

Personality and Social Psychology

Does extraversion increase following a three-hour flirt training? Exploring two training routes

MATHIAS ALLEMAND,¹  BENJAMIN GMÜR² and CHRISTOPH FLÜCKIGER³

¹University Research Priority Program “Dynamics of Healthy Aging”, University of Zurich, Switzerland

²Berufsmaturitätsschule, Berufsbildungsschule Winterthur BBW, Switzerland

³Department of Psychology, University of Zurich, Switzerland

Allemand, M., Gmür, B. & Flückiger, C. (2022). Does extraversion increase following a three-hour flirt training? Exploring two training routes. *Scandinavian Journal of Psychology*, 63, 265–274.

Flirting situations are opportunities to behave in extraverted ways. However, it is not clear whether engaging in flirting behavior predicts extraversion. The current study explored whether extraversion increases following a 3-h flirt training and compared two training routes to flirting. A two-arm randomized pre-post design with two active conditions were used. Ninety-six adults between 18 and 49 years (67.7% women) were randomized to either: (1) a problem-oriented training strategy that aims to compensate for problems and deficits related to flirting; or (2) a strengths-oriented training strategy that capitalizes on individuals’ strengths and resources. The outcome variables were assessed before and 30 days after the training. Participants in both conditions reported higher scores in flirting behavior as well as in extraversion following the trainings. The results suggest that flirt trainings are potentially interesting indirect intervention approaches to increase the expression of extraversion.

Key words: Extraversion, flirting, flirt skill training, assertiveness training, problem-oriented strategy, strengths-oriented strategy.

Mathias Allemand, University of Zurich, University Research Priority Program “Dynamics of Healthy Aging”, Andreasstrasse 15, Box 2, CH-8050 Zurich, Switzerland. E-mail: mathias.allemand@uzh.ch

INTRODUCTION

Extraversion is a personality trait that predicts individual outcomes such as well-being, physical health, popularity, volunteerism, and career success (Magee, Heaven, & Miller, 2013; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Soto, 2019; Steel, Schmidt, & Shultz, 2008; Sutin, Costa Jr., Miech, & Eaton, 2009). Extraversion also predicts relationship outcomes such as romantic interest and attraction. For instance, research has shown that extraverted people report higher levels of romantic satisfaction (Soto, 2019). Given these desirable consequences, it is not surprising that many people want to become more extraverted (Hudson & Fraley, 2016; Stieger *et al.*, 2020). The current study explored whether participation in a flirt training with the goal to promote flirting skills is a potential route to increase extraversion.

The expression of extraversion in everyday life

Extraversion is one of the Big Five traits, but it also has been a part of many other personality theories (Wilt & Revelle, 2017). It refers to relatively stable individual differences in the tendency to experience and exhibit positive affect, to show assertive behavior and decisive thinking, and to experience desires for social attention (Wilt & Revelle, 2009). Theoretical and empirical work suggests several key features of extraversion including a tendency to evoke and enjoy social attention (Ashton, Lee, & Paunonen, 2002), a sensitivity to potential rewards and activation of the reward system in social situations (Denissen & Penke, 2008; Lucas, Diener, Grob, Suh, & Shao, 2000), and a tendency to experience frequent positive affect (Fleeson, Malanos,

& Achille, 2002; Smillie, DeYoung, & Hall, 2014). In addition, a biological perspective suggests that extraversion derives from a biological system promoting active approach and exploration of the environment (Depue & Collins, 1999).

Extraverted people typically tend to show extraverted behaviors more frequently and more intensely than less extraverted people. But even if people have high scores in extraversion, they cannot always act extraverted. Sometimes situations constrain the expression of extraversion (e.g., staying alone in the home office all day). To express extraversion and other traits, social opportunities and triggering situations, respectively, are needed (Wrzus & Roberts, 2017). For instance, meeting new people at networking events may trigger conversation (e.g., small talks) for the more extraverted people, because they tend to seek out social stimulation to engage with others. In contrast, less extraverted people prefer spending more time alone because they are overwhelmed by the pressure to interact socially.

Extraversion is a main predictor of sociable behavior in experimental (Eaton & Funder, 2003; Fleeson & Law, 2015; McCabe & Fleeson, 2016) and field settings (Fleeson & Gallagher, 2009; McCabe & Fleeson, 2012; Sherman, Rauthmann, Brown, Serfass, & Jones, 2015). For example, research using natural observation with the Electronically Activated Recorder methodology found that extraversion was primarily expressed in daily interactions and language use (Mehl, Gosling, & Pennebaker, 2006). Extraverted people were more talkative, more social, and spent less time alone than less extraverted people. Research has also shown that extraverted people act more sociable in general and they behave more sociable during social and recreational activities that typically requires low-effort in terms of physical or mental activities as compared to work or athletic activities (Breil *et al.*, 2019).

Section Editor: Dr Torsten Martiny-Huenger

Flirting situations as opportunities for the expression of extraversion

One particular triggering situation for the expression of extraversion is flirting with a potential partner because of romantic interest and attraction. Flirting is a universal and enjoyable form of interaction (Guerrero, Andersen, & Afifi, 2018) that includes verbal and nonverbal communication (e.g., giving compliments; La France, 2015) and different motivations to engage in flirting behavior (e.g., flirting to explore potential interest; Henningsen, Braz, & Davies, 2008). Flirting might be helpful to establish romantic relationships and new social roles, especially in the process of getting to know each other. Developmental theory posits that establishing romantic relationships is an important developmental task in early adulthood (Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). Assuming that flirting helps to get in contact with other people, it may also promote the satisfaction of the psychological need for relatedness (Ryan & Deci, 2017). Hence, flirting can be seen as a relevant form of social interaction.

