

**Nudging towards responsible gambling: Improving young adults' gambling decisions
with the use of feedback pop-up messages supported by a conversational agent and a
smiling expression**

Exploring the effectiveness of a conversational agent and a smile as visual nudges to guide
young adults into timely withdrawal from gambling

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Intellectual property statement

In writing this thesis, several technological tools were used for support purposes. Firstly, Grammarly (free version) was used to check spelling and structure errors. Secondly, the free version of Quilbott was utilized to improve sentence structures. Thirdly, tables were formatted with Microsoft Word. Fourthly, designing the conceptual model with the research hypotheses was realized with Draw.io. Fifthly, the free version of Canva provided visuals for the online gambling environment that was designed in Figma. Lastly, ChatGPT provided feedback that was exclusively used to brainstorm and reflect and not to generate textual content. Important to note that the thesis content is entirely written by the researcher and ensembles authentic work.

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Abstract

Participation in online gambling has increased, especially among Dutch young adults who are vulnerable to negative consequences. Therefore, designing a responsible gambling tool (RGT) is crucial. Although feedback pop-up messages help to disrupt the flow state of gambling, low message elaboration leads (negatively) impacts its effectiveness in motivating responsible gambling. Hence, the current study examined how a conversational agent (CA) and smiling expression influenced the feedback pop-up message's effectiveness in empowering responsible gambling among Dutch young adults. Individuals ($N = 131$) gambled in an online slot-play simulation while exposed to manipulated feedback pop-up messages and their responsible gambling behavior was measured by stopping behavior and recalling the pop-up message. The results suggested that only the conversational agent was significantly effective in stopping intention. Furthermore, results revealed no significant difference between the conversational agent and smiling expression on the recall ability of the content and eliciting positive emotions compared to the controlled condition. Moreover, recall mediated the effect on stopping intention but was not influenced by positive emotions nor the presence of the CA or smiling expression. Additionally, young gamblers' stopping intentions were moderated by CA' attractiveness and trustworthiness. These findings suggest gambling companies, RGT and game developers to visualize an attractive and trustworthy-looking conversational agent when using feedback pop-up messages for empowering responsible gambling.

Keywords: conversational agent, smiling expression, feedback messages, pop-up messages, responsible gambling, responsible gambling tool, Dutch young adults, attractiveness, trustworthiness, positive emotions

Table of Contents

ABSTRACT	4
INTRODUCTION.....	7
THEORETICAL FRAMEWORK.....	11
ELABORATION LIKELIHOOD MODEL	11
VISUAL NUDGES.....	12
<i>Conversational Agents</i>	<i>13</i>
<i>Smiling.....</i>	<i>15</i>
POSITIVE EMOTIONS	17
ATTRACTIVENESS AND TRUSTWORTHINESS	18
METHOD	21
DESIGN.....	21
PARTICIPANTS	21
MATERIALS.....	23
<i>Design</i>	<i>24</i>
<i>Gambling set-up</i>	<i>25</i>
MEASURES.....	26
<i>Dependent variables.....</i>	<i>26</i>
<i>Mediators</i>	<i>27</i>
<i>Moderators</i>	<i>28</i>
<i>Manipulation check</i>	<i>28</i>
PROCEDURE.....	29
ANALYSIS.....	29
RESULTS.....	31
RESPONDENTS	31
STOPPING BEHAVIOR.....	34

<i>Intention</i>	34
<i>Continuance</i>	35
POSITIVE EMOTIONS	37
RECALL	39
MEDIATION ANALYSES.....	40
<i>Conversational Agent</i>	41
<i>Smiling expression</i>	42
MODERATION EFFECTS	43
<i>Attractiveness</i>	44
<i>Trustworthiness</i>	44
DISCUSSION	46
LIMITATIONS AND FUTURE RESEARCH.....	50
PRACTICAL IMPLICATIONS.....	51
CONCLUSION.....	51
REFERENCES	53
APPENDICES	65
APPENDIX A	65
APPENDIX B	66
APPENDIX C	67
APPENDIX D	68
APPENDIX E	69
APPENDIX F	72
APPENDIX G.....	73

Nudging towards responsible gambling: Enhancing adolescent gambling behavior with the use of feedback pop-up messages supported by a conversational agent and a smiling expression

Engaging in games based on probability outcomes has always intrigued people. During the Roman Empire, ‘gambling’ was mostly limited to raffles (Jellinek, 2019), whereas in 2024 technological advancements provide digital platforms which expose gamblers to risks related to losing valuables like money (Gainsbury et al., 2018; Montiel et al., 2021). The Dutch legalization of online gambling in 2021 (EenVandaag, 2023; The Kansspelautoriteit, n.d) along with these technological advancements that provide the option to play anonymously regardless of your whereabouts (Montiel et al., 2021b; Newall, 2018), has increased gambling activity within the Netherlands. This development positively affects gambling operators through higher profits (NOS, 2023). However, in a single year from 2022 to 2023, the number of people seeking help for their gambling addiction has increased by a quarter to 2500 individuals, indicating the gambling increase negatively impacts the health of their player base (Landelijk Alcohol en Drugs Informatie Systeem, 2023). Serious negative consequences of (online) gambling that are reported are relational damage; financial consequences; decreased productivity; mental suffering from depression or anxiousness (Fortier et al., 2024; Zeelenberg et al., 2023); criminal activities etc. (EenVandaag, 2023). Thus, it is imperative to encourage responsible gambling behavior so gamblers can enjoy playing while limiting negative side effects.

Specialists emphasize that especially gamblers between the ages of 18 and 25 are prone to social and health-related problems resulting from gambling (EenVandaag, 2023; NOS, 2024; Vanlerberghe, 2024; Van Rooij et al., 2021). They are more likely to make impulsive choices than adults because their cognitive skills for managing excitement are less sophisticated, which makes them more sensitive to their surroundings, social pressure, and

the high attractiveness of rewards (Montiel et al., 2021; Ipenburg, 2024). They therefore struggle more with ending gambling sessions on time, guarding themselves from the risks of losing money, and realizing the (impact) of long-term consequences (Ipenburg, 2024). To control gambling addiction, Dutch people were encouraged to lawfully gamble with authorized gambling companies such as Toto (NOS, 2022), which increased exposure to gambling marketing activities, normalizing gambling. This normalized perception of online gambling lowers the threshold for young gamblers to entertain themselves with such activities (Montiel et al., 2021; Van Rooij et al., 2021), which in turn contributes to the fact that almost one-fourth of all Dutch gambling accounts in 2023 are held by young adults (The Kansspelautoriteit, 2024). Given this increase in gambling among young adults, it is crucial to design responsible online gambling environments.

Consequently, more research has been conducted on designing responsible gambling tools (RGT), to provide means to nudge gamblers into making sensible and controlled decisions by maintaining self-control (Bjørseth et al., 2021; Finlay et al., 2006; Gainsbury et al., 2018; Gainsbury et al., 2020; Newall, 2018; S. Gainsbury et al., 2018; Van Rooij et al., 2021). One commonly tested tool for responsible gambling is the display of feedback pop-up messages, notifications encouraging people to reflect on their gambling behavior (Bjørseth et al., 2021; Hollingshead et al., 2019). Gamblers tend to be persistent when positive emotions like excitement resulting from winning are triggered (Kiyak et al., 2023). This tendency can be combated with feedback pop-up messages as they have stimulated minimizing their betting amounts and playtime before (Bjørseth et al., 2021). Given that (young) gamblers tend to overestimate their gambling choices and skills by gambling with too much money, not withdrawing their balance in time, and underestimating the long-lasting consequences (Auer & Griffiths, 2023; Gainsbury et al., 2018), feedback pop-up messages are applied as RGT in the current study.

Researchers argue there is room for improvement in designing effective feedback pop-up messages (Grande-Gosende et al., 2019; M. M. Auer & Griffiths, 2015), because participants struggle to recall the displayed information (Hollingshead et al., 2019). Players' pitfall to overestimate their winning probabilities and underestimate their defeat (Caillon et al., 2021; Hollingshead et al., 2019) can explain why the majority of participants did not attentively read the provided information. An overload of information and distractions can also contribute to this. Regardless of the cause, low content recall suggests inadequate message elaboration, so minimal consideration reading a message which should be high to increase the likelihood of someone carrying out a message's behavior (Perloff, 2017).

The message elaboration can be increased by nudging gamblers with visual heuristics, which are simple guidelines evoking positive emotions that potentially support better information processing (Perloff, 2017). Applying visuals to the feedback pop-up messages can be beneficial because graphics are a preferred communication medium by young adults (Azad et al., 2023). To my knowledge, the effectiveness of visually supporting the message content of feedback pop-up messages has so far remained unexplored.

One visual heuristic that evokes positive emotions is a conversational agent (CA), a computer-programmed bot designed to textually or orally communicate with people, like human interaction (Han, 2021). CAs led to desirable choices in other contexts (Adaji & Adisa, 2022; Greer et al., 2019; Moore et al., 2023; Pizzi et al., 2023) because they are less frequently seen as intrusive by young adults (Greer et al., 2019), especially when they have human features (Han, 2021; Pizzi et al., 2023). With this, trust and acceptance of CA increase, leading to higher message engagement, and evoking positive feelings and attitudes (Han, 2021). The latter stimulates deliberate behavioral change (Greer et al., 2019) because people tend to adapt their behavior that aligns with the information being presented to maintain a joyful mood (Shiota et al., 2021). Besides intrusiveness, acceptance of a CA is

also influenced by perceived trustworthiness (Rheu et al., 2020) and attractiveness (Holzwarth et al., 2006; Shamekhi et al., 2018) as it affects the emotional state. Therefore, CAs combined with textual content might increase the effectiveness of feedback pop-up messages as they can evoke positive emotions and associations.

Displaying a smile also elicits pleasant emotions, feelings individuals like to maintain (Torre et al., 2019) which in turn stimulates behavioral change. Smiling is defined as facially expressing a positive emotion by curling the corners of the mouth and raising the cheeks when feeling happy, joyful, amused or friendly (Hosseiniapanah et al., 2018; Torre et al., 2019). Smiles increase trustworthiness (Ozono et al., 2010) and allure (Torre et al., 2019). Therefore, using a smile possibly strengthens the effectiveness of CA's appearance which can moderate the effectiveness of the feedback pop-up message.

In sum, this thesis aims to contribute to building an effective RGT for the growing number of young gamblers to promote responsible gambling by encouraging timely balance withdrawal, hence limiting exposure to the harmful effects of gambling on Dutch young adults. The message engagement, crucial to comprehend the information before adopting your behavior towards it, must be improved. Hereby, positive emotions will be evoked by a smile and CA, analyzing the unexplored area within responsible online gambling regarding their effectiveness in visually supporting textual content within pop-up messages. This leads to the following research question:

To what extent does the presence of a conversational agent and a smiling expression influence a pop-up message's effectiveness in nudging Dutch young adults into responsible gambling?

