very addicted to vaping, somewhat addicted to vaping, not at all addicted to vaping, I don't know. Past 30-day use of other substances [including, other combustible tobacco products, alcohol, vaped marijuana, marijuana (excluding vaping)] were determined from the item: "Have you used any of the following products within the past 30 days? (Select all that apply.)" Past 12 month attempt to quit was measured by the item: "During the past 12 months, how many times have you stopped vaping for one day or longer because you were trying to quit for good?" Responses were categorized into none (e.g., I did not try to quit during the past 12 months) vs. at least 1 time (e.g., 1 time, 2 times, 3–5 times, 6–9 times, 10 or more times). Residing with someone else who uses nicotine or tobacco, including vaping, was assessed with a binary response (yes/no).
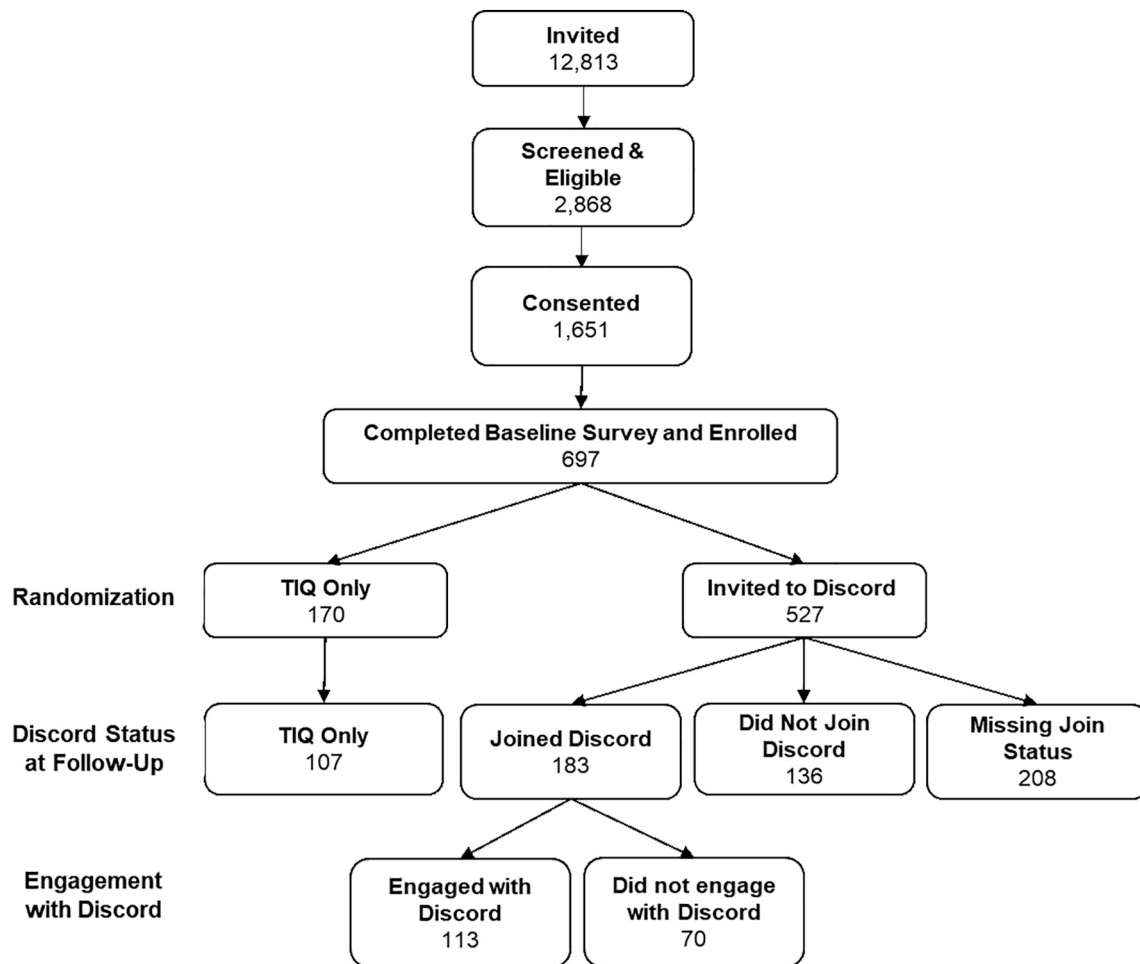
Fig. 1. CONSORT diagram.