The desires for social attention and the tendency to seek contact with other people likely may foster flirting behavior. Indeed, research has shown that extraverted people tend to engage in more flirting behavior (Back *et al.*, 2011), have more dating variety (Pauononen, 2003; Soto, 2019), and prefer a more physical flirting style (Hall, Carter, Cody, & Albright, 2010). Furthermore, extraverted people rate themselves as more attractive than less extraverted people, and are also rated from others as more attractive (Meier, Robinson, Carter, & Hinsz, 2010; Soto, 2019). Finally, expressing extraversion in flirting situations may activate the reward system (Denissen & Penke, 2008) and promote the experience of positive affect (Smillie, Kern, & Uljarevic, 2019), which then might encourage further expressions of extraversion.

Promoting the expression of extraversion

Flirting situations are particularly interesting everyday situations to study the role of extraversion. One research strategy would be to offer opportunities for the expression of extraversion as a potential route to increase flirting behaviors. For instance, a speed dating paradigm (Back *et al.*, 2011) may trigger extraverted behaviors. A second research strategy would be to experimentally manipulate extraversion and to examine its consequences. Several recent studies have begun to examine the effects of intentional extraverted behavior on well-being and other outcome variables (Jacques-Hamilton, Sun, & Smillie, 2019; Margolis & Lyubomirsky, 2020; McNiel, Lowman, & Fleeson, 2010; Zelenski, Santoro, & Whelan, 2012). Although experimental manipulations were effective in activating extraverted behaviors in the short-term, the contra-trait hypothesis (Gallagher, Hoyle, & Fleeson, 2011) also claims that it is more effortful to enact behaviors that deviate from the typical mean of a person. Indeed, there is some evidence for this claim showing that extraverted people who intentionally show less extraverted behaviors reported their behaviors as more effortful (Gallagher *et al.*, 2011). Another approach is to promote extraversion by creating specific “if-then” plans to increase the frequency of extraverted behaviors in everyday life contexts (Gollwitzer, 1999). Indeed, recent

longitudinal work provides evidence for an increase in extraversion as a result of completing “behavioral challenges” (Hudson, Briley, Chopik, & Derringer, 2019). This means that study participants freely accepted and engaged in weekly behavioral challenges that are typical of people with high scores in traits such as extraversion (e.g., introduce oneself to a new person). The results have shown that performing these trait-typical behaviors predicted trait change over time. Finally, a recent digital coaching intervention study provides initial evidence that personality traits can also be changed through a coaching with the help of a smartphone application (Stieger *et al.*, 2021). In particular, findings indicate that people who wanted to become more extraverted showed greater increases in extraversion.

Promoting flirting through broad training routes

The current study pursued an *indirect strategy* to target extraversion. Instead of experimentally inducing or manipulating extraverted behavior, the current study addresses flirting and examined whether participation in a 3-h flirt training program increased extraversion. There are several reasons to believe that flirt training and trained skills and competencies can promote extraversion by encouraging flirting behaviors. First, a flirt training in a group of people provides a good opportunity to meet new people and to satisfy the desires for social attention, in particular for extraverted people (Ashton *et al.*, 2002; Wilt & Revelle, 2017). Second, the social situation of flirting may activate the reward system and thus functions as an amplifier of extraverted behavior (Denissen & Penke, 2008; Lucas *et al.*, 2000). Hence, positive flirting experience and behaviors in everyday life may strengthen and reinforce the expression of extraversion. Indeed, reinforcement has been described as an important short-term process of personality change (Wrzus & Roberts, 2017). Third, social experiences in flirting can provide a good opportunity to experience and display positive affect, an important feature of extraversion (Fleeson *et al.*, 2002; Smillie, Wilt, Kabbani, Garratt, & Revelle, 2015). Indeed, previous work found positive associations between extraversion and positive affect (Lucas, Le, & Dyrenforth, 2008; Smillie *et al.*, 2014).

Flirting skills and competencies can be trained in different ways. Here we focus on two broad training routes. A *problem-oriented* training strategy primarily aims to increase flirting behavior by compensating for problems and deficits (e.g., lack of social skills, knowledge gaps) and challenging thoughts, feelings, and behaviors associated with flirting. This is the traditional perspective of training approaches to promote assertiveness and social competencies in which problems and deficits are seen as challenges to be solved and action is required to engage in effective training techniques. In contrast to this traditional problem-oriented perspective, a *strengths-oriented* training strategy additionally aims to increase flirting behavior by explicitly fostering (“capitalizing”) on individuals’ preexisting capabilities, interpersonal skills, and motivational preferences (e.g., working out preexisting skills and self-esteem in the already existing flirting behaviors). More generally, a strengths-oriented perspective systematizes on the sound and healthy parts of the client’s resources and strengths, in addition to the client’s

problems and deficits. The activation of strengths may help to initiate and maintain positive feedback circuits of extending (preexisting) flirting skills, reinforce the client's positive expectations for change, and increase the client's openness for the training process (Flückiger & Wüsten, 2021; Flückiger, Wüsten, Zinbarg, & Wampold, 2010; Scheel, Davis, & Henderson, 2013).

