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# Default rules in investment decision-making: trait anxiety and decision-making styles

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## Abstract

This study investigates the role of default options in the relationship between trait anxiety, and decision-making styles and financial decisions. One hundred and ninety-four participants were divided into three groups and subjected to three different conditions. Under each experimental condition, they had to decide whether to accept or reject investment proposals. In the first group, they had been enrolled in investment plans by default (opt-out condition), in the second group, they had not been automatically enrolled in these plans (opt-in condition), and in the third group they had to choose whether to enroll or not (control condition). The results showed that the investment decisions of anxious, avoidant, rational and dependent individuals could be facilitated by default options. In conclusion, using default options as a “nudge” can support specific groups of people to improve their financial decisions.

**Keywords:** Nudge, Default options, Anxiety, Decision-making styles, Investments

## Introduction

The concept of nudge, defined as “liberty-preserving approaches that steer people in particular directions, but that also allow them to their own way” (Sunstein 2014), has been applied to different areas of people’s lives, including consumer, health, energy, and civic behavior (e.g., Halpern 2018; Momsen and Stoerk 2014), but principally economics (Thaler and Sunstein 2008). It has become very popular in the last few decades in both private and public institutions and in several countries, such as the US, Australia, Canada, the UK, and others in Europe. Different types of nudges with beneficial effects have been identified (e.g., default rules, simplification, uses of social norms, increases in ease and convenience; see Sunstein 2014 for a list of the most important nudges), and the number is constantly growing (for a review, see Szaszi et al. 2018). Among them, *default rules* are the most effective and well-known type of nudges; it has been shown, for example, that automatically depositing a share of one’s salary into a savings account (which you can close without any cost) increases employees’ adherence to savings plans (Benartzi and Thaler 2004). *Simplification* is another form of nudge that involves promoting existing programs, involving education, health, finance, and so on, by reducing their complexity. Informing people that the majority of their peers are engaged in a certain type of behavior is also a type of nudge. Indeed, emphasizing what most people do

usually creates a *social norm* that individuals tend to follow. Making healthy food more visible to consumers is an example of a nudge based on the *increased ease and convenience* of product availability. For example, clearly displaying fruit and vegetables in a campus coffee shop increases their consumption by students, and consequently reducing their intake of unhealthy foods (Wansink et al. 2013).

Many large US firms have adopted different types of nudges to increase employee participation in savings programs. An example of this was the White House Social and Behavioral Sciences Team, which was active from 2015 to 2017 and was composed of a group of behavioral science experts. The goal of this team was to improve federal policies and programs, with nudge methods to support people in several fields, such as encouraging them to invest their savings in retirement plans. In the UK, the Behavioral Insights Team has applied nudging in public policy since 2010 and the European Commission has realized several studies since 2008 to examine the facilitating effect of nudges in several fields of application, such as Internet behavior, energy saving, investment decisions, and so on (e.g., Brenninkmeijer and Blonk 2012; Foukaras and Toma 2014).

*Default options* are one of the most effective types of nudges, and they refer to the events or conditions set in place when no alternatives are actively chosen. The impact of default rules has been shown by automatic enrollment plans wherein governments, companies and public agencies randomly assign people to an institutional program, then give them the chance to change from this default condition to one of various alternatives, including health care plans (Samuelson and Zeckhauser 1988), influenza vaccination (Chapman et al. 2010), and savings plans (Benartzi and Thaler 2013). A classic example is the introduction of presumed or deemed consent for organ donation (i.e., opt-out strategy, whereby organ donation occurs automatically unless a specific request is made before death for organs not to be taken) to increase the number of organs available for transplant (Arshad et al. 2019). The literature shows that the majority of people do not change their assigned default program in an opt-out frame, and the percentages of organ donors in countries with an opt-out system are much higher than in countries with an opt-in system, wherein people have to actively sign up to a register to donate their organs after death (Johnson and Goldstein 2003).