2.2.3. Psychological distress

Psychological distress was measured using the Kessler-6 Scale (Kessler et al., 2010), a validated instrument that is scored such that higher scores are indicative of higher levels of psychological distress. The Kessler-6 scale includes six items asking: "During the past 30 days, about how often did you feel…? Nervous, Hopeless, Restless or fidgety, So depressed that nothing could cheer you up, That everything was an effort, Worthless". Responses included none of the time, a little of the time, some of the time, most of the time, and all of the time. These responses were summed across items, with higher sum scores indicating higher levels of psychological distress.

2.2.4. Cessation outcome measures

Cessation outcome measures included confidence in ability to quit or stay quit and vaping abstinence in the past month. Specifically, confidence in the ability to quit or stay quit was measured by the following questions: 1) "How confident are you that you can quit vaping?" and 2) "How confident are you that you can stay quit from vaping?". Responses ranged from not at all (1) to very much (5). Vaping abstinence in the past month was measured using the item: "In the past month, did you vape at all, even a puff of someone else's?". Responses were dichotomized into not abstinent from vaping in the past month (e.g., yes) and abstinent from vaping in the past month (e.g., no). These measures were collected during the baseline and at 1-month follow-up surveys.

2.2.5. Intervention engagement

Engagement as a general construct was measured through a combination of self-report survey items, calculated interaction metrics from

operational Discord data, and calculated interaction metrics from operational TIQ data. Acceptance of invitation to join TIQ Discord was determined from participants' responses to the following item on the 1-month follow-up survey: "Did you join the TIQ Discord community?" Responses included yes (e.g., accepted invitation to join TIQ Discord) and no (e.g., rejected invitation to join TIQ Discord). To quantify engagement with TIQ Discord, participants' Discord usernames were matched to downloaded TIQ Discord records to count the number of messages and reactions contributed by participants during the study period. Message and reaction counts for each respondent were then dichotomized (e.g., 0 = "Not Engaged-with-Discord" vs. 1+ = "Engaged-with- Discord"). Interaction metrics were also available from metadata collected by the TIQ Program, which included the number of mobile originated messages sent by the user, the number of days enrolled in TIQ, whether a quit date was set (yes vs. no), and whether the respondent had used an on-demand keyword like COPE, STRESS, FEELS, MORE, BREATHE, SLIP, or TIPS (yes vs. no).

2.3. Statistical analysis

Descriptive statistics (i.e., frequencies and percentages for categorical variables and means, medians, and ranges for continuous variables) for baseline characteristics are provided according to randomized group assignment (i.e., TIQ-only; TIQ + Discord, or invited to join TIQ Discord) for the full sample, and by join status (i.e., TIQ-only; accepted invitation to TIQ Discord; rejected invitation to TIQ Discord) among those who provided 1-month follow-up survey data. These descriptive statistics are provided as supplemental material.

Table 1

Baseline sociodemographic characteristics among participants providing 1-month post-enrollment data, by engagement status (N = 290).

	TIQ-only (N = 107)		Engaged with discord (N = 113)		Did not engage with discord (N = 70)		Chi-square	p-Value or Fisher's exact p-value
	N	%	N	%	N	%		
Age category (years)							3.06	0.5482
13–15	6	5.6	3	2.7	4	5.7		
18–20	52	48.6	51	45.1	37	52.9		
21–24	49	45.8	59	52.2	29	41.4		
Gender							6.27	0.1800
Male	38	35.5	26	23.0	18	13.2		
Female	65	60.8	81	71.7	51	37.5		
Non-binary/other	4	3.7	6	5.3	1	0.7		
Race							1.95	0.3772
White	101	34.4	105	92.9	60	85.7		
Non-White	6	5.6	8	7.1	10	14.3		
Ethnicity							3.42	0.4893
Hispanic/Latino/Spanish origin	20	18.7	20	17.7	11	8.1		
Not Hispanic/Latino/Spanish origin	87	81.3	91	80.5	59	43.4		
Prefer not to say or missing	0	0.0	2	1.8	0	0.0		
Sexual orientation							1.97	0.5787
Straight/heterosexual	69	64.5	68	60.2	47	34.6		
Gay or lesbian	5	4.7	8	7.1	2	1.5		
Bisexual	24	22.4	28	24.8	15	11.0		
Queer/other	7	6.5	9	8.0	6	4.4		
Prefer not to say or missing	2	1.9	N/A					
Perceived financial situation							13.59	0.0930
Live comfortably	38	35.5	29	25.7	21	15.4		
Meets needs with a little left over	42	39.3	46	40.7	23	16.9		
Meets basic expenses with nothing left over	15	14.0	24	21.2	22	16.2		
Don't meet basic expenses	7	6.5	6	5.3	4	2.9		
Prefer not to say or missing	5	4.7	8	7.1	0	0.0		