The current study

This study was conducted to examine whether extraversion increases following a 3-h flirt training in a group setting. Moreover, we contrasted a problem-oriented strategy with a strengths-oriented strategy to explore the relative efficacy of two training routes within the same training program (see also Allemann & Flückiger, 2020; Cheavens, Strunk, Lazarus, & Goldstein, 2012; Flückiger, Forrer, Schnider, Bättig, Bodenmann & Zinbarg, 2016; Flückiger, Vislă, Wolfer, Hilpert *et al.* 2021 for a comparable approach). We focused on two research questions. First, do flirting experience and behavior increase following a flirt training and do they vary depending on the training strategies? We expected an increase in flirting experience and behavior following the flirt training. Second, does extraversion increase following a flirt training and does it vary depending on the training strategies? Based on the assumption that social skills training and positive flirting experience and behavior can promote the expression of extraversion, we expected an increase in extraversion. The reported study and the hypotheses were not preregistered.

METHODS

Participants

The sample consisted of 99 participants.¹ Participants were recruited at the University of Zurich through multiple channels including study presentations in lectures, online advertisements, and university mailings. To be eligible, participants needed to be 18 years or older, to be fluent in German, and to have the personal desire to flirt or make contact with other people more frequently and in more relaxed ways. All participants completed a survey before the training. An online survey 1 month after the training to assess the outcome variables was completed by 97% of participants. Due to the importance of the longitudinal data for the current research questions, we excluded the three persons without data at the second measurement occasion from data analysis, resulting in a final sample of 96 participants (67.7% women). The majority (89.6%) of participants were between 18 and 29 years old and 10.4% were between 30 and 49 years old. All participants were unpaid volunteers.

Study design and procedure

The flirt training study was conducted according to the ethical principles promulgated by the Ethics Committee of the Faculty of Arts and Social Sciences of the University of Zurich. We used a two-arm randomized pre-post design with two active conditions, in which participants were randomized to either a problem-oriented training condition or a strengths-oriented training condition. In comparison to an inactive control condition, this design allows us to examine the relative efficacy of the conditions (e.g., Wampold & Imel, 2015). On a study website, participants registered online for the date of their choice for a single training session and were then randomized to one of the two conditions using a computerized allocation procedure. Participants were not aware of the existence of two conditions. Before the training started,

participants gave their informed consent and filled out the outcome measures (T0). Immediately after the training session they completed a short evaluation of the training. The training session lasted for 3 h. After the training, participants had 30 days to implement the acquired flirting skills and strategies in their everyday life contexts (i.e., the "in-vivo" training phase). Then, directly after this training phase participants received a link to an online survey with the outcome measures (T1). On average, participants responded to the questionnaire 36 days ($SD = 5.76$) after the training session.

A total of eight 3-h trainings (four per condition) in group settings with 9–14 participants were conducted in-person. All instructor-led trainings were led by the second author, who has a teaching qualification as a high school teacher of psychology and education, has undergone further training in learning coaching, and has extensive professional teaching experience.²

Structure, modules and methods of the "FlirtActiv" training

The FlirtActiv training was informed by a well-established German assertiveness training (GSK; Hinsch & Pflingsten, 2015) that includes a flexible conceptual framework with an explanatory model and gives explicit guidance to easily adapt the content to specific tasks, target groups, and settings (Hinsch & Pflingsten, 2015). The GSK focuses on three different types of social situations (i.e., asserting one's rights, building relationships, seeking sympathy). Based on a problem-oriented perspective, the GSK assertiveness training provides effective training strategies and techniques to help individuals to compensate for social problems and deficits (e.g., lack of social skills, knowledge gaps) with the goal to become more socially competent. We adapted the GSK to flirting situations and used four recommended practices associated with previously effective skill trainings for this adaptation process (SAFE: sequenced, active, focused, and explicit; Durlak, Weissberg, & Pachan, 2010). Care was taken to ensure that the FlirtActiv training: (1) follows a comprehensible sequence of topics and training module; (2) the participants are actively involved; (3) each training module has a clear focus; and (4) has explicit learning goals.

The main goals of the FlirtActiv training are to help participants to recognize potential flirting situations as well as to learn skills through role plays and other tasks in order to flirt more often in more relaxed ways and to get in contact with other people more easily. The flirt training consists of five modules (see Table 1 for an overview).

Module 1: introduction. The trainer introduces the goals of the training, the expectations and training methods, and the structure of the training, followed by a definition of flirting. Finally, the explanatory model (Hinsch & Pflingsten, 2015) is introduced to explain how situations are associated with thoughts, feelings, and behaviors. The basic idea of the model is that social situations such as flirting situations may trigger thoughts (e.g., positive or negative self-verbalization) that influence feelings (e.g., confidence or uncertainty) and behaviors (e.g., approach or avoidance). Every behavior then can lead to new thoughts.

Module 2: flirting situation. The second part refers to the flirting situation that may serve as a trigger for thoughts, feelings, and behaviors (Wrzus & Roberts, 2017). Participants learn to create favorable conditions for flirting and to identify and select potential social situations that can serve as triggers for flirting behaviors.

Module 3: flirting experience. Participants learn to recognize potential internal (e.g., maladaptive beliefs) or external flirting barriers (e.g., reactions from others) and how they influence their thoughts (e.g., self-verbalization) and feelings (Hinsch & Pflingsten, 2015). They also learn how to overcome flirting barriers. More generally, this training component aims to target and to increase one's awareness of beliefs, expectations, and motives to realize insight (Allemann & Flückiger, 2017).

Module 4: flirting behavior. The focus here is on how to flirt in competent ways. Participants are confronted with flirt facts – scientific facts for successful flirting. Furthermore, they learn flirting skills by means of role plays with video feedback on tablets and how to deal with success and failure in flirting. This component focuses on practicing new behaviors (Allemann & Flückiger, 2017).