Theoretical framework

Elaboration Likelihood model

The Elaboration Likelihood Model (ELM) explains how people can best be nudged into performing a certain behavior based on the knowledge of how humans process information (Petty & Cacioppo, 1986). This ELM first discusses ‘elaboration’ as the degree to which an individual considers or alters a message (Perloff, 2017). For this thesis, this means to what extent participants are thinking about withdrawing their current balance. It secondly discusses the ‘likelihood’ of an individual acting according to the behavior described within a message (Perloff, 2017). Within this thesis this refers to the probability of the participant withdrawing their current gambling balance after exposure to the smiling expression and/or CA. Whether participants read the message and stop their gambling session depends on how the (persuasive) information is processed (Perloff, 2017), so therefore ELM is valuable to apply in the current study.

According to dual process theory, information is processed exclusively via either the ‘central’ or ‘peripheral’ route (Perloff, 2017). When individuals are contemplating something, the ‘central route’ is used because it requires logical thinking to create arguments (Petty & Cacioppo, 1986), for example when buying a car. These arguments are based on personal biases, attitudes, values and intelligence (Barrouillet, 2011). However, humans are exposed to large amounts of information while they have limited processing capacity, forcing individuals to mostly rely on “simple decision-making rules” called heuristics (Perloff, 2017). People for instance use their peripheral route (Petty & Cacioppo, 1986) when buying toothpaste. The central and peripheral processing routes require a different approach for an effective persuasion attempt based on the reader’s level of motivation and ability to read a persuasive message (Perloff, 2017).

Motivation in this thesis means individuals feel compelled to (Petty & Cacioppo, 1986) read the feedback pop-up message which is important to stimulate behavioral change

(Hollingshead et al., 2019). The motivation level can be affected by exposure to personally irrelevant information (Petty & Cacioppo, 1986), for example, the proximity (near or distant) of the future (Petty et al., 1981). Ability, a state in which individuals should be able to comprehend the messages' content and the communicated expected behavior (Petty & Cacioppo, 1986), can be affected by distraction and/or information overload (Perloff, 2017). In the context of responsible gambling, this entails making decisions fitting within their abilities and limitations. More specifically for the current study, individuals understand the importance of timely balance withdrawal (stopping their gambling sessions). Given motivation and ability determine how effective a persuasion attempt is, it is valuable to understand their current intensity within online gambling contexts.

The demonstration that gamblers struggled to recall the content of persuasive messages (Caillon et al., 2021; Hollingshead et al., 2019c), suggests that online gamblers' ability and motivation are low. Firstly, players pay less attention to their environment because they are engaged in a flow of gambling activities (Lavoie & Main, 2019). Moreover, gamblers might be less motivated to read the message as it is rather relevant to try winning a high amount of money. In such situations, people tend to rely on peripheral cues: simple guidelines triggering positive or negative emotions supporting the decision whether to (or not) engage with and accept the communicated message (Petty & Cacioppo, 1986). Given the likelihood of elaborating and complying with the feedback message is suggested to be low, the RGT in this thesis is designed to function as a peripheral cue.

Visual nudges

Visuals can be peripheral cues to increase message engagement (Kim et al., 2022) and influence people to alter their attitudes or behaviors (Kay et al., 2024). Nevertheless, to my knowledge visuals have not yet been explored as support for text within feedback pop-up messages in the online gambling context. Hence, examining the impact of employing visual

communication as assistance to increase the likelihood of gambling responsibly is highlighted within this thesis. Especially, because the ELM model argues that message engagement is crucial for recall ability and thus messages' effectiveness.

Conversational Agents

One potential visual cue to use is conversational agents (CAs). These are computer-programmed bots designed to have a human-like interaction with users (Han, 2021), and provide amusing interactions (Han, 2021; Greer et al., 2019; Moore et al., 2023; Rheu et al., 2020; Shamekhi et al., 2018). Previous research indicates that CAs indeed support behavioral change in various contexts.

Pizzi et al. (2023) for example proposed CAs' effectiveness within the e-commerce field because the visual appearance of a CA influenced peoples' buying decisions. Within this study, participants needed to consider vacation purchases: car rental and travel insurance. A CA, manipulated with the presence of humanlike characteristics and gaze direction, provided support during their shopping experience by answering questions and giving advice. When the CA had a humanlike embodiment and specifically focused their gaze on the reader, they were perceived as helpful and kind triggering positive emotions. Consequently, more participants booked a rental car and travel insurance.

There are also supporting results suggesting CAs' effectiveness within the employment sector. During Shamekhi et al. (2018)' study, participants were challenged to hire the most suitable intern by sharing their reasonings for their preferences with their fictional colleagues. These discussions were monitored by CASSY, the agent responsible for time management and positive group dynamics like equal speaking turns and feedback. The experiment was manipulated by visually displaying or playing the voice of the CA. When interacting with the visually displayed CA participants collaborated more as a team by providing each other more feedback, asking and answering more questions due to

experiencing “social presence” (Shamekhi et al., 2018). This suggests that CAs’ can increase message elaboration and the likelihood of behavioral change as participants considered to interact more with the CA and “colleagues”. Additionally, positive emotions were elicited because conversations flowed more smoothly with the displayed CA than solely the sound condition.

An important note is that the CA within the current study is implemented differently than in previous research. Most studies measure the effect of a longer-duration conversation between the CA and the user (Greer et al., 2019; Pizzi et al. 2023; Shamekhi et al., 2018), but the current study solely measures the effect of CAs’ visual appearance and entails a brief interaction. Gamblers solely interact with the CA by reading the pop-up messages (multiple times) and choosing one of the provided answer options: withdraw or continue playing. Shamekhi et al. (2018) suggest this brief duration should not be considered a problem as visually displaying the CA already triggers social presence, so the sensation of someone being in attendance of the mediated space (Rosenthal-von Der Pütten et al., 2009) and can trigger behavioral change.

In the current study the CA is visualized via an avatar, an animated character in a computer-generated environment (Song et al., 2013). However, the avatar is solely used to represent the CA (a casino host) and not to stimulate user identification or represent the user itself to trigger behavioral change (Song et al., 2013). Therefore, this study uses an altered CA combined with an avatar. Nevertheless, since it is crucial to notice the animated CA and not to identify with an avatar within the current study, the hypotheses are motivated by the underlying theory regarding the effectiveness of conversational agents. Given both Pizzi et al. (2023) and Shamekhi et al. (2018) suggest that CA can have a positive impact on behavioral change, the first hypotheses are formulated:

H1: Displaying the combination of a textual feedback pop-up message with the visual presence of a CA has a greater impact on the gambling stopping behavior of Dutch young adults than solely displaying the textual feedback pop-up message.

H1a: Displaying the combination of a textual feedback pop-up message with the visual presence of a CA elicits more positive emotions among Dutch young adults than solely displaying the textual feedback pop-up message.

H1b: Displaying the combination of a textual feedback pop-up message with the visual presence of a CA leads to better recall of the messages' content among Dutch young adults than solely displaying the textual feedback pop-up message.

Smiling

Pizzi et al.'s (2023) research suggest that non-behavioral cues influence people's behavior. Therefore, a visual display of a smile, a facial expression of a positive emotion by curling the corners of the mouth and raising the cheeks (Hosseinpanah et al., 2018; Torre et al., 2019), may positively impact individuals' attitudes. For instance, participants judged brands more positively when an Instagram post involves a smiling individual while visualizing the brand logo or name, compared to a neutral expression (Nanne et al., 2020). A smile not only leads to attitudinal change, but it also affects behavior.

Ilicic et al. (2016) examined the role of smiling authentically in advertisements, specifically how this can transform negative judgments towards celebrities into positive judgements. A smile evoked positive emotions in participants, judging celebrities they did (not) like more positively when they showed a "natural" compared to a "forced" smile. This increased participants' willingness to engage with the advertisement and their inspiration to buy something from Logitech. Based on the success of these cases, the following is hypothesized:

H2: Displaying the feedback pop-up message with the visual presence of a smiling expression has a greater impact on the gambling stopping behavior of Dutch young adults than solely displaying the textual feedback pop-up message.

H2a: Displaying the feedback pop-up message with the visual appearance of a smile elicits more positive emotions among Dutch young adults than solely displaying the textual feedback pop-up message.

H2b: Displaying the feedback pop-up message with the visual appearance of a smile leads to better recall of the messages' content among Dutch young adults compared to solely displaying the textual feedback pop-up message.

Intending to create an effective RGT it is also interesting to explore the combined effect of a smile and conversational agent. Baek et al. (2021) suggested that this combination can lead to higher beneficial behavior. The wide grin namely humanized the CA and persuaded respondents to gift higher money amounts than the robot-condition. Although the presence of a smiling expression and CA are tested with charities and not gambling, the results indicate the effects of CAs' on gambling-stopping behavior can be empowered by the presence of a smile or vice versa. Hence, the current study hypothesizes:

H3: Displaying the feedback pop-up message with the visual presence of a smile and conversational agent combined has a greater impact on the gambling stopping behavior of Dutch young adults than the message solely displaying a smiling expression or conversational agent.

H3a: Displaying the feedback pop-up message with the visual presence of a smile and conversational agent combined elicits more positive emotions among Dutch young adults than the message solely displaying a smiling expression or conversational agent.

H3b: Displaying the feedback pop-up message with the visual presence of a smile and conversational agent combined leads to better recall of the messages' content among Dutch young adults compared to solely displaying the textual feedback pop-up message.

Positive emotions

Visuals are also potentially effective in changing behaviors and attitudes since they can trigger emotions (Geraidine & Nienaber, 2024) which is beneficial to influence the decision of whether to (or not) accept the communicated message. As previously mentioned, specifically emotions of positive valence can support behavioral change as they increase message engagement. For instance, Duong et al. (2023) researched whether music can effectively nudge participants to vaccinate themselves. Experimental groups listened to and watched popular music videos while indirectly exposed to comments promoting COVID-19 vaccinations. The music evoked nostalgia and inspiration, leading to less disagreement about the vaccine benefits than informative audiovisuals. Additionally, their perceived vulnerability increased, consequently increasing the likelihood to vaccinate. This behavioral change could be explained by individuals wanting to retain positive feelings (Torre et al., 2019), like nostalgia and inspiration.

Another example is when narratives successfully increased participants' interest in climate change (Wong-Parodi & Feygina, 2021). A variation from factual to metaphoric narratives described the impact of not changing our climate behavior, which manipulated the extent participants were engaged with the provided information. Hereby, vividly written stories evoked negative and positive feelings strengthening personal relevance on climate change topic. Based on higher mail subscriptions about environmental developments and higher donation intention the positive feelings also boosted motivation and ability to read the

climate crisis message. Which in turn increased participants' intention to combat this environmental issue (Wong-Parodi & Feygina, 2021).

Within the current thesis, elaboration refers to the extent participants are thinking about withdrawing their current balance (stopping their gambling session). As mentioned before message elaboration can be influenced by individuals' motivation and/or ability to read information which can be measured by recall of the message's content (Caillon et al., 2021; Hollingshead et al., 2019c; Kim et al., 2022). Given the study examples mentioned above, both suggested that positive emotions led to more message elaboration which increased the likelihood of participants (deliberately) getting vaccinated or donate more, the following hypotheses are formulated:

H4: Positive emotions elicited by the CA and/or smiling expression mediate the ability of Dutch young adults to better recall the feedback pop-up messages' content (message elaboration)

H4a: The ability to recall the feedback pop-up messages' content mediated by positive emotions elicited by the CA and/or smiling expression also mediate the effect of the RGT on increasing gambling-stopping behavior among Dutch young adults.