Simple forms of default rules have shown strong and stable effects across different cultures and age groups (e.g., Madrian and Shea 2001), as well as in the financial field, in particular savings behaviors (e.g., Choi et al. 2004). For example, Ashraf et al. (2006) show that the default option of a commitment savings account has an impact on both household decision-making power (i.e., the household is more likely to buy durables) and the self-perception of savings behavior (i.e., people with time-inconsistent preferences report being more disciplined savers). Moreover, Madrian and Shea (2001) show that default options can increase participation in retirement plans, from 49 to 86%, among new employees.

The main research area where this effect has been studied is behavioral economics with the underlying theory of *libertarian paternalism*, the idea that it is both possible and legitimate for private and public institutions to affect behavior while also respecting freedom of choice (Thaler and Sunstein 2003; Camerer et al. 2003). According to behavioral economics, human behavior depends on both the environmental situation in which a decision is taken and the individual preferences of the person who makes the

decision (e.g., Mani et al. 2013). Behavioral economics has accumulated a notable body of laboratory and field research (see DellaVigna 2009 for a review), showing that people have a priori ideas about uncertain events and specific preferences that can lead them to troublesome behaviors, such as saving inadequately for retirement or accumulating high credit card debt. These preferences are influenced not only by social norms, the opinions and behaviors of other people (Slovic 1995), and financial literacy (i.e., the knowledge of financial products, e.g., a bond or a stock; the knowledge of financial concepts; and mathematical skills or the numeracy necessary for effective financial decision-making and engagement in certain activities, e.g., financial planning, see Hastings et al. 2013), but also by personality traits (e.g., Gambetti and Giusberti 2019) and emotions (Loewenstein and Lerner 2003). For example, people may have self-control problems; they make long-term savings plans but then they do not always follow through because of the temptation to consume, that is, the intertemporal inconsistency of preferences (Loewenstein and Prelec 1992). Therefore, extensive experimental evidence seems to indicate that people in different areas of their lives are unconscious victims of social influence and cognitive biases because they make decisions by relying excessively on their feelings and emotions (e.g., Rick and Loewenstein 2008). In this regard, individuals are far from rational and often act against their own interests, yet they are quite predictable in their “irrationality” because they show recurring behavioral patterns (e.g., Smelter and Baltes 2001; Ariely et al. 2009). Starting from the assumptions of behavioral economics, *libertarian paternalism* aims to change the “architecture of choices,” that is, the frame of decision-making to improve individual behaviors while limiting their emotive and cognitive distortions. Notably, Thaler and Sunstein (2008) state that institutions and companies should identify the best possible option and assign people to this condition by default (providing a nudge), leaving them with the possibility to choose from other options, which institutions judge less favorably, however, to improve their living and economic conditions.

The nudge literature recognizes that behavioral change interacts and is modulated by personality (e.g., Ashraf et al. 2006), but there is still little evidence about how specific personality traits and decision-making styles affect individual decision-making under different conditions and rules. This study explores whether a certain type of nudge—default rules (i.e., automatic enrollment in specific plans)—can improve decision-making regarding financial investments. Specifically, default options can help people who are more prone to making unfavorable decisions in the economic field (such as avoiding investments) because of their specific characteristics, such as avoidant and dependent decision-making styles and trait anxiety (e.g., Shih and Ke 2014; Gambetti and Giusberti 2012, 2019). The novelty of this research is its focus on trait anxiety and decision-making styles, which have not been considered in the previous financial literature about nudge. If default rules are found to have an impact on financial decision-making in these individuals, then this further elucidates the potential effect of nudges, thereby allowing financial institutions to guide their clients in a more targeted way depending on their individual differences. For example, the present research could improve financial proposals and questionnaires. A case in point is the Market in Financial Instruments Directive (MiFID), which is a questionnaire introduced by the European Regulator to identify the profile, preferences, and needs of potential investors. The purpose of this

questionnaire is to investigate the suitability and appropriateness of each financial product or service proposed to clients. The suitability is a wider concept that may be defined as “the degree to which the product or service offered by the intermediary matches the client’s financial situation, investment objectives, level of risk tolerance, financial need, knowledge and experience” (Bank for International Settlement 2008). Although the MiFID questionnaires provided by major Italian financial groups appear to be largely different, they are usually made up of three sections vis-a-vis financial objectives, financial capacity, and financial experience and knowledge (Marinelli and Mazzolli 2010). The results of the present research can be used to improve this kind of questionnaire by adding a specific section about investor characteristics regarding personality traits and decision-making styles.