Baseline sociodemographic characteristics are presented by engagement status (i.e., TIQ-only; Engaged-with-Discord; and Not Engaged-with-Discord) among those who provided 1-month follow-up survey data. Baseline characteristic comparisons were determined by Chi-square, Fisher's exact, and *t*-tests at a significance value of *p*-value <0.05. Post-hoc group comparisons were determined using the Tukey test (Keselman and Rogan, 1977).

Differences in cessation outcome measures (e.g., confidence in the ability to quit/stay quit, vaping abstinence, e-cigarette dependence scale score, and interaction metrics) were compared across Engaged-with-Discord and Not Engaged-with-Discord groups, among those who had provided 1-month follow-up survey data, using Chi-square, Fisher's exact, and *t*-tests at a significance value of p-value <0.05. Again, Tukey tests were used to determine post-hoc group differences (Keselman and Rogan, 1977).

3. Results

As shown in the CONSORT diagram (Fig. 1), 12,813 individuals who enrolled in TIQ were invited to participate in the study. Of these, 2868 were screened and eligible, and 1651 consented to participate in the study. A total of 697 enrolled, completed the baseline survey, and were randomized to either TIQ-only (*n* = 170) or TIQ + Discord (*n* = 527). As shown in Supplemental Table 1, there were no significant differences in baseline characteristics across those randomized to receive TIQ-only and those receiving an invitation to join TIQ Discord (TIQ + Discord).

Of those who completed the baseline survey (*n* = 697), 426 (61.1 %) provided follow-up survey data 1-month post-enrollment (107 TIQ-only; 319 TIQ + Discord). The *n* = 319 participants randomized to TIQ + Discord who provided follow-up data were able to be further classified as having "Accepted the invitation to Discord" (Accepters, *n* = 183, 57.4 %) or "Rejected the invitation to Discord" (Rejecters, *n* = 136, 42.6 %). Three-way baseline differences across the group randomized to TIQ-only and the two subgroups of participants randomized to TIQ + Discord (Accepters; Rejecters) are explored in Supplemental Table 2. As shown in Supplemental Table 2, there were few significant differences in

baseline characteristics across those that received TIQ-only, compared to those who had accepted the invitation to join TIQ Discord, and those who had rejected the invitation to join TIQ Discord. A greater proportion of those who had accepted the invitation to join TIQ Discord reported using other combustible tobacco products, relative to the other two groups, and responders in the TIQ-only group were less likely than others to report past 30-day use of alcohol or marijuana. Those who had accepted the invitation to join TIQ Discord had higher psychological distress scores, relative to those who received TIQ-only and those who rejected the invitation to join TIQ Discord.

Among the *n* = 183 who accepted the invitation to join TIQ Discord, *n* = 113 (61.7 %) actually engaged with TIQ Discord ("Engaged-with-Discord") by either contributing a message or reaction. The mean numbers of contributed messages and reactions among those who were engaged with TIQ Discord were 4.0 (median = 1, range = 1–51) and 0.31 (median = 0, range = 0–14), respectively. Comparisons across these three groups ("Engaged-with-Discord"; "Did not engage with Discord", "TIQ-only") were of primary focus in this pilot study and are reported in the tables that follow.

As shown on Table 1, there were no significant baseline sociodemographic characteristic differences across those who received TIQ-only (N = 107), those who engaged with TIQ Discord ("Engaged-with-Discord", N = 113), and those who did not engage with TIQ Discord (N = 290). Specifically, there were no differences across gender, race, ethnicity, sexual orientation, or perceived financial situation according to omnibus tests.