Attractiveness and trustworthiness

Besides the potential effect of CAs triggering positive emotions, previous studies regarding embodied CAs suggest that their effectiveness in changing behavior and attitude can be moderated by attractiveness (Rheu et al., 2020) and trustworthiness (Holzwarth et al., 2006; Shamekhi et al., 2018). For instance, Hao et al. (2024) examined the positive influence of attractiveness on behavioral change. Participants ordered in a fictive restaurant to which they could customize their meals. A pictorial character persuaded them to make responsible choices related to their health. The avatar's look differed: either visualized aesthetically or

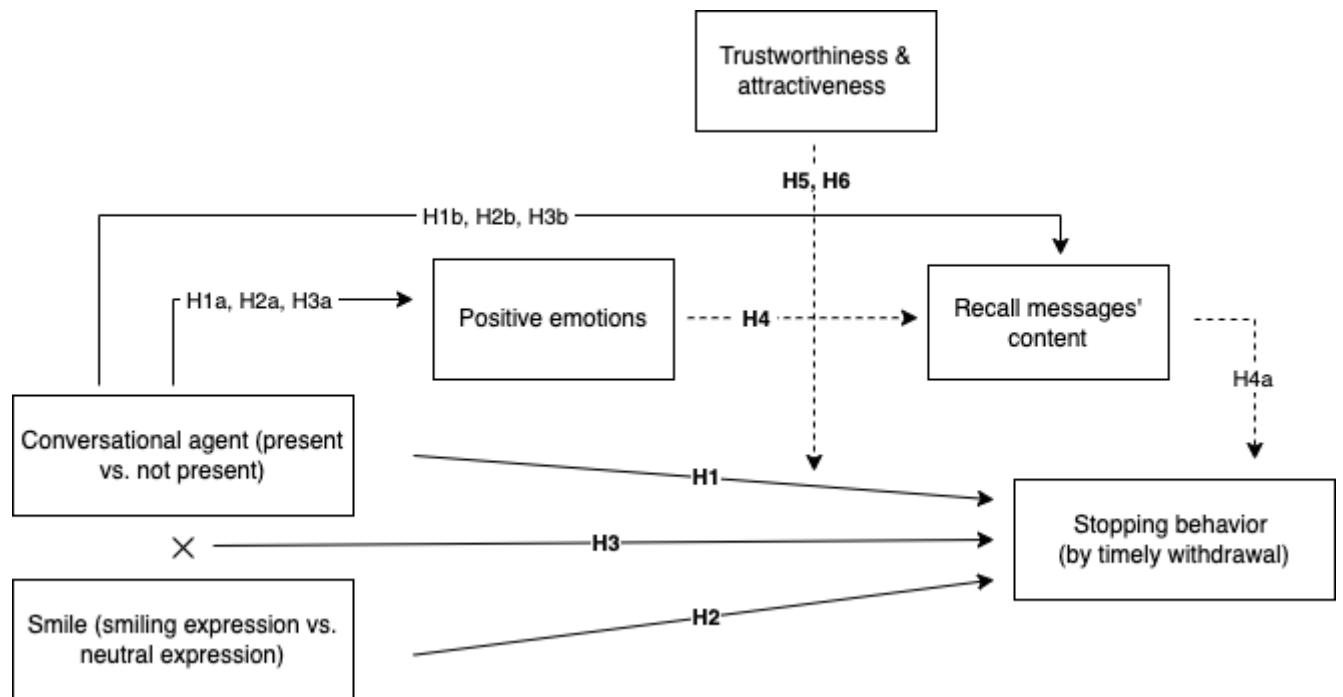
everyday-like. The results suggested that the aesthetic avatar influenced participants the most in customizing their pizza with healthier toppings or small plates.

Holzwarth et al. (2006) suggested that trustworthiness empowers behavioral change even more than attractiveness. They examined how an agent can contribute to an online shopping experience that is as equally pleasant as in real-life. When respondents were enthusiastic about designing their shoes, they relied more on the advice of the sincere-looking agent than the attractive agent. Consequently, more respondents also intended to buy the designed shoe. This suggests that both attractiveness and trustworthiness independently influence behavioral change.

Both studies mentioned above propose that a CA perceived as attractive and trustworthy triggers positive emotions and behavioral change. In this light, the following hypotheses are formulated:

H5: CA's attractiveness moderates the relation between exposure to a CA and gambling stopping behavior

H6: CA's trustworthiness moderates the relation between exposure to a CA and gambling stopping behavior

Figure 1*A conceptual framework with hypotheses*

Method

Design

A quantitative 2x2 between-subject design was conducted to assess whether the visual appearance of a conversational agent and smiling facial expression in a pop-up feedback message are effective in stimulating young adults to withdraw their money and stop their gambling session. The study manipulated the independent variable based on the presence of a ‘conversational agent’ (with CA versus without CA), whereas the second independent variable was about the presence of a smiling expression (with smiling expression versus without smiling expression). Thus, participants were exposed to either one of the four conditions to measure the message’s effectiveness referring to ‘responsible gambling’ (see Table 1). This dependent variable was assessed by recall of the message content and continuance of gambling.

Table 1

Study conditions

Conditions	Content
Condition 1	No smile + no CA present
Condition 2	No Smile + CA present
Condition 3	Smile present + no CA present
Condition 4	Smile present + CA present

Participants

A mixed sampling method was applied to ensure a representative sample group. Firstly, purposive sampling (Treadwell & Davis, 2019) was applied because it was important to recruit participants with gambling experience for higher study validity which could suggest this RGT indeed works in the online gambling context. This method was applied by

distributing the survey via multiple Dutch (online) platforms with the topic of online gambling and or a young adult audience, specifically Facebook-groups; Reddit-groups, SurveySwap and the Onetime Forum. Secondly, convenience sampling was applied by contacting professional (experts) and personal (friends and family) networks via e-mail, Whatsapp, Instagram and LinkedIn to ensure enough participants were recruited due to time constraints (Treadwell & Davis, 2019). Lastly, flyers were distributed on campus. Given this study focuses on the importance of nudging young adults into responsible gambling as their online gambling behavior has increased (The Kansspelautoriteit, 2024), participants were included if stated to have gambled online before and were between 18 and 26 years old.

According to a G-power analysis (Faul et al., 2009) using a statistical power of 0.8, with a medium effect size of ($f = 0.25$) and alpha of 0.05, 158 participants in total, thus about 40 participants per condition are needed to be recruited to represent a representative sample of young gamblers. In total, 257 young adults started the survey but unfortunately, 66 participants dropped out, 59 participants had to be excluded as they lacked attention during the experiment as confirmed with manipulation checks (see results section), and one did not consent.

Eventually, the survey consisted of 131 participants with an average age of 22.9 ($SD = 3.85$) which slightly decreased the statistical power to 0.7. The largest gender group was women (50.8%, $N = 66$), followed by men ($N = 57$, 43.8%), non-binary (1.5%, $N = 2$), and five respondents preferred anonymity on their gender (3.8%). Most Dutch young adults had gambled occasionally within the past three months (46.9%, $N = 61$). Nevertheless, many participants had not gambled within this timeframe (31.5%, $N = 41$). Furthermore, 19 respondents reported having gambled monthly (14.6%, $N = 19$) and 9 respondents weekly (6.9%, $N = 9$). Lastly, the majority had finished their HBO bachelor ($N = 57$, 43.8%). More detailed demographic descriptives can be read in Table 2.

Table 2*Detailed descriptives of the participant's gender and gambling behavior.*

Gambling behavior	Occasionally	Monthly	Weekly	Not the past three months	Total
Gender					
Women	<i>N</i> = 31, 23.8%	<i>N</i> = 9, 6.9%	<i>N</i> = 1, 0.8%	<i>N</i> = 25, 19.2%	<i>N</i> = 66, 50.8%
Men	<i>N</i> = 27, 20.8%	<i>N</i> = 10, 7.7%	<i>N</i> = 7, 5.4%	<i>N</i> = 13, 10%	<i>N</i> = 57, 43.8%
Non-binary			<i>N</i> = 1, 0.8%	<i>N</i> = 1, 0.8%	<i>N</i> = 2, 1.5%
Rather not say			<i>N</i> = 3, 2.3%	<i>N</i> = 2, 1.5%	<i>N</i> = 5, 3.8%
Total	<i>N</i> = 61, 46.9%	<i>N</i> = 19, 14.6%	<i>N</i> = 41, 31.5%	<i>N</i> = 9, 6.9%	<i>N</i> = 130, 100%

Note. One participant did not share their demographic info, so the total is 130 participants.

Materials

The study manipulated the independent variable ‘conversational agent’ by exposing participants in the experimental condition to a conversational agent who communicates the feedback pop-up message. Hereby, the CA were human-like embodied as this evoked a more positive attitude compared to robot-embodied agents in earlier research (Baek et al., 2021). The control group was exposed solely to the textual feedback pop-up message (see Figure 2).

The second independent variable ‘Smiling expression’ was also divided into an experimental group that saw a smiling emoticon or smiling CA, and a control condition that saw the text-only feedback pop-up message (see Figure 2) or the CA without a smile. Smiling

was expressed via an emoticon in the text-only condition because emoticons are globally used in daily online communication (Hancock et al., 2023; Konrad et al., 2020). Besides familiarity, emojis displayed next to a text message support clarifying its underlying intention(s) (Hancock et al., 2023).

Design

All feedback pop-up messages consistently communicated: “You’ve played X rounds. It’s important to keep track of your spending. Consider withdrawing your current balance and take a break to stay in control of your gambling habits.”. This ensured the CA and smiling expression exclusively affected the gambling behavior. Furthermore, the content is informative, non-intrusive, and personalized content which motivates responsible gambling (Bjørseth et al., 2021; M. M. Auer & Griffiths, 2015; M. Auer & Griffiths, 2023).

The conversational agents were generated with DALLE3 Image-Gen via www.popai.pro and were pre-tested with pilot respondents via www.qualtrics.com to validate whether the displayed facial expressions evoked the intended emotion valence (positive or neutral). All five pilot respondents interpreted the facial expressions correctly, so the visuals of CAs and the emoticon were implemented within the feedback pop-up messages via the online platform Canva (www.canva.com). The same platform was used to recreate an online gambling environment and to reconstruct ‘fruit play’ by screen recording the designed slides (Appendix A). This way interactive elements of a spinning wheel, sound, etc were displayed which increased the feeling of realism, and thus validity. The game was designed with neutral colors to ensure the differences in outcomes were solely attributed to the CA and smiling expression given colors might impact gambling behavior (Finlay et al., n.d.).