### Literature review and hypotheses

In the economic field, people tend to make unfavorable financial decisions, not only because they usually have limited self-control over their expenses (e.g., spending more money than they have) and act on the basis of their preferences, but also because they normally have difficulties in understanding financial concepts, including diversification of portfolios and deductible or copayment costs (see Loewenstein et al. 2013; Handel and Kolstad 2015). Moreover, they have limited financial knowledge about their savings and borrowing, such as their mortgages, and usually fail to plan for known expenses, such as college tuition and retirement (Hastings et al. 2013).

In addition to the capability of self-control, as well as financial education and literacy, the variability in financial decision-making can be explained by individual characteristics. Economics is one of the fields wherein the impact of personal characteristics is more evident because of the high uncertainty and consequences that decisions may have on people’s lives (e.g., Donnelly et al. 2012). Research has widely shown the importance of individual differences, such as decision-making styles and personality traits, on individual economic decisions and outcomes (e.g., Muhammad and Abdullah 2009; Riaz et al. 2012; Jamal et al. 2014; Gambetti and Giusberti 2017, 2019).

Regarding personality traits, research shows that people with high introversion, independence, and emotional stability traits are good at saving and avoiding debts, making accurate financial decisions, and incurring low extra expenditures and monetary risks (Chitra and Ramya Sreedevi 2011; Rustichini et al. 2012; Ebrahimi et al. 2016). However, making favorable financial decisions is linked to not only the ability to save money, but also the tendency to invest in different ways (e.g., Lo et al. 2005). Recent research showed that extroversion, self-control, trait anger, and trait anxiety were found to be strong predictors of investment decision-making (e.g., Mayfield et al. 2008; Oehler et al. 2018; Gambetti and Giusberti 2012, 2019). In particular, extroverted and lively individuals who are optimistic and outgoing are likely to take the initiative to spend on high-risk and short-term investments (Nyhus and Webley 2001; Mayfield et al. 2008; Oehler et al. 2017). Moreover, people with high self-control and low impulsivity, who are practical, solution-oriented, and better at managing their money compared to highly neurotic individuals (Donnelly et al. 2012; Webley and Nyhus 2001), are prone to invest in different types of stocks, as well as industrial and state bonds (Gambetti and Giusberti 2019). On the one hand, trait anger is positively associated with the tendency to diversify a

portfolio (Gambetti and Giusberti 2012), but on the other, trait anxiety, characterized by high levels of apprehension, tension, and vigilance, predicts over-prudent financial decisions, opting for saving money and not making investments (e.g., Shih and Ke 2014; Gambetti and Giusberti 2019). Thus, trait anxiety is the personality dimension most closely related to the tendency to avoid investments, with the risk of unfavorable financial decisions. Thus, it is selected as independent variable in the present study. Similarly, those suffering from depression are prone to use a risk-averse approach, whereby expected losses are minimized (Leahy et al. 2012). It should also be noted that previous research shows that in the investment field, it is better to study specific personality traits, such as trait anxiety, than personality characteristics at the broadest level of abstraction (Gambetti and Giusberti 2019). The latter may include neuroticism, which covers different personality traits, such as anxiety and anger, that correlate with opposing risk preferences and attitudes and may result in contrasting financial decisions (e.g., Gambetti and Giusberti 2012).