Table 2 displays comparisons of baseline psychological distress and use behaviors for those who provided follow-up data. Comparisons were made across those who received TIQ-only, those Engaged-with-Discord, and those who did not engage with TIQ Discord. According to omnibus tests, the three groups differed across reported past 30-day use of other substances and psychological distress. Following the significant omnibus test, post-hoc two-way comparisons determined that a greater proportion of the Engaged-with-Discord group reported past 30-day use of alcohol (*p*-value = 0.003), vaping marijuana (p-value <0.001), marijuana (p-value <0.001), and other combustible tobacco use (p-

Table 2
Baseline E-cigarette use behaviors and psychological distress among participants providing 1-month post-enrollment data, by engagement status (N = 290).

	TIQ-only (N = 107)		Engaged with discord (N = 113)		Did not engage with discord (N = 70)		Chi-square	p-Value or Fisher's exact p-value
	N	%	N	%	N	%		
Confidence in ability to quit/stay quit								
Very much	20	18.7	18	15.9	15	21.4	2.72	0.9505
A lot	21	19.6	22	19.5	14	20.0		
A moderate amount	40	37.4	43	38.1	27	38.6		
A little	21	19.6	22	19.5	9	12.9		
Not at all	5	4.7	8	7.1	5	7.1		
Missing	0	0.0	0	0.0	0	0.0		
Would you say you are….?								
Very addicted to vaping	68	63.6	40	57.1	78	69.0	8.57	0.1989
Somewhat addicted to vaping	39	36.5	27	38.6	34	30.1		
Not at all addicted to vaping	0	0.0	2	2.9	1	0.9		
I don't know	0	0.0	1	1.4	0	0.0		
Past 12 month attempt to quit								
Yes	79	73.8	83	73.5	58	82.9	2.47	0.2908
No	28	26.2	30	26.5	12	17.1		
Past 30-day use of other substances								
Other combustible tobacco products	24	14.1	48	42.5	27	38.6	9.56	*0.0084*
Alcohol	44	25.9	43	38.1	27	38.6	9.29	*0.0096*
Vaped marijuana	33	19.4	45	39.8	28	40.0	15.14	*0.0005*
Marijuana (excluding vaping)	38	22.4	24	21.2	22	31.4	12.47	*0.0019*
Resides with someone who uses nicotine or tobacco products (includes vaping)							0.08	0.9634
Yes	62	57.9	64	56.6	41	58.6		
No	45	42.1	49	43.4	29	41.4		

	TIQ-only (N = 107)		Engaged with discord (N = 113)		Did not engage with discord (N = 70)		F-statistic	p-Value
	N	Mean, SD (range: min, max)	N	Mean, SD (range: min, max)	N	Mean, SD (range: min, max)		
E-cigarette dependence scale (EDS) score	107	2.6, 0.7, (0.25–4.00)	113	2.7, 0.8, (0.5–4.0)	70	2.8, 0.8, (1.0–4.0)	1.66	0.1922
Psychological distress (Kessler-6 Score)	107	11.7, 5.1 (3.00–30.00)	113	13.6, 5.7 (2.0–24.0)	70	13.8, 6.0 (1.0–24.0)	4.49	*0.0121*

Note. Italicized text indicates statistically significant differences at p-value < 0.05.

value = 0.009), compared to the TIQ-only group. Those who received TIQ-only also reported lower levels of psychological distress, compared to the Engaged-with-Discord group (p-value = 0.003). No baseline differences were found between the Engaged-with-Discord group and the Not-Engaged-with-Discord group. No significant baseline differences were found between TIQ-only and the Not Engaged-with-Discord groups, although numerical trends among the Not-Engaged group suggested greater similarity to the Engaged group than the TIQ Only group.

Table 3 displays differences in cessation outcome measures and interaction metrics across those who received TIQ-only, those Engaged-with-Discord, and those who did not engage with TIQ Discord, among those who provided follow-up data 1-month post-enrollment. Significant group differences were found across confidence in the ability to stay quit. Post-hoc comparisons suggested significant differences between the Engaged-with-Discord group and the Not-Engaged-with-Discord group. Specifically, when asked what their level of confidence in their ability to quit or stay quit was, a greater proportion of the Engaged-with-Discord group responded with "very much" (29.4 % vs. 25.7 %) or "a lot" (22.0 % vs. 18.6 %), relative to the Not Engaged-with-Discord group (p-value = 0.0235). No statistically significant differences were found across e-cigarette dependence scale score (p-value = 0.7519), vaping abstinence (p-value = 0.3286), or TIQ interaction metrics (e.g., number of text messages sent by user, number of days enrolled in TIQ, setting a quit date, or use of the on-demand keywords).