Table 1. An overview of the modules, contents, and methods of the two training routes

Training modules	Problem-oriented condition (FlirtActiv)	Strengths-oriented condition (FlirtActiv+)	Training methods
1. Introduction	<ul style="list-style-type: none"> • Training goals, expectations, methods, and structure • “Training icebreaker” • Working definition of flirting • Explanatory model with a focus on the compensation of problems and deficits 	<ul style="list-style-type: none"> • Training goals, expectations, methods, and structure • “Training icebreaker” • Working definition of flirting • <i>Explanatory model with a focus on strengths and resources</i> 	<ul style="list-style-type: none"> • Information • Group work • Individual work
2. Flirting situation	<ul style="list-style-type: none"> • Create favorable flirting conditions to perform the learned skills • Identify and select potential social situations as triggers for flirting behaviors 	<ul style="list-style-type: none"> • <i>Create favorable flirting conditions to use the strengths and resources</i> • Identify and select potential social situations as triggers for flirting behaviors 	<ul style="list-style-type: none"> • Psychoeducation • Group work
3. Flirting experience	<ul style="list-style-type: none"> • Recognize potential flirting barriers and their effects on thoughts and feelings • Overcome flirting barriers 	<ul style="list-style-type: none"> • <i>Recognize strengths and resources and their effects on thoughts and feelings</i> • <i>Use strengths and resources for flirting experiences</i> 	<ul style="list-style-type: none"> • Psychoeducation • Individual work • Group work
4. Flirting behavior	<ul style="list-style-type: none"> • Flirt facts: Scientific facts for successful flirting • Flirting skills and role play with a focus on the compensation of problems and deficits • Self-reflection to learn from failures and successes in flirting 	<ul style="list-style-type: none"> • Flirt facts: Scientific facts for successful flirting • <i>Flirting skills and role play with a focus on the activation of strengths and resources</i> • Self-reflection to learn from failures and successes in flirting 	<ul style="list-style-type: none"> • Psychoeducation • Individual work • Role plays in small groups with video feedback
5. Knowledge transfer and farewell	<ul style="list-style-type: none"> • Transfer of knowledge and skills to everyday life with a focus on the compensation of problems and deficits • Plan small flirt exercises for everyday life (if-then plans) • Summary of the training session • Take home messages 	<ul style="list-style-type: none"> • <i>Transfer of knowledge and skills to everyday life with a focus on the activation of strengths and resources</i> • Plan small flirt exercises for everyday life (if-then plans) • Summary of the training session • Take home messages 	<ul style="list-style-type: none"> • Psychoeducation • Individual work • Group work

Notes: The strengths-oriented training condition (FlirtActiv+) represents an enrichment of the problem-oriented condition (FlirtActiv). The differences are shown in Italics.

Module 5: knowledge transfer and farewell. Finally, to promote the transfer of what has been learned into everyday life contexts, the last part of the training session refers to the planning of behavioral exercises for the “in-vivo” training phase. For example, generating implementation intentions in the form of specific “if-then plans” can lead to better goal attainment and help individuals in habit formation (Gollwitzer, 1999). The session closes with a summary of the entire training session and take home messages.

Training methods. The FlirtActiv training comprises a diverse set of training methods including psychoeducation, individual work (e.g., self-reflection tasks, small behavioral exercises for everyday life), and group work (e.g., skill training, role plays in small groups with video feedback, discussions). The training was explicitly contextualized as a flirt skill training and not as a training to increase extraversion. Although the study information for participants disclosed the aim of the study (i.e., to examine flirting and extraversion), all training sessions were conducted without using terms such as “extraversion” or “personality change.” In this way, we made an attempt to counteract threats to internal and external validity through demand characteristics.

Enrichment of the flirt training with Strengths-Oriented components (“FlirtActiv+”)

The FlirtActiv training described above pursues a problem-oriented training strategy. To contrast this perspective with a strengths-oriented training strategy *within* the same flirt training (FlirtActiv+), we specifically enriched the flirt training with strengths-oriented components. The strengths-oriented condition has an equivalent structure, but differs in three specific ways. First, one training module (no. 3) differs in content between the two conditions: while the focus in the problem-oriented condition is on compensation of problems and deficits by recognizing and overcoming flirting barriers (see above), participants in the strengths-oriented condition are trained to identify and use strengths and resources in concrete flirting situations (e.g., using social support by close friends to initiate social contacts). Second, the goal of the strengths-oriented condition is to actuate and intensify available resources such as individuals’ capabilities, interpersonal skills, and motivational preferences, and to actively introduce unused resources (Flückiger *et al.*, 2010; Flückiger & Wüsten, 2021). The development of new resources was not a priority in this condition. During the training session, the trainer aims to explicitly facilitate positive

experiences and emotions related to flirting and helps to identify resource potentials and to make them more accessible for the implementation of behavioral exercises in everyday life contexts. Third, the strengths-oriented training condition includes specific individual and group activities with the goal to initiate and maintain positive feedback circuits (Flückiger *et al.*, 2010; Flückiger & Wüsten, 2021). For example, participants not only considered how they could create favorable conditions for flirting, but also specifically looked for contexts in which they could express their strengths and resources related to flirting. Table 1 includes an overview of the two conditions. Two manuals were developed for both conditions by the second author.

Outcome measures

Extraversion. The extraversion scale from the BFI (John, Naumann, & Soto, 2008) was used to measure extraversion before the training (T0) and after the “in-vivo” trainings phase (T1). The eight items were rated on a scale ranging from *strongly disagree* (1) to *strongly agree* (5). The instruction was slightly adapted with respect to the time frame: “For each statement, indicate the answer that best applies to you during the last 30 days.”³

The alpha reliabilities for the two assessments were 0.87 and 0.86.