In addition to personality traits, decision-making styles can also predict investment decisions. They are defined as habitual patterns and tendencies in the way an individual approaches and reacts when confronted with a decision-making situation. The number of decision-making styles is subject to debate. On the one hand, Scott and Bruce (1995) suggest that there are five styles: (1) rational (i.e., a tendency to analyze information and not being easily swayed by emotions), (2) intuitive (i.e., a tendency to rely upon intuitions, feelings, and sensations), (3) avoidant (i.e., a proneness to procrastination in making decisions), (4) dependent (i.e., needing the assistance and support of others), and (5) spontaneous (i.e., a tendency to make decisions in an impulsive way). On the other hand, Nygren (2000) identifies three decision-making styles (i.e., analytical, intuitive, regret-based), whereas Leykin and DeRubeis (2010) differentiate among nine styles (i.e., respected, confident, spontaneous, dependent, vigilant, avoidant, brooding, intuitive, anxious).

The five decision-making styles identified by Scott and Bruce (1995) have been correlated with various personality dimensions. For example, Riaz et al. (2012) show that the Big Five personality factors contribute from 15.4 to 28.1% variance in decision-making styles. The authors show that each of the Big Five personality traits (Costa and McCrae 1992) can be mapped onto a specific behavioral decision-making pattern: conscientiousness positively correlates with the rational decision-making style, openness to experience is positively associated with the intuitive decision-making style, extroversion is positively associated with the spontaneous style, agreeableness is positively associated with the dependent decision-making style, and neuroticism is positively related to the avoidant decision-making style. In addition, recent studies have shown that decision-making styles predict decision-making competence, not only in everyday life (Dewberry et al. 2013), but also in the financial field (Cosenza et al. 2019). Specifically, the rational decision-making style mediates the relationship between self-control (i.e., a personality trait associated with conscientiousness and low impulsivity) and investment decisions, and it predicts the ability to manage one's money effectively (Donnelly et al. 2012; Gambetti and Giusberti 2019; Cosenza et al. 2019). Moreover, rational individuals are more likely to have profitable investments compared to intuitive and spontaneous individuals who are more influenced by emotions and insights, and thus may have problems

in managing their money and be more prone to gambling (Muhammad and Abdullah 2009; Jamal et al. 2014). However, avoidant decision-making style predicts the tendency not to invest, not only correlating with trait anxiety but also mediating the relationship between trait anxiety and investment decision-making (Riaz et al. 2012; Gambetti and Giusberti 2019). As we mentioned above, anxious individuals tend to save money and avoid investments, holding interest-bearing accounts owing to their perception of the low predictability of stock trends (Gambetti and Giusberti 2012, 2019). This can be explained by the tendency of anxious individuals to interpret possible negative outcomes as more likely to occur; this tendency leads them to avoid risks, while making excessively prudential decisions (Maner et al. 2007). Thus, anxious and avoidant people are more likely to make unfavorable (i.e., economically disadvantageous) and inefficient (i.e., selecting a course of action in an untimely manner) decisions, leading them to miss profitable financial opportunities (e.g., Lo et al. 2005).

Although a big part of the behavioral/nudge revolution is to acknowledge the heterogeneity of individuals (e.g., Ashraf et al. 2006), no studies have investigated whether using nudges could serve to modulate the influence of trait anxiety and decision-making styles on investment decisions by supporting and improving the decisional process and, thus, reducing unfavorable choices. To fill this gap in the literature, the aim of the present study is to investigate the role of default options in the relationship between trait anxiety, decision-making styles, and intention/preference to invest. As in previous research (e.g., Johnson and Goldstein 2004; Chapman et al. 2010), we define three experimental conditions: (1) “opt-out,” in which it is assumed that participants are enrolled in a specific investment plan by default; (2) “opt-in,” in which it is assumed that participants do not automatically adhere to a specific plan, but they can choose to sign up; and (3) “control,” in which participants have to make a decision to accept or reject an investment proposal. The first two conditions evaluate people’s intentions about investment plans in two different decisional frames (default agreement or default disagreement). The opt-out condition measures the nudge effect, given that participants are pushed by the decisional frame to adhere to the investment plan proposed, whereas the control condition gives information about participants’ preferences regarding each investment plan. We are interested in both intentions and preferences, which are seen as different concepts in the financial field. Intention is the likelihood that an individual makes a particular decision based on their will to do so. For example, the desire to adhere to an investment plan by giving (in opt-in condition) or withholding (in opt-out condition) their consent. However, preference can be viewed as an attitude that influences individuals’ decisions and then results in a behavioral tendency that leads an individual to make a particular choice (Madden et al. 1992; Schiffman et al. 2000). Thus, the control condition can be important to evaluate the preferences of participants with different individual characteristics outside a specific decisional frame.