Figure 2*Conditions of between-subject 2x2 design*

Note. The picture on the upper left displays the controlled condition without the presence of a CA and smiling expression. The upper right picture presents the experimental group with the presence of a CA. The experimental group for the smiling expression were exposed to the picture on the bottom left. Whereas the right picture on the bottom visualizes the presence of both the smiling expression and CA.

Gambling set-up

This study specifically uses slot play for online gambling because previous research regarding pop-up messages' effectiveness has also been conducted within this context (Bjørseth et al., 2021; Hollingshead et al., 2019c; Lavoie & Main, 2019; Stewart & Wohl, 2012; M. M. Auer & Griffiths, 2015). Moreover, slot play is a well-known gambling game because it was one of the first play machines people used in recreation spots like the

shawarma shop. In this study, the challenge is to line three of the same fruit sorts as the classic slot play (BETCITY, 2024) by starting the video (see Figure 3). Furthermore, not more than four rounds in total could be played to prevent boredom and dropouts. Lastly, to exclude individual arousal levels not affected by wins or losses, it was predetermined in which slot play rounds participants gained profit or lost money (McGivern et al., 2019).

Figure 3

The fictive gambling environment



Note. The actual used videos that represented the fictive gambling environment can be found in Appendix A.

Measures

Dependent variables

The study's dependent variable 'responsible gambling' was assessed in two ways. Firstly, by participants' ability to recall the message's content based on the method used by Hollingshead et al. (2019c). Participants were required to select the correct feedback pop-up messages' content choosing between, "I was asked to consider withdrawing **my current balance from my gambling account**", "I was asked to consider **taking a break**", "I was asked to consider **thinking about my limitations**", and "I was asked to consider **withdrawing my current balance and take a break**". For data analysis, the latter option was recoded to 'correct answer' the three remaining statements as 'incorrect answer'.

Secondly, responsible gambling was measured with withdrawal intention via the Behavioral Intention items of The Reasoned Action Approach on a 7-point Likert-type scale (*1: totally disagree to 7: totally agree*). Fishbein and Ajzen (2010a) argue the Behavioral Intention items are well for determining how plausible it is for individuals to act according to the communicated behavior, providing a more nuanced insight. These items measured participants' entire gambling experience because participants assessed them after ending their gambling session. All four original statements of the behavioral intention construct were used but two statements were reversed to prevent pattern recognition and straight liners (Fishbein & Ajzen, 2010b; Krosnick & Presser, 2010) (see Appendix B). Furthermore, for a valid study, the statements were specified to the intention of 'withdrawing money' during slot play (e.g. *"I will withdraw money from my gambling account"*) resulting in a sufficient Cronbach's Alpha ($\alpha = .86$).

A secondary measurement was 'continuance' (M. Auer & Griffiths, 2023) to examine if the intention and actual behavior aligned. After each round, participants chose to "continue" which automatically led to a new round of slot play or "withdraw" which directed participants to the questions starting with the PANAS statements. Participants were assigned a score for each round they continued with a maximum of five. Hereby, a lower continuance score indicates responsible gambling behavior. Note however that 'continuance' is more dependent on context than intention, therefore actions can deviate from intentions (Ajzen, 1985).

Mediators

This study expects that positive emotions mediate the effect on stopping behavior (H4a) via its influence on the ability to recall information (message elaboration, H4). To measure to what extent the participants' positive affective state was affected by the CA or smiling expression, the Positive and Negative Affect Schedule (PANAS) by Watson et al.

(1988) was used. After their entire gambling experience, participants assessed their emotional state on a 5-point Likert-type scale (1: not at all to 5: extremely) (see Appendix C). For a neater survey layout and readability (Toepoel, 2016) the items were limited to ten ($\alpha = .73$), consisting of words commonly used to describe five positive and five negative emotions to prevent straight liners (Krosnick & Presser, 2010) (e.g. “Please indicate to what extent you feel proud”). Furthermore, because specifically positive emotions were posited to have a mediating role, negative emotions were reversed to positive ones.

Moderators

It is hypothesized the degree of stopping behavior are moderated by CA’s perceived trustworthiness (Rheu et al., 2020) and attractiveness (Holzwarth et al., 2006; Shamekhi et al., 2018). Hence, these moderators will be measured with reliable scales designed by Holzwarth et al. (2006) (See Appendix D). Both ‘attractiveness’ (e.g. “In my opinion, the virtual conversational agent is unattractive) and ‘credibility’ (e.g. “In my opinion, the virtual conversational agent is competent) consist of three statements with a minimum Chronbach’s Alpha of 0.90. In total, two statements were reversed to prevent people from scoring the statements the same and all were assessed on a seven-point Likert scale (1: completely disagree to 7: completely agree).

Manipulation check

To ensure the participants were consciously exposed to the manipulation, they were asked about the presence of the CA or a smiling expression. The questions “Did a pop-up message appear on your screen?”, “Was there a character displayed on your screen?”, and “Was there an emoticon displayed on your screen?” were measured on a binominal level (yes/no). The last manipulation check regarding the combined effect was formulated as “What kind of facial expression did the CA have?”, and measured on a multiple-choice level (neutral, smiling; angry).

Procedure

Participants were provided with a link to access the Qualtrics survey for remote and individual participation. After they read the information letter, were instructed to gamble on a fictive platform and provided informed consent, they were shown videos of fruit play rounds. Within the first video, participants were informed they had a starting amount of 20 euros (Stewart & Wohl, 2012). Each round cost 4 euros. After each spin, the (manipulated) feedback based on one of the four experimental conditions was displayed on screen. Hereby, participants either chose to continue or withdraw the current balance from their account which measured their continuance score.

Directly after their gambling session ended, participants indicated their affective states by the PANAS statements to minimize other influences of emotional changes. Hereafter, the effectiveness of responsible gambling was measured by testing their ability to recall the pop-up messages' content, indicating the elaboration level. Subsequently, their answers to The Reasoned Action Approach statements about behavioral intention to withdraw were collected for the same goal. Afterwards, participants of the experimental CA group indicated the CA's trustworthiness and attractiveness on Holzwarth et al. (2006) scales. Then all experimental groups responded to the manipulation checks. To complete the survey, participants answered demographic questions (gambling behavior, gender, age, and educational program). Finally, after a maximum of 10 minutes, participants were thanked for their participation despite not receiving a reimbursement, and debriefed with information about the research intentions and various conditions.

Analysis

The data was analyzed using Jamovi version 2.3.28. Firstly, a descriptive analysis was conducted to characterize the sample demographically by age, gender, gambling behavior, and educational level. Secondly, a Factorial ANOVA assessed whether exposure to the

presence of a CA or smiling expression had a greater impact on the stopping behavior among Dutch young adults (H1, H2, H3). The same statistical test was used to examine whether gamblers experienced more positive emotions and were able to better recall the message's content with the presence of a CA or smiling expression than the controlled condition without visual support (H1a/b, H2a/b and H3a/b). Running these analyses examined what direct relationship the CA and smiling expression have, which can help to better interpret the more complex influence of the mediation and moderation effect.

Furthermore, to examine whether the positive emotions indeed mediated the relation between the CA, smiling expression, ability to recall (H4) and intention to stop gambling (H4a), a MODMED GLM was performed. Lastly, to examine a possible moderating effect of the CA's attractiveness and trustworthiness on stopping behavior (H5 and H6), a correlation analysis is used instead of moderation (GLM MEDMOD) analysis. To run this test, the data should contain values for both stimuli but these were not measured for the presence of a smiling expression since the moderation hypothesis specifically concerned CA's attractiveness and trustworthiness.

Results

Respondents

Of the 257 collected responses, 66 were incomplete and 59 were answered incorrectly regarding the manipulation checks. Hereby, most people inaccurately claimed not to have seen a pop-up message within the videos ($N = 44$), and eleven people did not notice the emoticon within the message. Furthermore, two people did not see an avatar in the experimental CA condition. Moreover, two participants misinterpreted the smiling facial expression as neutral. Lastly, one individual did not give informed consent. For validity, the 116 participants who dropped out, lacked attention to the manipulated variables, and did not consent were removed from the dataset. Consequently, the dataset contained 131 participants.

Before the hypothesis tests were run, it was tested whether the descriptive variables were equally distributed across the four conditions (see Table 3). Firstly, the gambling behavior, gender, and educational level were tested with a Chi-Square of Independence. A Fisher's exact test was performed because all valuables contained expected values below 5. The participants' gender varied significantly between the experimental conditions. Conversely, no significant differences in educational level and gambling behavior were found across the groups. For age, a One-way ANOVA also demonstrated a nonsignificant difference among the four conditions. Therefore, solely 'gender' was considered as co-variate when running the following hypothesis-tests.

Table 3*Descriptives of equal distribution per condition*

Conditions	No smile and No CA	No smile and CA	Smile and no CA	Smile and CA	Total	Chi Square Test	One-way ANOVA
Gambling behavior						Fisher's exact test, (9) = 10.50, $p =$.336	
Occasionally	$N = 14$	$N = 11$	$N = 13$	$N = 23$	61		
Monthly	$N = 8$	$N = 5$	$N = 3$	$N = 3$	19		
Weekly	$N = 2$	$N = 4$	$N = 2$	$N = 1$	9		
Not	$N = 9$	$N = 15$	$N = 7$	$N = 1$	41		
Total	$N = 33$	$N = 35$	$N = 38$	$N = 24$	130		
Gender						Fisher's exact test, (9) = 16.3, $p = .025$	
Men	$N = 14$	$N = 21$	$N = 5$	$N = 17$	57		
Non-binary	$N = 1$	$N = 1$	$N = 0$	$N = 0$	2		
Women	$N = 17$	$N = 12$	$N = 16$	$N = 21$	66		
Rather not say	$N = 1$	$N = 1$	$N = 3$	$N = 0$	5		

Total	<i>N</i> = 33	<i>N</i> = 35	<i>N</i> = 24	<i>N</i> = 38	130	
						Fisher's
						exact test,
						(9) = 16.3,
						$p = .106$
Educational level						
Master Degree	<i>N</i> = 4	<i>N</i> = 0	<i>N</i> = 5	<i>N</i> = 1	10	
Bachelor	<i>N</i> = 21	<i>N</i> = 27	<i>N</i> = 14	<i>N</i> = 26	88	
Middelbareschool- diploma of vergelijkbaar Lager dan middelbareschool- diploma	<i>N</i> = 8	<i>N</i> = 8	<i>N</i> = 5	<i>N</i> = 10	31	
	<i>N</i> = 0	<i>N</i> = 0	<i>N</i> = 0	<i>N</i> = 1	1	
Total	<i>N</i> = 33	<i>N</i> = 35	<i>N</i> = 24	<i>N</i> = 38	130	
Age	<i>M</i> = 22.6, <i>SD</i> = 2.12	<i>M</i> = 23.2, <i>SD</i> = 3.12	<i>M</i> = 22.5, <i>SD</i> = 1.91	<i>M</i> = 23.1 <i>SD</i> = 6.03		<i>F</i>(3,68.7) = 0.527, <i>p</i> = .665

Note. There was one participant who did not share their demographic answers. Therefore, the total is 130 participants. However, given the answers of this participant were sufficient to perform the hypothesis-testing the participant was not excluded from the dataset. Moreover, the Fisher's exact tests were run because the expected value was below five.