Importance of flirting and desire to flirt. At T0 and T1, participants responded to two single items (“How important is flirting to you?”; 1 = not important at all, 7 = very important; “How strong is your desire to flirt more often?”; 1 = not strong at all, 7 = very strong).

Flirting experience. At T0 and T1, participants were asked about their satisfaction (“How satisfied are you with your flirting behavior?”; 1 = not satisfied at all, 7 = very satisfied), difficulty (“How difficult do you find it to flirt?”; 1 = very difficult, 7 = not difficult at all) and experience with flirting (“How did you experience flirting in the last 4 weeks overall?”; 1 = very negative, 7 = very positive). We averaged the items to build a composite score of flirting experience. The alpha reliabilities were 0.77 and 0.76.

Flirting behavior. At T0 and T1, participants were asked about opportunities (“How often have you had the opportunity to flirt in the past 30 days?”; 1 = daily, 2 = several times per week, 3 = 1 time per week, 4 = several times per month, 5 = less) and frequency of flirting (“How often have you flirted in the past 30 days?”; 1 = daily, 2 = several times per week, 3 = 1 time per week, 4 = several times per month, 5 = less). The items were recoded so that a high score indicated more flirting behavior. The two items were averaged and show good alpha reliabilities of 0.88 and 0.87. At T1 only, we included one item (“Compared to the time before the FlirtActiv training I flirted. . .”; 1 = much less, 7 = much more) to measure perceived change in flirting.

Frequency of in-vivo flirting exercises. At T1 only, participants responded to an item about the performed exercises (“How often have you done your everyday flirting exercises [‘Flirt challenge’] in the past 30 days?”; 1 = daily, 2 = several times per week, 3 = 1 time per week, 4 = several times per month, 5 = less). The item was recoded so that a high score indicated more flirting exercises.

Evaluation of the training

Directly after the training, the trainer assessed the extent to which he followed the training manual (1 = not at all, 5 = complete). The trainer also evaluated the engagement of the group (1 = very passive, 5 = very active) and the group climate (1 = very destructive, 5 = very constructive). Participants indicated how satisfied they were with the training and with the trainer (1 = very unsatisfied, 5 = very satisfied), how understandable the explanations by the trainer were (1 = difficult to understand, 5 = easy to understand). Moreover, participants rated two items (“I felt comfortable in the training” and “I have the impression that the training helps me a lot”) on a scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Analytic strategy

We used multilevel modeling (Bolger & Laurenceau, 2013) to deal with the data structure that included two assessments of the outcome variables

(Level 1: time) nested within participants (Level 2: person), and participants were nested within training groups (Level 3: group setting). Although the focus was on Levels 1 and 2, we included Level 3 to account for potential variations between the groups, which is a common analytical procedure in group intervention work. For each outcome variable, we tested a series of three-level random intercept and fixed slope models in which the intercepts are allowed to vary across individuals. Time was scaled such that 0 was the value for T0 and 1 was the value for T1. We included condition (0 = problem-oriented condition, 1 = strengths-oriented condition) and the condition by slope interaction as Level 2 predictors to investigate whether change from T0 to T1 differed between the two training conditions. Note that the three-level models for importance of flirting and flirting behavior did not converge due to redundancy in the data structure and thus did not provide estimates of the between-group setting variance. We thus estimated two-level models for these two variables. All models were estimated with the maximum likelihood (ML) estimation method. Data and materials are available on OSF at https://osf.io/8abk2/?view_only=e240d9ac52b745609b45f867bad835d1.

RESULTS

The descriptive statistics of the evaluation of the training are shown in Table S1. The trainer reported a relatively high compliance with the training manuals and perceived the groups as very active and constructive with no differences between the two training conditions, $F_s < 1$, $ps > 0.35$. Furthermore, participants were very satisfied with the quality of the training. The two conditions did not differ with respect to the evaluation by participants, $F_s < 1$, $ps > 0.58$. Finally, 91.7% of the participants indicated that they would recommend the flirt training to others, supporting the subjective success of the training.

The descriptive statistics of the outcome variables are shown in Table 2. The correlations between the study variables are shown in Table 3. As expected, higher levels in extraversion were associated with higher scores in flirting experience and behavior. Satisfying experiences with flirting were associated with a lower desire to flirt. The rank-order stability coefficients across 1 month for the outcome variables ranged from 0.56 (flirting experience) to 0.64 (desire to flirt/extraversion), all $ps < 0.001$. Frequency of “in-vivo” flirting exercises was associated with more positive flirting experience, more flirting behavior, and higher levels of extraversion at T1.

Do flirting experience and behavior increase following a flirt training?

Table 4 presents the estimates and 95% confidence intervals for the fixed effects of the conditional random intercept and fixed slope models. Consistent with a successful random assignment, the condition effect was not statistically significant with respect to the outcome variables, suggesting equal initial levels across conditions. Table S2 includes the effect sizes across the conditions at T0 for the outcome variables.