4. Discussion

Over half of invited participants joined TIQ Discord – an uptake rate

higher than that usually expected for tobacco cessation communities. For example, about one third of a young adult smoker sample indicated interest in using a social network to quit in one prior study (Ramo et al., 2015). Another study found about 41 % of users who had access to an online tobacco cessation community joined without additional prompting (Graham et al., 2017a). Higher uptake in the current study may be indicative of higher acceptance of an online resource for social support, or a reflection of the popularity of Discord among youth and young adults in our sample. The relatively high acceptability rate of this study might be attributed to the invitation text message that highlighted an opportunity to learn more about quitting paired with a $40 incentive to participate in the study, though more research is needed to validate this hypothesis.

Additionally, while the observational design of the current study precludes making causal links between participation in TIQ Discord and increase in confidence, the real-time social support received by actively engaging in the Discord server was associated with the sizable increase in confidence to quit/stay quit among those who engaged. This is notable, given that engagement at the participant level was found to be low (e.g., the mean number of contributed messages was 4, with a range of 1–51) in this study. Future research is recommended to learn the mechanisms of how social support may influence confidence to quit in a real-world vaping cessation program.

4.1. Limitations

The following limitations need to be considered. First, the study sample was obtained from enrollees of TIQ and represent treatment-

Table 3

Cessation outcome measures and interaction metrics among participants providing data at 1-month post-enrollment, by engagement status (N = 290).

	TIQ-only (N = 107)		Engaged with discord (n = 113)		Did not engage with discord (n = 70)		F-statistic	p-Value
	N	Mean, SD (range: min, max)	N	Mean, SD (range: min, max)	N	Mean, SD (range: min, max)		
E-cigarette dependence scale score	104	2.8, 1.2 (1.0–5.0)	109	2.7, 1.2, (1.0–5.0)	70	2.6, 1.3, (1.0–5.0)	0.29	0.7519

	TIQ-only (N = 107)		Engaged with discord (n = 113)		Did not engage with discord (n = 70)		Chi-square	p-Value
	N	%	N	%	N	%		
Vaped in the past 30 days							2.23	0.3286
No	28	26.2	38	33.6	25	35.7		
Yes	79	73.8	75	66.4	45	64.3		
Confidence in the ability to quit/stay quit							16.25	*0.0392*
Very much	27	26.0	32	29.4	18	25.7		
A lot	14	13.5	24	22.0	13	18.6		
A moderate amount	37	35.6	24	22.0	27	38.6		
A little	16	15.4	15	13.8	11	15.7		
Not at all	10	9.6	14	12.8	1	1.4		
Missing	3							
N								

This Is Quitting (TIQ) interaction metrics	TIQ-only (N = 107)		Engaged with discord (n = 113)		Did not engage with discord (n = 70)		F-statistic	p-Value
	N	Mean, SD (Range: min, max)	N	Mean, SD (Range: min, max)	N	Mean, SD (Range: min, max)		
Number of mobile originated messages sent by user	106	16.2, 8.8 (2.00–57.00)	107	17.6, 10.8, (1.0–4.0)	64	16.6, 10.6, (6.0–49.0)	0.57	0.5653
Number of days enrolled in TIQ	106	35.8, 6.0 (31.00–63.00)	107	36.3, 6.5, (31.0–63.0)	64	37.1, 7.1, (30.0–69.0)	0.71	0.4938

	TIQ-only (N = 107)		Engaged with discord (n = 113)		Did not engage with discord (n = 70)		Chi-square	p-Value
	N	%	N	%	N	%		
Set quit date							2.49	0.2867
Yes	92	86.0	88	77.9	56	80.0		
No	15	14.0	25	22.1	14	20.0		
Used any on-demand keywords (COPE, STRESS, FEELS, MORE, BREATHE, SLIP, TIPS)							0.68	0.7196
Yes	72	67.9	68	63.6	44	68.8		
No	34	32.1	39	35.5	20	31.3		
Missing	1		6		6			