Stopping behavior

Intention

A Factorial ANCOVA was conducted to determine whether the presence of a CA (H1) and/or smiling expression (H2 and H3) had a greater impact on respondents' stopping behavior. This was firstly examined via stopping intention as it was primarily expected that more gamblers would intend to stop after exposure to the visual nudges. The analysis controlled for 'gender' as a covariate due to its significant influence on the continuance of gambling $F(1,118) = 4.89, p = .029, \eta^2_{\text{partial}} = .04$. Respondents' score on intention to quit was measured with the Intention Scale, consisting of four items (e.g. "*I will withdraw money from my gambling account*") on a 7-point Likert scale. The mean of the scale across all four conditions was 4.79 ($SD = 1.44$), and the scale's reliability was good $\alpha = .86$.

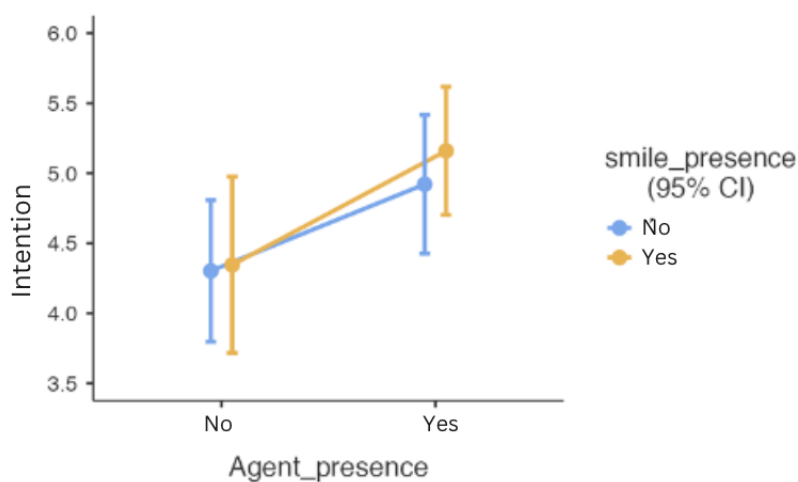
The intention was not normally distributed (CA present, no smile present: *z-score skewness* = -2.63, *z-score kurtosis* = 0.47 and CA present, smile present: *z-score skewness* = -3.08, *z-score kurtosis* = 1.35). The assumption of homogeneity of variances was met ($V = 1.31$). Although the Factorial ANCOVA is fairly robust against the violations of normality, the outcomes should be interpreted with caution.

The factorial ANCOVA showed a significant main effect of CA presence, $F(1,118) = 7.16, p = .009, \text{partial } \eta^2 = .06$. Intention to stop gambling for the pop-up message with CA was higher ($M = 5.03, SD = 1.38$) than for the pop-up message without CA ($M = 4.48, SD = 1.47$). There was no significant main effect of smile presence, $F(1,118) = 0.28, p = .599, \text{partial } \eta^2 = .00$. Intention to stop gambling for the pop-up message with a smile present was higher ($M = 4.93, SD = 1.40$) than for the message without a smile ($M = 4.65, SD = 1.48$), but this effect did not reach significance. Finally, there was also no significant interaction effect, $F(1,118) = 0.14, p = .711, \text{partial } \eta^2 = .00$. As seen in Figure 4, the effects of CA and smile presence on intention are similar and the presence of CA does not empower the smile.

Therefore, the results solely support the expectation that CA's presence results in more Dutch young adults intending to stop gambling than the controlled text-only, smiling expression or combined condition. In contrast, the two latter-mentioned conditions did not influence intention. What this entails on the overall conclusion regarding H1, H2 and H3 is mentioned later.

Figure 4

Effects of CA presence and smiling expression presence on the intention to stop gambling



Continuance

Hypothesis H1 which posited the presence of a CA (H1) and/or smiling expression (H2 and H3) had a greater impact on respondents' stopping behavior, was also measured with continuance. It was expected that fewer Dutch young adults would continue gambling after seeing the CA and/or smile. The analysis included 'gender' as a co-variate but had no significant influence on the continuance of gambling $F(1,118) = 0.02, p = .0875, \eta^2_{\text{partial}} = .00$. Nevertheless, the analysis remained controlled for gender because it was unevenly distributed within the experiment conditions.

The continuance score was not normally distributed (CA present, no smile present: $z\text{-score skewness} = 0.12, z\text{-score kurtosis} = -1.97$ and no CA present, no smile present: $z\text{-score skewness} = -0.05, z\text{-score kurtosis} = -2.24$). The assumption of homogeneity of variances was

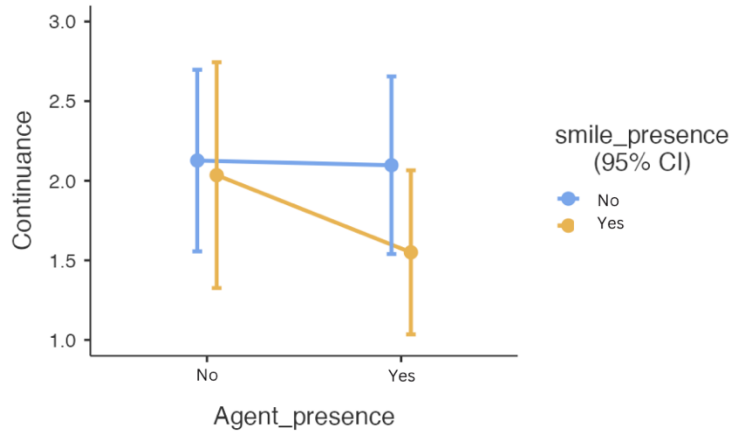
met ($V = 1.33$). Although the Factorial ANCOVA is fairly robust against the violations of normality the outcomes should be cautiously interpreted.

The factorial ANCOVA showed a nonsignificant main effect of CA presence, $F(1,118) = 0.73, p = .395$, partial $\eta^2 = .01$. Continuance for the pop-up message with CA was lower ($M = 1.78, SD = 1.56$) than for the pop-up message without CA ($M = 2.00, SD = 1.59$), but without reaching significance. There was no significant main effect of smile presence, $F(1,118) = 1.12, p = .292$, partial $\eta^2 = .01$. Continuance for the pop-up message with a smile present was thus insignificantly lower ($M = 1.92, SD = 1.47$) than for the message without a smile ($M = 2.06, SD = 1.69$), nonetheless without reaching significance. Finally, there was also no significant interaction effect, $F(1,118) = 0.59, p = .443$, partial $\eta^2 = .01$. Figure 5 illustrates the CA and smile presence lower continuance (without reaching significantly) and is a smile not perceived differently by the presence of CA. Therefore, the results do not support the expectation that CA's nor a smiling expression persuade more Dutch young adults to stop gambling than the controlled text-only.

In conclusion, the data partially supports the overall hypothesis that the presence of a CA (H1) had a greater impact on Dutch young adults' stopping behavior and smiling expression. Indeed, more respondents intended to stop gambling after seeing the CA but did continue, however. Furthermore, the overall hypothesis that the presence of a smiling expression (H2) or its strengthened effect by CA had a greater impact on Dutch young adults' stopping behavior is not supported by the data. Unexpectedly, the smiling expressions did not influence the actual stopping behavior of gamblers nor did the presence or absence of a smile differentially affect the effectiveness of the message when the CA is absent or present.

Figure 5

Effects of CA presence and smiling expression presence on actual stopping behavior (continuance)



Positive emotions

To test whether the presence of a CA and/or smiling expression affected respondents' positive emotions (H1a, H2a, H3a), a Factorial ANCOVA was performed. The analysis included 'gender' as a covariate, but did not significantly influence positive emotions $F(1,118) = 0.92, p = .339$, partial $\eta^2 = .01$. Nevertheless, the analysis was controlled for gender because it was unevenly distributed within the experiment conditions. Respondents' emotional score after seeing the pop-up text message was measured with ten PANAS-items on a 5-point Likert scale, measuring both negative and positive emotions (e.g. *enthusiastic or nervous*). The mean of the scale was 3.59 ($SD = 0.58$) and the scale's reliability was acceptable $\alpha = .73$.

Emotions were normally distributed but the assumption of homogeneity of variances was not met. The variance ratio was 2.29 but the Levene's test did not indicate a significant result, $F(3, 119) = 0.99, p = .399$. Therefore, homogeneity is also not violated.

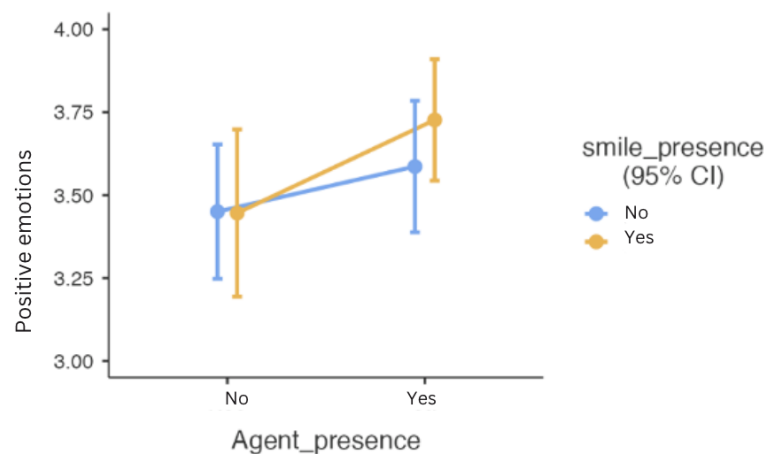
The factorial ANCOVA showed a nonsignificant main effect of CA presence, $F(1,118) = 3.78, p = .054$, partial $\eta^2 = .03$. Positive emotions for the pop-up message with CA were

higher ($M = 3.67$, $SD = 0.52$) than for the pop-up message without CA ($M = 3.48$, $SD = 0.63$), nonetheless without reaching significance. There was also no significant main effect of smile presence, $F(1,118) = 0.40$, $p = .527$, partial $\eta^2 = .00$. Positive emotions for the pop-up message with a smile present were higher ($M = 3.63$, $SD = 0.59$) than for the message without a smile ($M = 3.54$, $SD = 0.57$), but also without reaching significance. Finally, there was also no significant interaction effect, $F(1,118) = 0.47$, $p = .493$, partial $\eta^2 = .00$. Figure 6 illustrates that the presence of the smiling condition did not have a stronger or weaker influence on eliciting positive emotions when accompanied by the CA presence than without the CA.

Thus, the presence of a CA and smiling emotion did trigger more positive emotions compared to solely the text-condition hypotheses but significance was not reached, so the results do not justify hypotheses H1b and H2b. Additionally, H3 is also not supported as the smiling condition remained to insignificantly influence positive emotions despite the CA being present or not.