Results from Table 4 indicate that, on average, participants reported significantly higher flirting experience and behavior scores 1 month after training, regardless of the training condition. Furthermore, the condition by slope interactions in Table 4 indicated that there were no significant differences in change levels with respect to the outcome variables between the two training conditions. For example, participants in the problem-

Table 2. Descriptive statistics of the study variables

Variable	Range	Problem-oriented condition (<i>n</i> = 48)				Strengths-oriented condition (<i>n</i> = 48)			
		<i>M</i> _{T0}	<i>SD</i> _{T0}	<i>M</i> _{T1}	<i>SD</i> _{T1}	<i>M</i> _{T0}	<i>SD</i> _{T0}	<i>M</i> _{T1}	<i>SD</i> _{T1}
Importance of flirting	1–7	4.75	1.50	4.90	1.24	5.10	1.17	5.23	1.17
Desire to flirt	1–7	4.48	1.61	4.31	1.50	4.37	1.51	3.83	1.62
Flirting experience	1–7	3.91	1.14	4.68	0.87	4.11	1.26	4.84	1.61
Flirting behavior	1–5	2.46	1.12	3.31	0.88	2.70	1.25	3.19	1.08
Extraversion	1–5	3.38	0.62	3.54	0.55	3.42	0.71	3.61	0.68
Perceived change in flirting	1–7	–	–	4.75	0.84	–	–	4.44	0.68
Frequency of exercises	1–5	–	–	2.25	1.33	–	–	2.27	1.22

Table 3. Zero-order correlation among the study variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Importance of flirting (T0)	–										
2. Desire to flirt (T0)	0.49***	–									
3. Flirting experience (T0)	0.15	–0.22*	–								
4. Flirting behavior (T0)	0.27**	–0.14	0.59***	–							
5. Extraversion (T0)	0.05	–0.17	0.63***	0.39***	–						
6. Importance of flirting (T1)	0.60***	0.43***	0.17	0.23*	0.10	–					
7. Desire to flirt (T1)	0.39***	0.64***	–0.30**	–0.25*	–0.29**	0.37***	–				
8. Flirting experience (T1)	0.05	–0.19	0.56***	0.34**	0.43***	0.24*	–0.27**	–			
9. Flirting behavior (T1)	0.13	0.01	0.34**	0.57***	0.32**	0.29**	–0.10	0.50***	–		
10. Extraversion (T1)	–0.12	–0.18	0.37**	0.20*	0.64***	0.19	–0.25*	0.61***	0.43***	–	
11. Perceived change in flirting (T1)	–0.12	0.20*	–0.28**	–0.25*	–0.16	0.14	0.30**	0.16	0.19	0.22*	–
12. Frequency of exercises (T1)	–0.12	–0.03	–0.09	–0.15	–0.07	0.06	0.03	0.28**	0.23*	0.32**	0.48***

Notes: *N* = 96.

p* < 0.05, *p* < 0.01, ****p* < 0.001.

Table 4. Fixed effects parameter estimates for the multilevel models for the outcome variables

Fixed effects	Importance of flirting ^a	Desire to flirt	Flirting experience	Flirting behavior ^a	Extraversion
Intercept					
Estimate (SE)	4.60 (0.30)***	4.65 (0.35)***	3.15 (0.28)***	1.60 (0.26)***	3.23 (0.15)***
95% CI	4.02; 5.19	3.94; 5.35	2.58; 3.72	1.10; 2.11	2.91; 3.54
Slope					
Estimate (SE)	0.15 (0.17)	–0.17 (0.19)	0.77 (0.15)***	0.85 (0.14)***	0.16 (0.08)*
95% CI	–0.18; 0.48	–0.54; 0.21	0.47; 1.07	0.57; 1.14	0.0004; 0.31
Condition					
Estimate (SE)	0.38 (0.42)	0.27 (0.49)	0.23 (0.40)	0.60 (0.36)	0.004 (0.22)
95% CI	–0.46; 1.21	–0.72; 1.26	–0.57; 1.04	–0.11; 1.32	–0.44; 0.45
Condition by slope					
Estimate (SE)	–0.02 (0.23)	–0.38 (0.27)	–0.04 (0.21)	–0.36 (0.20)	0.03 (0.11)
95% CI	–0.49; 0.45	–0.90; 1.52	–0.47; 0.38	–0.77; 0.04	–0.19; 0.25

Notes: *N* = 96; SE = standard error; condition: 0 = problem-oriented condition (*n* = 48), 1 = strengths-oriented condition (*n* = 48).

^aBecause parameters related to the group level were not able to be estimated in the three-level model due to redundancy in the data, we estimated a two-level model with two measurements being nested within persons.

p* < 0.05, **p* < 0.001.

oriented training condition on average showed an increase of 0.77 over time, whereas participants in the strengths-oriented training condition show an increase of 0.73 (0.77 + [–0.04]). The small slope difference was not significant. Table S2 includes the effect sizes over time for the outcome variables. The increases in flirting experience and behavior from T0 to T1 represent medium-sized effects.

Additionally, we tested whether the two conditions differ with respect to perceived change in flirting behavior and frequency of “in-vivo” flirting exercises at T1. We found a significant mean difference in perceived change in flirting, *F* (1, 94) = 4.02, *p* = 0.048. Participants in the problem-oriented training condition felt that they flirted more often in comparison to the time before the flirt training than those participants in the strengths-orientation

condition, Cohen's $d = 0.41$. The two conditions did not differ with respect to frequency of "in-vivo" flirting exercises, $F(1, 94) = 0.01, p = 0.94$. Table S2 includes the effect sizes across the conditions at T1 for all outcome variables. In sum, the results suggest that flirting experience and behavior increased in both conditions.

Does extraversion increase following a flirt training?

On average, participants reported significantly higher extraversion scores 1 month after training (Table 4, Table S2).⁴

Moreover, we found that extraversion did not differ at T0 and T1 between the two training conditions and the time by condition interaction was not significant as well. Additional correlational analyses with difference scores (T1–T0) as change indexes have shown that change in extraversion was positively associated with change in flirting experience ($r = 0.56, p < 0.001$) and change in flirting behavior ($r = 0.38, p < 0.001$). Changes in the two flirting variables were also significantly interrelated ($r = 0.48, p < 0.001$). These results suggest that increases in flirting experience and behavior following a flirt training are associated with an increase in extraversion. Controlling for condition in a partial correlation did not change the results.