In general, we expect nudging to have a significant effect on both the intention/preference and conviction to invest. This is suggested by the literature in the financial field, which supposes that people normally make unfavorable investment decisions (e.g., Loewenstein et al. 2013; Handel and Kolstad 2014), and research into the efficacy of nudges (Benartzi and Thaler 2004; Bruns et al. 2018; Johnson and Goldstein 2003). In particular, we hypothesize that:

**Hy0** The opt-out condition will differ significantly from the opt-in and control conditions regarding intention/conviction to invest, whereas there will be no significant differences between the opt-in and control conditions.

Regarding individual differences, we hypothesize that default rules might help people with high trait anxiety and avoidant style to improve their economic choices, thereby giving them the nudge to make investments. In particular, default options can support the financial decisions of anxious and avoidant individuals, who usually tend not to invest their money or opt for low-risk investments (e.g., Shih and Ke 2014; Gambetti and Giusberti 2012, 2019), thereby pushing them to make investments. Thus, we propose that:

**Hy1** Trait anxiety and avoidant decision-making style will be positively related with investment intentions only in the opt-out condition, and not in the control (in which they can express their preferences about investments) or opt-in conditions (in which they are not pushed by a decisional frame to invest their money).

However, the investment decisions of high rational, intuitive, and spontaneous individuals may be influenced less or not at all by default options. In particular, rational people, who have high self-control and are already prone to invest, thus making profitable and gainful decisions (e.g., Donnelly et al. 2012; Muhammad and Abdullah 2009; Jamal et al. 2014; Gambetti and Giusberti 2019), would choose to invest, regardless of the situation they are in (with or without the presence of default options). Thus, we expect that:

**Hy2** No significant differences will be found between the three experimental conditions for rational individuals. We expect them to express their preference for investments (in the control condition) and choose to invest in both opt-in and opt-out conditions.

Conversely, individuals with intuitive and spontaneous decision-making styles, which are positively associated (Scott and Bruce 1995) and prone to making unfavorable financial decisions, such as gambling (Smelter and Baltes 2001), may not be supported by the decisional frame (e.g., default rules) in making investments. This is because they base their financial intentions and decisions on emotions, feelings, and sensations regardless of frame, for example, a default situation (Muhammad and Abdullah 2009; Jamal et al. 2014). Thus, we hypothesize that:

**Hy3** Intuitive and spontaneous individuals will express their preference for investing money in the control condition, and they will tend to invest both in opt-in and opt-out conditions because of their sensations, feelings, and emotions regardless of the decisional frame.

Finally, regarding the dependent decision making-style, only a few studies have investigated the relationship between this specific style and financial intentions and decisions, with contrasting results. On the one hand, some studies have shown that people with a high dependent personality trait do usually make unfavorable financial decisions (e.g., Nyhus and Webley 2001; Chitra and Ramya Sreedevi 2011). On the other hand, Gambetti and Giusberti (2019) report that individuals with a dependent decision-making style are prone to invest, thereby making advantageous decisions, probably following the advice of their bank consultants. In this sense, dependent individuals may be supported by nudges and in particular by default options. This can be explained by their tendency to follow pre-established conditions, such as the automatic enrolment in financial plans.

We expect this behavior to contrast with that of independent individuals who would not benefit from this type of nudge. Thus, we expect that:

**Hy4** Dependent individuals will express their preferences to invest their money in the control condition, but they will make more investment decisions in the opt-out condition than in the opt-in condition.