Figure 6

Effects of CA presence and smiling expression presence on eliciting positive emotions



Note. The distribution values are for positive emotions were (no CA and smile present: z -score skewness = -0.11, z -score kurtosis = -1.23; No CA present, smile present: z -score skewness = -0.45, z -score kurtosis = -0.85; CA present, no smile present: z -score skewness = -

0.88, *z-score kurtosis* = -1.04; CA and smile present: *z-score skewness* = -1.31, *z-score kurtosis* = -1.02).

Recall

A Factorial ANCOVA was conducted to determine if the presence of a CA and/or smiling expression affected respondents' ability to recall the pop-up message' content (H1b, H2b, H3b) and was controlled for gender. The results showed no significant influence of gender on the ability to recall, $F(1,118) = 0.12, p = .725$, partial $\eta^2 = .00$. Nevertheless, the analysis was controlled for gender because it was unevenly distributed within the experiment conditions.

Recall ability was not normally distributed (no CA, no smile present: *z-score skewness* = -0.16, *z-score kurtosis* = -2.67; no CA, smile present: *z-score skewness* = -0.18, *z-score kurtosis* = -2.41; CA present, no smile present: *z-score skewness* = -0.15, *z-score kurtosis* = -2.72, CA and smile present: *z-score skewness* = -0.87, *z-score kurtosis* = -2.67). The assumption of homogeneity of variances was met ($V = 1.04$). Although the Factorial ANCOVA is fairly robust against the violations of normality, the outcomes should be interpreted with caution.

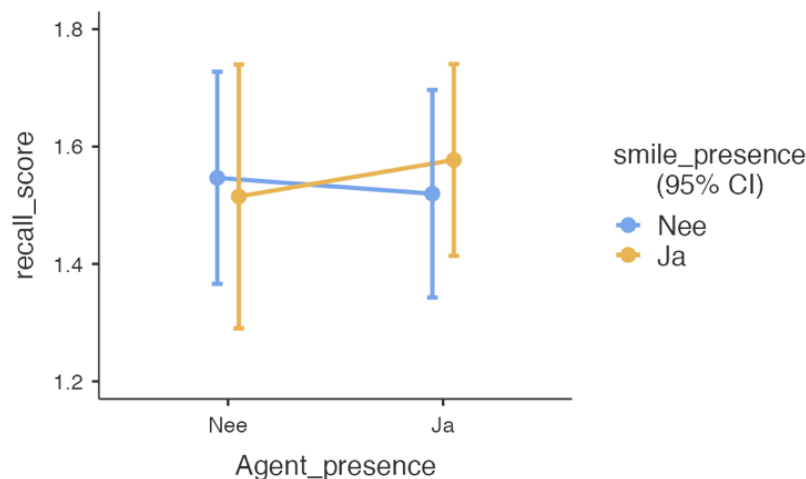
The factorial ANOVA showed a non-significant main effect of CA presence, $F(1,118) = 0.03, p = .855$, $\eta^2_{\text{partial}} = .00$. Ability to recall the pop-up message with CA was higher ($M = 1.55, SD = 0.50$) than for the pop-up message without CA ($M = 1.52, SD = 0.50$), but this difference was insignificant. There was also no significant main effect of smile presence, $F(1,118) = 0.02, p = .893$, $\eta^2_{\text{partial}} = .00$. Positive emotions for the pop-up message with a smile present were higher ($M = 1.56, SD = 0.50$) than for the message without a smile ($M = 1.51, SD = 0.50$), nonetheless without reaching significance. Finally, there was also no significant interaction effect, $F(1,118) = 0.22, p = .635$, $\eta^2_{\text{partial}} = .00$. Figure 7 suggests

whether the CA's absence and presence influences how the smiling expression is perceived but this effect did not reach significance.

Thus, hypotheses H1c, H2c and H3c are not supported because the effect of a CA, smiling condition either accompanied or not by a CA increasing recall ability had a non-significant effect. This concludes that the exposure to a CA, smiling condition or the combination did not lead to better message elaboration, so better recall of the pop-up messages' content.

Figure 7

Effects of CA presence and smiling expression presence on recall ability



Mediation analyses

The elaboration model explained that positive emotions can compel motivation to read the feedback pop-up message increasing the ability to recall the content which in turn would affect the likelihood to comply with the suggestion to stop gambling (Petty & Cacioppo, 1986). Therefore, a serial mediation of positive emotions and the ability to recall in the relationship between CA, smiling expression and the intention to stop gambling was hypothesized (H4/H4a). This analysis specifically examined the stopping intention because the extent people feel compelled to stop gambling provide more nuanced results (Fishbein &

Ajzen, 2010d). This is more valuable given respondents can be hindered from acting as intended since a fictive gambling setting is used (Ajzen, 1985; Fishbein & Ajzen, 2010c) which can limit participants' risk perception due not experiencing negative consequences as will be experienced in real-life gambling (Quoidbach et al., 2013). For the same reason, the potential moderation effect on stopping behavior also analysed stopping intention.

Although the presence of CA and smiling expression did not directly elicit more positive emotions compared to solely a textual pop-up (H1 and H2), the elicited emotions can still partially justify why Dutch young adults were not able to better recall their content message and intended to stop gambling solely after seeing the CA (Hayes, 2022). Therefore, a GLM Mediation Analysis examined a potential serial moderation (H4/H4a) (see Figure 8). Gender was included as a 'covariate' but did not influence positive emotions $b = -0.10$, $SE = 0.10$, $\beta = -0.09$, $z = -0.98$, $p = .327$, 95% BCa CI [-0.31;0.10] nor recall $b = 0.05$, $SE = 0.09$, $\beta = 0.05$, $z = 0.52$, $p = .602$, 95% BCa CI [-0.13;0.23]. Nevertheless, the analysis was controlled for both variables because of their uneven distribution within the experiment conditions.

Conversational Agent

The results revealed a significant direct effect of CA on the intention to stop, $b = 0.69$, $SE = 0.26$, $\beta = 0.23$, $z = 2.64$, $p = .008$, 95% BCa CI [0.18;1.19]. The total effect of CA on stopping intention was also significant, $b = 0.72$, $SE = 0.26$, $\beta = 0.24$, $z = 2.72$, $p = .007$, 95% BCa CI [0.20, 1.23]. There was a significant effect of recall ability on intention to stop gambling, $b = 0.60$, $SE = 0.25$, $\beta = 0.21$, $z = 2.41$, $p = .016$, 95% BCa CI [0.11; 1.09]. In conflict, the CA has a non-significant effect on positive emotions, $b = 0.21$, $SE = 0.10$, $\beta = 0.17$, $z = 1.93$, $p = .054$, 95% BCa CI [-0.01;0.41] and recall $b = -0.01$, $SE = 0.09$, $\beta = -0.02$, $z = -0.13$, $p = .896$, 95% BCa CI [-0.20;0.17]. Furthermore, positive emotions also had a non-significant effect on recall ability, $b = 0.14$, $SE = 0.08$, $\beta = 0.16$, $z = 1.80$, $p = .072$, 95% BCa

CI [-0.01;0.30]. Lastly, there was a non-significant indirect effect of CA on the intention to stop gambling through positive emotions and ability to recall $b = 0.02$, $SE = 0.02$, $\beta = 0.01$, $z = 1.17$, $p = .243$, 95% BCa CI [-0.01, 0.05]. Hence, there is no partial serial mediation between the presence of a CA, positive emotions and the ability to recall on the intention of more Dutch young adults to stop gambling.

Smiling expression

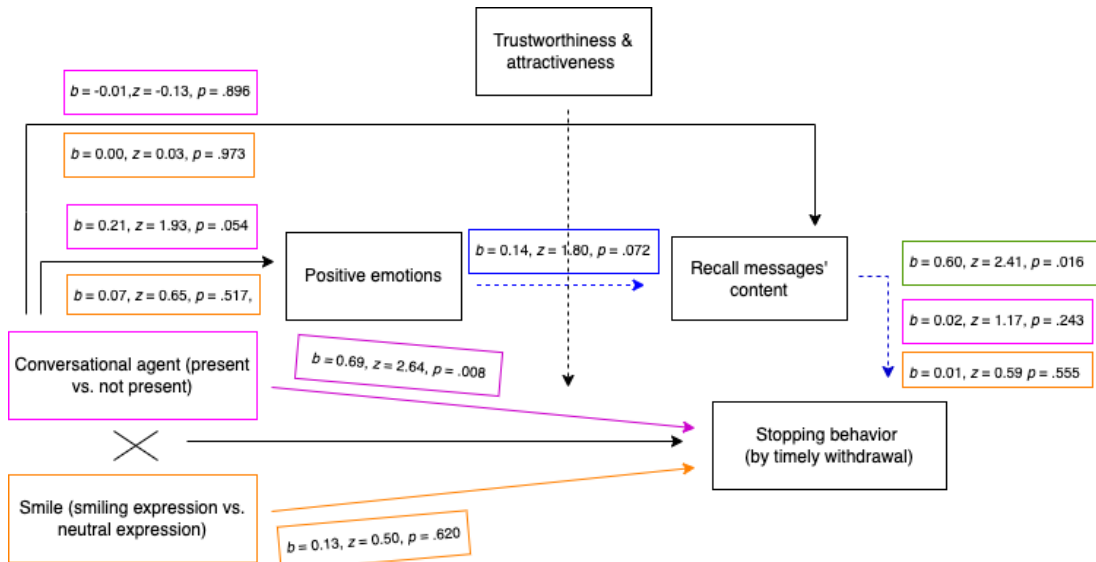
The results revealed a non-significant direct effect of smiling expression on the intention to stop, $b = 0.13$, $SE = 0.26$, $\beta = 0.04$, $z = 0.50$, $p = .620$, 95% BCa CI [-0.38;0.63]. The total effect of a smiling expression on the intention to stop was also non-significant, $b = 0.14$, $SE = 0.26$, $\beta = 0.05$, $z = 0.54$, $p = .592$, 95% BCa CI [-0.38, 0.66]. There was a significant effect of recall ability on intention to stop gambling, $b = 0.60$, $SE = 0.25$, $\beta = 0.21$, $z = 2.41$, $p = .016$, 95% BCa CI [0.11; 1.09]. In contrast, the smiling expression has a non-significant effect on positive emotions, $b = 0.07$, $SE = 0.11$, $\beta = 0.06$, $z = 0.65$, $p = .517$, 95% BCa CI [-0.14;0.27] and recall $b = 0.00$, $SE = 0.09$, $\beta = 0.00$, $z = 0.03$, $p = .973$, 95% BCa CI [-0.18;0.18]. Furthermore, positive emotions also had a non-significant effect on recall ability, $b = 0.14$, $SE = 0.08$, $\beta = 0.16$, $z = 1.80$, $p = .072$, 95% BCa CI [-0.01;0.30]. Lastly, there was a non-significant indirect effect of smiling expression on the intention to stop gambling through positive emotions and recall ability $b = 0.01$, $SE = 0.01$, $\beta = 0.00$, $z = 0.59$, $p = .555$, 95% BCa CI [-0.01, 0.03]. Thus, there is no partial serial mediation between the presence of a smiling expression, positive emotions and the ability to recall on the intention of more Dutch young adults to stop gambling.