DISCUSSION

Flirting situations provide interesting opportunities to express extraversion. But is it also possible to increase the expression of extraversion by learning and practicing flirting skills in everyday life? The main idea of the indirect approach to personality change is not to target extraversion directly, but to address flirting, which is related to extraversion. In the current study, we explored this idea and contributed to scientific progress on efforts to modify or accentuate personality traits in the short-term in four ways. First, the results of the evaluation of the training have shown that participants have liked the flirt training and they felt comfortable during the training. In addition, the trainer rated the groups as highly committed during the training sessions and with a positive group climate.

Second, we found that 1 month after training, participants reported flirting significantly more often and in more relaxed ways than before the training. The increases in flirting experience and behavior from T0 to T1 reflect medium-sized effects. When we planned the study, we were not aware of any evidence-based flirt trainings. Therefore, we decided to adapt a well-established assertiveness training to the context of flirting and implemented two routes of the same training. This decision was also motivated by research supporting the efficacy of assertiveness trainings to target social problem and deficits and promote social competencies in clinical and non-clinical samples (Hinsch & Pfungsten, 2015; Probst, Geib, Güroff, & Mühlberger, 2017; Speed, Goldstein, & Goldfried, 2018). The current results provide initial evidence that the adaptation of an established assertiveness training was successful. Future research is needed to further evaluate the flirt training. It is worth noting that the importance of flirting did not change following the training. The desire to flirt tended to show a small decrease from T0 to T1. However, this mean difference did not become statistically significant.

Third, we found that 1 month after training, participants reported significantly higher scores in extraversion than before the training with a moderate effect.⁵

This finding is intriguing, as it suggests a potential "side effect" of a flirt training on extraversion, and complements cross-sectional research on the positive associations between extraversion and indicators of flirting behavior (Paunonen, 2003; Soto, 2019). This finding also contributes to the literature on experimental manipulations of extraversion (Jacques-Hamilton *et al.*, 2019; Margolis & Lyubomirsky, 2020). Several mechanisms might be responsible for this transfer or potential "side effect" of the training. The flirt training and, in particular, the "in-vivo" training phase may have created more opportunities to express extraversion more frequently and intensively than before. It is also possible that the training has initiated multiple short-term sequences in which triggering (flirting) situations have led to more expressions of extraversion (Wrzus & Roberts, 2017). From a functional perspective, the flirt training may have helped to create favorable flirting conditions to satisfy the desire for social attention (Wilt & Revelle, 2017), activate the reward system (Lucas *et al.*, 2000), promote the experience of positive affect (Smillie *et al.*, 2015), and enhance the expression of extraversion. These potential mechanisms should be tested in future research using intensive longitudinal methods such as diary and experience sampling in everyday life contexts (Bolger & Laurenceau, 2013). While there is still little research on intended personality trait change through psychological interventions (e.g., Hudson *et al.*, 2019; Stieger *et al.*, 2021), there is an established field of research on behavior change (Hagger, Cameron, Hamilton, Hankonen, & Lintunen, 2020). Intervention efforts to change personality traits typically target specific and narrowly defined behaviors that reflect behavioral expressions of personality traits (Allemand & Flückiger, 2017). Therefore, these personality change efforts could benefit greatly from behavioral science, such as the development of interventions based on established behavior change frameworks (Michie, van Stralen, & West, 2011) and the use of evidence-based behavior change strategies, such as implementation intentions (Gollwitzer, 1999). In turn, behavior change research could benefit greatly from personality change intervention efforts, for example, by integrating more broadly defined constructs such as traits that cover a broader range of related behaviors rather than addressing only specific behaviors. The current study served as an initial step to accentuate extraverted behaviors and experiences by means of a flirt training. Future research is needed to replicate the effects of the flirt training and to investigate potential mechanisms for changes in extraversion through flirt trainings.

Fourth, we contrasted two training conditions to explore the relative efficacy of a strengths-oriented training strategy in comparison to a "classical" problem-oriented training strategy. The results provide initial evidence that both training routes showed similar outcomes with respect to flirting and extraversion. If this result were to be replicated in future studies, it would mean that both training routes might be taken into consideration when helping people to flirt in a more competent way. However, it is an open question whether the activated strengths and resources in the strengths-orientation condition became effective or needed more time, as the activation of resources usually takes time (Flückiger

et al., 2010, 2021). Strengths-oriented intervention approaches in coaching, counseling, and psychotherapy typically includes multiple steps over several sessions. Due to the brevity of the flirt training, it was not possible to include more complex methods to activate strengths and resources.