## Method

### Sample and experimental design

To determine the a priori sample size, we performed a statistical power analysis using the GPower 3.1 software (Faul et al. 2007). A sample size of 186 participants was suggested by this power analysis (considering the following input parameters: effect size = .015; alpha error prob. = .05; power or 1-beta error prob. = .095) to perform subsequent data analyses (i.e., a multivariate ANOVA and separate hierarchical multiple regressions for each experimental condition) with three predictors of interest: T-Anxiety, the five decision-making styles, and three experimental conditions. 194 Italian adults between 30 and 65 years old ( $M_{\text{age}} = 55.64$ ,  $SD = 5.01$ ; 42% males) were recruited through social networks and notices in cultural centers, libraries, and workplaces. Participants had different occupations (office workers, bankers, entrepreneurs, manual workers, artisans, and so on) and were tested individually in a university laboratory. Participation was voluntary and the study was approved by the Ethics Committee of the local university.

The educational level of the sample was as follows: 40% had a middle school certificate, 40% had graduated from high school, and 20% had a bachelor's or graduate degree. However, 2.1% did not respond to the question about educational level. The participants were asked to rate their experience in the financial field on a 3-point rating scale: 53.6% of the sample was inexperienced, 23.7% had no specific training but had learned something from previous personal experience, and 21.1% had studied financial topics or worked in the field of economics. Similarly, 2.1% did not respond to the question about experience in the financial field.

The participants were randomly divided into the three experimental conditions: *opt-out* ( $N = 66$ ), wherein it was assumed that the participants automatically adhered to a specific financial plan, with the possibility to withdraw at any time; *opt-in* ( $N = 62$ ), wherein it was assumed that the participants did not automatically accept the specific plan, but they could choose to sign up; and *control* ( $N = 66$ ), wherein the participants had to make a decision to accept or reject an investment proposal.

### Instruments

The *State-Trait Anxiety Inventory-Y* (STAI-Y; Spielberger 2010; trad. It. Pedrabissi and Santinello 1998) is an instrument that measures anxiety and is split into the State Anxiety Scale that evaluates how people feel at the moment (e.g., "I feel at ease") and the Trait Anxiety Scale that evaluates how people generally feel (e.g., "I am a steady person"). In the present study, only the Trait Anxiety Scale was considered. This scale has 20 items with the focused areas including worry, tension, apprehension, and nervousness. The participants can respond on a scale from 1 (almost never) to 4 (almost always). In the present sample, Cronbach's  $\alpha$  was .82 for this scale.



The *General Decision-Making Style* (GDMS; Scott and Bruce 1995; trad. It. Gambetti et al. 2008) is a self-administered questionnaire composed of 25 items in total and 5 items for each scale. The scales are as follows: Rational (e.g., “I double-check my information sources to be sure I have the right facts before making a decision”), Intuitive (e.g., “When making a decision, I rely upon my instincts”), Dependent (e.g., “I often need the assistance of other people when making important decisions”), Avoidant (e.g., “I avoid making important decisions until the pressure is on”), and Spontaneous (e.g., “I generally make snap decisions”). The 25 items were presented to the responders in a 5-step Likert scale ranging from strongly disagree (1), to strongly agree (5). In the present sample, Cronbach’s  $\alpha$  ranged from .72 to .87 across the five scales.