In conclusion, positive emotions did not influence the ability to recall the message content which rejects hypothesis H4. However, better recall of the message's content indeed controlled the intention to stop gambling which partially supports hypothesis H4A. Although

the primary focus of the serial mediation lies on the CA and smiling expression performing autonomously, the moderating effect on the interaction is reported in Appendix F.

Figure 8

The direct and indirect effects of the mediation models



Note. H4 is highlighted with the blue arrow and values between positive emotions' and 'recall message's content'. H4a is highlighted with the blue arrow between 'recall message's content' and 'stopping behavior' whereas the pink values present the results of the CA condition. The orange values present the results of the smiling expression condition.

Moderation effects

As mentioned before, the moderation effects are assessed on stopping intention due to validity reasons. Additionally, a correlation analysis instead of a moderation analysis examined whether attractiveness and trustworthiness strengthened the relationship between the CA and the stopping intention: more participants intend to end their gambling session. The data namely did not contain any values of attractiveness and trustworthiness for the smiling condition which was needed to run the GLM MEDMOD analysis.

Attractiveness

A correlation analysis tested whether attractiveness is positively correlated with the stopping intention. The average score for attractiveness was 6 ($M = 5.51$, $SD = 1.04$). Because the data on attractiveness was not normally distributed ($z\text{-score skewness} = -3.34$, $z\text{-score kurtosis} = 1.57$) Spearman's coefficient is used. There is a significant moderate positive relationship between attractiveness and intention to stop gambling, Spearman's rho (71) = 0.44, $p = <.001$. 44% of the variance in intention to stop gambling is accounted by attractiveness. Thus, there is a moderate positive correlation which suggests that the higher the perceived attractiveness of a CA, the greater the intention will be to end their gambling session. Hence, attractiveness moderated the relation between the presence of CA and stopping intention which supports hypotheses H5.

Trustworthiness

The correlation analysis was also used to examine whether trustworthiness is positively correlated with the stopping intention. The average score for trustworthiness was 5 ($M = 4.82$, $SD = 1.31$). Because the data on trustworthiness was not normally distributed ($z\text{-score skewness} = -2.57$, $z\text{-score kurtosis} = -0.18$), Spearman's coefficient was used. There is a significant moderate positive relationship between trustworthiness and the intention to stop gambling, Spearman's rho (71) = 0.34, $p = <.001$. 34% of the variance in intention to stop gambling is accounted by trustworthiness. Thus, there is a moderate positive correlation suggesting that the higher the perceived trustworthiness of a CA, the greater the intention to end gambling sessions will be. Hence, trustworthiness moderated the relation between the presence of CA and stopping intention which supports hypotheses H6.

The insight that attractiveness and trustworthiness moderately influenced stopping intention, interest arose in whether these constructs were positively correlated with each

other. Therefore, a correlation analysis was conducted followed by a reliability test (see Appendix G).

Discussion

The current study investigated to what extent the presence of a conversational agent (CA) and a smiling expression as visual nudges influence a pop-up message's effectiveness in nudging Dutch young adults into responsible gambling. Hereby, the visual nudges were compared to a text-only condition. Additionally, a potential mediating role of positive emotions and recall, and a moderated role for attractiveness and trustworthiness were examined. Responsible gambling was measured by the recall of the pop-up messages' content and the intention to stop their gambling session. It was hypothesized that the conversational agent and smile presence would favourably affect responsible gambling. Furthermore, it was expected the CA and smile would elicit positive emotions, mediating responsible gambling behavior. Lastly, the CA's attractiveness and trustworthiness were anticipated to have more positive impact on the stopping behavior regarding gambling.

The findings partially confirm the expectation that the visual presence of the CA has a greater impact on Dutch young adults' stopping behavior regarding gambling compared to the text-only feedback pop-up message (H1) as more individuals intended to stop gambling. Unexpectedly, not fewer gamblers continued after seeing the CA which can be explained by participants' limited risk perception as they might not have perceived the negative consequences of real-life gambling due to the use of a fictional setting (Quoidbach et al., 2013). In this light, drawing nuanced conclusions regarding participants' overall experience and their extent of feeling compelled to stop seems more valuable (Fishbein & Ajzen, 2010d). The insight that CA's presence increased intention aligns with the results of previous studies about behavioral change by a CA (Pizzi et al., 2023; Shamekhi et al., 2018), but the current study slightly differs since the CA did not elicit more positive emotions compared to the text-only and smiling condition. The favourable effect of CA's presence can rather be explained by social presence, the sense of the CA being physically present within the same environment

and mentally involved with the task (Shamekhi et al., 2018). Tsai et al. (2021) suggest this feels as if a human communicates the message, similar to a real-life situation, leading to a more enjoyable experience which can reduce resistance to align behavior with the presented message to maintain enjoyment (Shiota et al., 2021). Nonetheless, this should be interpreted with caution because of its speculative nature since social presence is not measured within the current study.

This study furthermore confirms that the CA's attractiveness and trustworthiness enhance its influence on the intention to stop gambling (H5 and H6). This aligns with the results of previous research in which both concepts independently influenced behavioral change (Hao et al., 2024; Holzwarth et al., 2006; Rosenberg-Kima et al., 2007). Nevertheless, an unexpected insight revealed a similar effect of both concepts on stopping intention. This entails that respondents might have evaluated the CA with an overall expression instead of assessing the concepts separately. This insight aligns with the study of Yuksel et al. (2017) who proposed a good-looking agent gained more trust than an average-looking person due to positively established prejudices about beauty. When individuals looked alluring, they for instance were perceived as confident extroverts and influential (Yuksel et al., 2017). Given the additional insights revealed a strong influence of attractiveness on trustworthiness and a strong consistency between these variables, it is interesting for future research to assess both measurements as one latent construct for instance regarding 'CA's likability'.

Contrary to CA's effectiveness and expectations the presence of a smiling expression did not have a greater impact on stopping behavior among participants than the text-only message. Moreover, CA's effect on stopping behavior remained the same with the absence and presence of a smile which rejects hypotheses H2 and H3. This unexpected result can be attributed to the use of different study contexts: Ilicic et al. (2016) and Nanne et al. (2020) focused on the smile effect in advertising instead of gambling, encouraging people to

purchase a product. The respondents in the current study might have misinterpreted the smiling expression as an encouragement (to continue gambling). Mouneyrac et al. (2017) suggest a message with a more serious, authoritative tone discourages gambling the most, despite other evidence that behavioral change is motivated by positive emotions (Duong et al., 2023; Wong-Parodi & Feygina, 2021). This is consistent with Newall et al.'s (2023) argument that negatively evoked emotions increase gamblers' awareness regarding gambling risks, which might contribute to acting more responsibly. However, because a neutral and smiling expression of a CA both significantly influenced stopping intention, expressing more negative emotions can be interrelated with another mechanism like social presence, but this should be examined in future research as the current study did not measure social presence.

Other hypotheses regarding the presence of a smiling expression and CA were their persuasive influence on eliciting more positive emotions than the text-only pop-up feedback message. The results did not reveal any difference between the presence of a smiling expression and CA (regardless whether it smiled or not) on positive emotions which rejects hypotheses H1b, H2b and H3b. The overall low average score on positive emotions potentially indicates gamblers experienced more negative emotions, possibly due to the pop-up message being perceived as an interruption of their gambling experience (Lavoie & Main, 2019). Another interpretation for the ineffectiveness of the nudges on positive emotions is the minimal contrast between emotions since the current study compared neutral with positive (facial) cues. Presumably, the positive emotions would have been better acknowledged if positive (facial) cues were compared to negative (facial) cues. Both Calvo-Barajas et al. (2020) and Y. Song et al. (2023) applied this contrast by displaying a cheerful vs mad social robot and were able to disentangle two unique, independent effects. Thus, comparing negative with positive emotions could help to better interpret the role of emotions regarding the effectiveness of feedback pop-up messages.

It was furthermore expected that positive emotions elicited by CA and/or smiling expressions would mediate an increase in participants' intention to stop gambling (H4a) because these emotions nudged young gamblers into better recalling the feedback messages' content (H4). However, the CA and a smiling expression did not significantly elicit positive emotions, and therefore might not have led to more young gamblers better recalling the feedback messages' content (Hayes, 2022), rejecting hypothesis H4. Furthermore, positive emotions did not affect Dutch young adults' intention to stop gambling but this was however influenced by their ability to message recall, which partially supports H4a and justifies the ELM model (Petty & Cacioppo, 1986). The absent mediating effect of positive emotions contradicts suggestions made by Duong et al. (2023) and (Wong-Parodi & Feygina, 2021) who argue these emotions lead to increased involvement and behavioral change. Within the latter study, positive feelings led to higher mail subscriptions and donation intention. Another explanation of positive emotions' ineffectiveness is the lack of contrast in displayed emotions (neutral vs smiling expression) since this might explain why the presence of CA and smiling expression did not elicit positive emotions (H1a, H2a and H3a). Regardless of the underlying cause, positive emotions not mediating responsible gambling behavior imply that the relationship between the mediating effect of the ability to recall the message content and the intention to stop gambling could be justified by other mechanisms beyond positive emotions (Hayes, 2022).

Lastly, the data revealed that exposure to the feedback pop-up message with the visual appearance of a CA and/or smiling expression did not lead to better recall of the messages' content among participants than after exposure to the text condition, rejecting hypotheses H1b, H2b and H3b. The ELM argues that peripheral cues help capture awareness towards the message and can willingly motivate engagement in reading the displayed content (Lam et al., 2022; Perloff, 2017; Petty & Cacioppo, 1986). Compared to previous studies (Duong et al.,

2023; Hao et al., 2024; Holzwarth et al., 2006; Pizzi et al., 2023; Shamekhi et al., 2018; Wong-Parodi & Feygina, 2021; Yuksel et al., 2017), the current study design provided insufficient time or ability for respondents to interact with the message which could have limited the effects on recall.

Limitations and future research

There were several limitations in the current study, leading to follow-up suggestions for future research. Firstly, the current sample size was relatively small because many respondents did not pass the manipulation checks or did not finish the survey. They were removed from the dataset. Although all respondents had gambling experience, this questions the study's generalizability and observations. Therefore, similar future research on responsible gambling should recruit more Dutch young adults.

The majority of participants who failed the manipulation checks did not recognize the smiling stimuli during the experiment, leading to the study's second limitation of not depicting the smiling emoticon salient enough. Within the current experiment, the size of this visual nudge was equal to the text. Given that it was previously suggested gamblers' message engagement was low (Caillon et al., 2021; Hollingshead et al., 2019c), the respondents might not have paid attention to the emoticon. Hence, future research should for example display the smiling emoticon larger, at least larger than the text message (Kim et al., 2022).

A third limitation regards the subtle contrast of valence between manipulations. Displaying neutral vs positive emotions might have led to a similar assessment of emotional states. Therefore, it is interesting whether more conclusive effects can be examined if the smiling expression is compared to an emotion with negative valence. Future research for example can compare a sad with a mad expression.