Note. Post hoc analyses using Tukey's test showed a statistically significant difference between engaged with Discord and did not engage with Discord (p-value = 0.0235).
Italicized text indicates statistically significant difference at p-value < 0.05.

seeking young people, who generally report higher levels of nicotine dependence. A comparison of this study sample to a nationally representative sample of young people interested in quitting vaping showed higher levels of nicotine dependence and higher vaping frequency (Do et al., 2023). Self-selection to participate in the study (by joining and then engaging with TIQ Discord) also prevents causal attribution, a limitation noted in previous studies on social support for tobacco cessation (Graham et al., 2017a; Yuan et al., 2023). Higher reported baseline prevalence of combustible tobacco, alcohol, and cannabis among follow-up responders in the TIQ + Discord groups may have been due to differential attrition, differential reporting, or chance. Future studies should aim to investigate that unexpected finding.

Additionally, engagement data available was limited to what was observed (e.g. from data on participants who posted or interacted with content with reactions). As such, we were unable to evaluate "lurking" (e.g., observing but not participating) behavior and its potential impact on outcomes. Previous studies have shown that even just reading content on an online cessation community with no "active" engagement may have a positive impact on cessation outcomes (Graham et al., 2017b). We strongly recommend digital platforms such as Discord take concrete steps to provide researchers with access to passive engagement data for research purposes, to allow for exploration of such findings in future studies.

Finally, it is possible that there are other differences between those who engaged with TIQ Discord and those who did not engage with TIQ Discord, which are not accounted for in the current study. For example, we did not account for potential differences in reasons for wanting to quit vaping, number of quit attempts, or additional methods for vaping cessation that were used by participants, which might also have an impact on the outcomes of interest. This is an area of research that should be considered, given that young people report greater concerns about current and mental health, which might influence confidence in ability to quit/stay quit especially if experiencing negative health impacts from vaping (Cha et al., 2024).

5. Conclusions

Results from this pilot study suggest acceptability for providing digital cessation social support via Discord to young people who are looking to quit vaping, with more than half of our invited participants joining TIQ Discord. Interest in accepting the opportunity to participate in TIQ Discord appears unrelated to demographic, psychosocial, and tobacco use characteristics, but could have been influenced by the intervention's emphasis on the benefits of social support. Engagement with Discord was associated with increased confidence in the ability to quit/stay quit, which has been demonstrated as a predictor of tobacco

abstinence in other studies (Gwaltney et al., 2009; Krishnan et al., 2022). A digital social platform may provide access to social support among young people quitting vaping who may not have similar resources in other settings. More research is needed to learn how social support messaging influences confidence to quit or stay quit and associations with quitting outcomes.

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CRediT authorship contribution statement

Elizabeth K. Do: Conceptualization, Supervision, Project administration, Methodology, Data curation, Writing – original draft, Writing – review & editing. **Sarah Cha:** Methodology, Data curation, Writing – original draft, Writing – review & editing. **Shreya Tulsiani:** Methodology, Writing – original draft, Writing – review & editing. **Giselle Edwards:** Writing – original draft, Writing – review & editing. **Linda Q. Yu:** Writing – original draft, Writing – review & editing. **Michael S. Amato:** Methodology, Data curation, Writing – original draft, Writing – review & editing. **Megan A. Jacobs:** Writing – original draft, Writing – review & editing. **Elizabeth C. Hair:** Conceptualization, Data curation, Supervision, Writing – review & editing, Funding acquisition.

Declaration of Generative AI and AI-assisted technologies in the writing process

No AI or AI-assisted technologies were used in the writing process.

Declaration of competing interest

The authors of this manuscript are employed by Truth Initiative, a non-profit public health organization that sells digital tobacco cessation programs to support its mission driven work.

Data availability

A data sharing agreement is required for the use of all data. Truth Initiative does not share data with tobacco industry representatives or affiliated researchers. Investigators seeking access to data used in the study should make a written request to Truth Initiative and submit a detailed research plan including the purpose of the proposed research, required variables, duration of the analysis phase, IRB approval with FWA information and documentation of investigator training in human subjects. Approved investigators may access datasets via an analytic Portal owned and administered by Truth Initiative.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.invent.2024.100779.

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