Limitations and future directions

The current research is limited in ways that should promote future research. This study randomly contrasted two structurally equivalent flirt interventions. Based on the current design, we cannot rule out the possibility that extraversion and flirting behavior increased in both conditions due to factors such as repeated measurement, seasonal effects, or other unknown effects. Future research using randomized controlled trials (RCTs) or other designs with inactive and active control groups are needed to better understand the specificity of treatment effects (e.g., Wampold & Imel, 2015). It is also important to note that participating in a 3-h session in a group setting is in itself an opportunity to practice extraverted behaviors and thus might increase extraversion. A second potential critique that also reflects a strength is the short duration of the flirt training. On one hand, it would be helpful for future research to divide the training package into two or more sessions and an optional “booster session” to further work on the flirting skills and strategies with the possibility of deepening relevant skills. Typical GSK trainings are conducted over several weeks with several “in-vivo” training phases in between. On the other hand, a short training is preferable, particularly for eventual intervention approaches. Understanding the ideal length of flirt trainings is an important goal for future research. Third, all training in both conditions was led by a psychologist involved in the development of the program, which may have influenced the results and limited their generalizability. The extent to which a therapist, trainer, or researcher believes that the (own) intervention is effective may represent a form of optimism bias (allegiance effect; Wampold, Imel, & Miller, 2009). Future research should include multiple trainers who are also not involved in the development of the flirt training to test whether the present results are generalizable to other trainers. Fourth, although the training was designed to promote “in-person” flirting skills, it was possible for participants to continue practicing flirting via a dating app or online. Future research should explicitly measure how individuals trained their flirting behavior during the “in-vivo” training phase. A future direction is to compare the effects of an online or app-based version of the flirt training in everyday life with the current in-person group training. Fifth, the study included only two assessments of the outcome variables and a short 30-day period between assessments. Thus, the question remains whether the observed short-term changes in extraversion and flirting reflect only a temporary accentuation that reverses over time or whether they persist, and what specific training strategies are most effective for achieving longer-term changes using the current indirect approach. Future research may wish to have more measurement occasions in order to better understand the change trajectories of flirting and extraversion. Future research is also needed to figure out the most appropriate longitudinal design of such a training to capture long-term changes. Longer “in-vivo”

phases would allow more time to practice the learned skills and strategies in everyday social contexts. Sixth, the findings of the study were based on self-reports only, leaving open the possibility that participants responded on the basis of what would be socially desirable. Future research may enrich self-report data with observer reports by close informants (e.g., friends) and behavioral measures. Finally, because the study included a student sample and thus younger adults, the findings cannot be generalized to non-students and older populations. Likewise, female participants were overrepresented. Gender needs more attention in future studies, as flirting may differ in many ways across gender, such as gender role beliefs and motivations for flirting (Clark, Oswald, & Pedersen, 2021; Henningsen et al., 2008). Future research should collect data in more diverse samples.

CONCLUSION

To conclude, this study provides initial evidence for the idea that extraversion can be accentuated through a flirt training – at least in the short-term. Participants reported flirting more often and in more relaxed ways 1 month after training and they reported higher scores in extraversion than before the training. This might reflect a “side effect” of the training. These findings provide a novel contribution to the field of personality psychology and beyond. Future work is needed to examine whether the short-term accentuation of extraversion transfer into permanent long-term changes.

The FlirtActiv training described in this research was developed by the second author in collaboration with the first author. During the development of the training and data collection phase, the second author was affiliated at the University of Zurich. We thank Patrick L. Hill and Gabrielle N. Pfund for feedback on earlier versions of the manuscript.

ACKNOWLEDGEMENT

Open Access Funding provided by Universitat Zurich. [Correction added on 21st May 2022, after first online publication: CSAL funding statement has been added.]

ENDNOTES

¹ We did not perform an a priori power analysis. In determining the sample size, we were guided by previous evaluation studies of the assertiveness training (see Hinsch & Pfungsten, 2015 for an overview) that we have adapted for this study and intervention studies with two active conditions (e.g., Allemand & Flückiger, 2020). We intended to recruit at least 100 participants. Recruitment continued until the available time slots for the flirt trainings were filled during the semester break in January and February 2019. We report all existing conditions, relevant measures and data exclusions for the current study.

² In order to carefully pilot the flirt training and “to train the trainer,” two pilot trainings ($n = 21$) followed by 60-min feedback sessions with the participants were conducted. Participants in the two pilot trainings were acquaintances, counseling psychologists, experts from dating agencies, and researchers.

³ We also included the 6-item extraversion scale from the Big Five Inventory-2 Short (BFI-2-S; Soto & John, 2017) to measure *trait extraversion* at T0 ($M = 3.26$, $SD = 0.66$, $\alpha = 0.76$) and at T1 ($M = 3.35$, $SD = 0.63$, $\alpha = 0.73$). The two assessments differed, $t(95) = 2.46$,

$p = 0.02$, $d = 0.14$. Due to the fact that several flirting variables (e.g., flirting behavior) were assessed with respect to the last 30 days, we focused on extraversion in the last 30 days.

⁴ Following Soto and John (2009), we formed two extraversion facets from the BFI extraversion scale: Assertiveness (T0: $M = 3.40$, $SD = 0.70$, $\alpha = 0.85$; T1: $M = 3.60$, $SD = 0.67$, $\alpha = 0.84$) and activity (T0: $M = 3.40$, $SD = 0.74$, $\alpha = 0.71$; T1: $M = 3.49$, $SD = 0.68$, $\alpha = 0.62$). We rerun random intercepts and fixed slope models for assertiveness (three-level model) and activity (two-level model; see Analytic Strategy section) to further explore the increase in extraversion. The results indicated a significant increase in assertiveness of 0.17 ($SE = 0.09$, 95% CI = 0.002; 0.35, $p < 0.05$) over time, whereas the increase of 0.10 ($SE = 0.09$, 95% CI = -0.07; 0.28, $p = 0.24$) in activity was not statistically significant. The condition and the condition by slope effects were not significant for both facets.

⁵ The additional facet-level analyses reported in Footnote 3 have shown that the increase in extraversion was primarily driven by the assertiveness facet of extraversion (Soto & John, 2009).

DATA AVAILABILITY STATEMENT

Data and materials are available on OSF: https://osf.io/8abk2/?view_only=e240d9ac52b745609b45f867bad835d1.

FUNDING STATEMENT

Open access funding provided by Universitat Zurich. WOA Institution: Universitat Zurich.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Table S1 Evaluation of the training directly after the training session

Table S2 Effect sizes across training conditions and time

Received 16 March 2021, Revised 7 December 2021, accepted 17 December 2021