The last limitation entails the reduced ecological validity due to the use of videos. The limited interaction offered in the slot game itself might have reduced the sense of realism and

agency. This contributes to a short interaction with the feedback pop-up messages which can lower the message engagement. Especially because the current study pre-determined that the messages disappeared after approximately ten seconds. Future research is advised to design a gambling environment where respondents themselves determine when to close the pop-up message by active interaction like clicking on buttons or a pop-up chat environment that requires responses. The latter is also more comparable to CA literature stimulating a longer-duration conversation between the CA and the user (M. M. Auer & Griffiths, 2015; Greer et al., 2019; McGivern et al., 2019; Pizzi et al., 2023; Shamekhi et al., 2018).

Practical implications

The results have various practical implications for gambling companies like TOTO, game- and RGT developers. Given more Dutch young adults intend to stop after exposure to a CA, the study first implies that feedback pop-up messages with a CA as visual support are a promising tool to gamble while limiting negative side effects. Therefore, gambling companies contribute to society's health if implementing these feedback pop-up messages on their online platforms. Game and RGT developers should consider designing attractive and trustworthy-looking CAs to strengthen the message's effectiveness. Hereby, it is advised to design feedback messages with contemplating text and visuals to increase relevancy and reader engagement. Lastly, gambling companies and developers are strongly advised to collaborate (more) with researchers to test these feedback messages in real-life gambling environments to test practical effectiveness.

Conclusion

The study explored whether a pop-up message's effectiveness in nudging Dutch young adults into responsible gambling can be influenced by the presence of a CA and/or a smiling expression. This only applied to CA's presence regarding the intention to stop gambling especially when perceived as attractive and trustworthy. To ensure its effectiveness

on Dutch young gamblers' actual stopping behavior, it is crucial to test feedback pop-up messages with a CA in real-life gambling settings. Furthermore, neither of the visual nudges elicited more positive emotions and had no mediating effects on responsible gambling, so it is reasonable to wonder whether positive feelings are beneficial for promoting responsible gambling. Nonetheless, better recall of the message's content did mediate the intention to stop gambling, even though participants were not stimulated to better recall the message's content in the presence of a CA and smiling expression. Future research might find different results when the study design stimulates more user interaction with the messages, increases the salience of the smiling expression and would compare negative and positive emotions among a larger sample of Dutch young adults via contemplating feedback messages. Overall, the insights of the current study contribute to the health literature and propose gambling companies to design feedback pop-up messages with the presence of a CA for encouraging responsible gambling activities.

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Appendices

Appendix A

Stimulated gambling environment

All videos used in the experiment were screen recordings of slides made in Canva. Each link shows a round of fruit play for each condition:

Version	Link
Controlled condition: text only	https://youtu.be/L7DUMkdWjVQ
Experimental condition: smiling expression	https://youtu.be/n_NS8sIL8sE
Experimental condition: neutral CA	https://youtu.be/SVPo3MI6hnk
Experimental condition: smiling CA	https://youtu.be/m2ws2G2Kp9Y

Appendix B

Behavioral intent (Fishbein & Ajzen, 2010b).

After the exposure to the feedback pop-up message... (1: totally disagree to 7: totally agree)

1. I intend to withdraw money from my gambling account
2. I am not willing to withdraw money from my gambling account (R)
3. I plan to withdraw money from my gambling account (R)
4. I will withdraw money from my gambling account

Appendix C

Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988)

Please indicate to what extent you feel the emotion described below at this moment: (*1: not at all to 5: extremely*)

	Not at all	A little	Moderately	Quite a bit	Extremely
Enthusiastic	☐	☐	☐	☐	☐
Nervous	☐	☐	☐	☐	☐
Upset	☐	☐	☐	☐	☐
Excited	☐	☐	☐	☐	☐
Irritable	☐	☐	☐	☐	☐
Proud	☐	☐	☐	☐	☐
Strong	☐	☐	☐	☐	☐
Afraid	☐	☐	☐	☐	☐
Ashamed	☐	☐	☐	☐	☐
Inspired	☐	☐	☐	☐	☐

Appendix D

Attractiveness (Holzwarth et al., 2006)

In my opinion, the virtual conversational agent is...(1: completely disagree to 7: completely agree).

1. *Unattractive (R)*
2. *Beautiful*
3. *Good looking*

Credibility (Holzwarth et al., 2006)

In my opinion, the virtual conversational agent is...(1: completely disagree to 7: completely agree).

1. *Sincere*
2. *Competent*
3. *Untrustworthy (R)*

Appendix E

Informed Consent

Beste deelnemer,

Welkom en fijn dat je wilt deelnemen aan dit onderzoek! Dit onderzoek wordt uitgevoerd als onderdeel van mijn Masterthesis aan Tilburg University (School of Humanities and Digital Sciences). Voordat je kan deelnemen, is het belangrijk om het doel en de procedure van dit onderzoek goed te begrijpen. Lees daarom aandachtig de onderstaande informatie door.

Met vriendelijke groet,

Ghislaine Latupeirissa

Doel van de studie

Onderzoeken van methoden om jongeren bewust te maken van verantwoord speelgedrag op online gokplatformen.

Procedure

Het onderzoek bestaat uit twee delen. Je begint met het spelen van een ‘slot play’ op een fictief gokplatform. Hierna word je gevraagd een korte enquête in te vullen over jouw speelervaring. Als afsluiting wordt er ook gevraagd naar jouw demografische gegevens (leeftijd, geslacht, opleidingsniveau en of je wel eens gokt). In totaal zal jouw deelname ongeveer 10 minuten duren.

Deelname

Deelname is volledig vrijwillig, dus je kan op elk moment besluiten om te stoppen door het tabblad in jouw browser te sluiten zonder dat dit nadelige gevolgen voor je heeft. Er zijn geen risico's verbonden aan dit onderzoek. Echter moet je **minimaal 18 jaar oud** zijn voor de deelname, omdat er gedurende het onderzoek gerefereerd wordt aan online gokken.

Daarnaast is de maximum **leeftijd 25 jaar**, omdat dit onderzoek zich richt op de gokervaring van **jongeren tussen 18 t/m 25 jaar**. Ten slotte moet je **minimaal één keer online gegokt** hebben om deel te kunnen nemen.

Persoonlijke gegevens en data opslag

Aan het begin van de deelname krijg je een ID-nummer dat je goed moet bewaren wanneer je jouw data wilt inzien of laten verwijderen. Zo zijn de antwoorden volledig anoniem en dus niet naar jou terug te herleiden. Verder wordt er vertrouwelijk met jouw gegevens omgegaan door de deze uitsluitend te gebruiken voor educatieve doeleinden. De data wordt de komende 10 jaar opgeslagen in een beveiligde server van Tilburg University waarna ze verwijderd worden.

Contact

Met vragen of wanneer je achteraf jouw deelname wilt intrekken, kan je contact opnemen met g.r.m.latupeirissa@tilburguniversity.edu.

Akkoord met deelname

Door deel te nemen aan het onderzoek ga je akkoord met het volgende:

- Ik heb de bovenstaande informatie gelezen en begrepen;
- Ik bevestig dat mijn deelname aan dit onderzoek vrijwillig is en dat ik op elk moment zonder opgave van reden en zonder negatieve gevolgen mag stoppen met het onderzoek;
- Ik geef toestemming voor de verwerking van anonieme gegevens zoals vermeld in de informatiebrief;
- Ik ben me ervan bewust dat ik kan vragen om mijn gegevens te laten verwijderen door contact op te nemen met de onderzoeker en mijn ID-nummer te vermelden, tot het moment van publicatie van de gegevens;
- Ik heb de gelegenheid gehad om aanvullende vragen te stellen via email;

- Ik geef toestemming om de gegevens voor een periode van ten minste tien jaar op te slaan;
- Ik ben tussen de 18 en 25 jaar oud;
- Ik heb minstens één keer online gegokt

Appendix F

Mediation effect on interaction effect

The results revealed a non-significant direct effect of the combined presence of a CA and smiling expression on the intention to stop, $b = 0.19$, $SE = 0.52$, $\beta = 0.03$, $z = 0.38$, $p = .706$, 95% BCa CI [-0.82;1.21]. The total effect of a smiling expression on the intention to stop was also non-significant, $b = 0.13$, $SE = 0.05$, $\beta = 0.02$, $z = 0.25$, $p = .800$, 95% BCa CI [-0.86, 1.11]. There was a significant effect of the ability to recall on intention to stop gambling, $b = 0.60$, $SE = 0.25$, $\beta = 0.21$, $z = 2.41$, $p = .016$, 95% BCa CI [0.11; 1.09]. In contrast, the combined presence of a CA and smiling expression has a non-significant effect on positive emotions, $b = 0.14$, $SE = 0.21$, $\beta = 0.06$, $z = 0.70$, $p = .482$, 95% BCa CI [-0.26;0.55] and recall $b = 0.07$, $SE = 0.18$, $\beta = 0.03$, $z = 0.38$, $p = .706$, 95% BCa CI [-0.29;0.42]. Furthermore, positive emotions also had a non-significant effect on recall ability, $b = 0.14$, $SE = 0.08$, $\beta = 0.17$, $z = 1.80$, $p = .072$, 95% BCa CI [-0.01;0.30]. Lastly, there was a non-significant indirect effect of smiling expression on the intention to stop gambling through positive emotions and recall ability $b = 0.01$, $SE = 0.02$, $\beta = 0.00$, $z = 0.63$, $p = .527$, 95% BCa CI [-0.03, 0.05]. Thus, there is no partial serial mediation between the combined presence of a CA and smiling expression, positive emotions and the ability to recall on the intention of more Dutch young adults to stop gambling. Not unexpected as there was no partial mediation of positive emotions independently by the presence of CA and the smiling expression.

Appendix G

Correlation between attractiveness and trustworthiness

After concluding stopping intention was moderately influenced by both attractiveness and trustworthiness, interest arose in whether these constructs were also positively correlated with each other. Therefore, a correlation analysis was conducted. The average score for attractiveness was 6 ($M = 5.51$, $SD = 1.04$) and CA's trustworthiness were assessed a 5 ($M = 4.82$, $SD = 1.31$). Because the data on trust was not normally distributed ($z\text{-score skewness} = -2.57$, $z\text{-score kurtosis} = -0.18$) and the sample size was small ($N = 73$), the Spearman's coefficient is used. There is a significant strong positive relationship between the attractiveness and trustworthiness of a CA. Spearman's rho (71) = 0.59, $p = <.001$. 59% of the variance in trustworthiness is accounted for by attractiveness. To conclude, there is a positive correlation which indicates when CA's are more perceived as attractive they are also assessed more trustworthy.

Given attractiveness and trustworthiness were strongly correlated, it was examined whether both constructs can be combined in one latent construct, a reliability analysis was performed. Respondents' score on 'likability of CA' was measured with the attractiveness and trustworthiness Scale, consisting of six items (e.g. Beautiful) in total. The mean of the scale attractiveness was 5.51 ($SD = 1.04$), trustworthiness 4.82 ($SD = 1.31$) and the reliability of the combined scale was good, $\alpha = .84$.