*Investment task* This task assessed decision-making in the financial field and, in particular, people’s intentions to make (or not make) investments using three scenarios. These were selected during a preliminary phase when we considered six possible scenarios concerning investments, which were created based on the previous studies about nudge plans (e.g., 401(k) plan; Benartzi and Thaler 2004). These scenarios were prepared in two almost identical versions, differing only in the default frame proposed to the participants (see the “opt-out” and “opt-in” experimental conditions). The sample of this preliminary phase was composed of a group of 38 Italian individuals ( $M_{\text{age}} = 37.64$ ,  $SD = 6.96$ , aged between 29 and 64; 30% males), recruited at cultural centers and randomly assigned to the opt-out ( $N = 22$ ) or opt-in ( $N = 16$ ) condition. This is a distinctive sample from the main sample of 194 participants. The participants were asked to respond on a 5-point scale (1 = absolutely not; 5 = absolutely) whether or not they would adhere to the proposed plan. Moreover, scenarios were evaluated based on the degree of realism and comprehensibility on 10-point scales (1 = not at all; 10 = very much). Three investment plan scenarios (about a portion of money in a bank account, a portion of production reward, and a portion of income in integrative retirement) were excluded. The first was excepted because it was chosen by few people in both the experimental conditions (opt-out:  $M = 1.37$ ,  $SD = .51$ ; opt-in:  $M = 1.44$ ;  $SD = 1.01$ ;  $\chi^2 = .45$ ,  $p = .50$ ), and the other two were excluded because they were chosen by the majority of participants in both conditions (production reward, opt-out:  $M = 3.33$ ,  $SD = 1.50$ ; opt-in:  $M = 2.50$ ;  $SD = 1.56$ ;  $\chi^2 = .61$ ,  $p = .43$ ; and integrative retirement, opt-out:  $M = 4.75$ ,  $SD = 3.10$ ; opt-in:  $M = 3.57$ ;  $SD = 1.90$ ;  $\chi^2 = .12$ ,  $p = .72$ ). The final set of three scenarios showed a medium degree of realism ( $M = 5.58$ ,  $SD = 2.59$ ), a high degree of comprehensibility ( $M = 6.98$ ,  $SD = 1.74$ ) and significant differences between the two experimental conditions ( $p$ s from .01 to .03).

The experimental investment task included the three selected scenarios. Scenario 1 was about enrollment in a plan in which a portion of one’s pay rise was invested, such as the well-known 401(k) plan that is a defined-contribution retirement account offered by many US employers (e.g., Thaler and Benartzi 2004). Scenario 2 was about the reinvestment of a coupon bond in a bank investment plan, which is a strategy to maximize the compound interest of money invested and coupon bonds obtained from the investment plan. Scenario 3 was about the investment of a proportion of one’s income in a private health insurance plan, a contract that does not give immediate benefits but saves for a rainy day. These three scenarios are conceptually and empirically correlated. Conceptually, they had similar risk-return profiles and time horizons. Empirically, Scenario 1

positively correlated with Scenario 2 ( $r = .18, p = .004$ ), Scenario 2 positively correlated with Scenario 3 ( $r = .20, p = .002$ ) and Scenario 1 positively correlated with Scenario 3 ( $r = .25, p = .000$ ). The investment task, calculated as the sum of the scenarios, measures intentions about different kinds of investments made to allocate money into an asset with the expectation of long-term profits deriving from that asset (see Bogle 2012). The three scenarios each had two options; one of these was identified as “investment intention,” coded in the following analyses as 1, and the other as “non-investment intention,” coded as 0; thus, the total score of the investment task ranged from 0 to 3. The three scenarios are randomized in each condition and are presented in the Appendix.

The participants were also asked to indicate their choice conviction for each scenario on a 10-point scale ranging from 1 (not at all) to 10 (very much); thus, the choice conviction ranged from 3 to 30. It may be useful to clarify the difference between intention and conviction here. On the one hand, both concepts would typically be linked to expected outcomes and connected to each other in an explanatory model based on the microeconomic utility or expectancy theory (Vroom 1964). This postulates that people anticipate rewards through the selection of actions, which lead to personal achievement, through a learned connection between desired outcome and behavior that is the outcome expectancy. On the other hand, the two concepts are distinct, both conceptually and empirically. Conceptually, intention entails whether the responders want to invest. In some cases, intention is formed only shortly before the actual decision, and in other cases, the intention never leads to actual behavior. Hence, intentions are assumed to predict, although imperfectly, individuals' choice to invest their money (see Davidsson 1995). Conviction, instead, involves whether the respondent feels that a certain investment would be a suitable choice for them, given their life and economic situation. Empirically, we found that intention and conviction scores were not correlated in the present sample ( $r = -.05, p = .48$ ).

### Procedure

The participants came to the laboratory, and after signing the informed consent, they completed the STAI, the GDMS, and the investment task in a procedure that lasted approximately 40 min. The experimental material was administered in a randomized manner to reduce or eliminate the possible “order effect” that could affect the responses (see Hogarth and Einhorn 1992). Finally, some demographic data were collected (i.e., age, gender, level of education and financial experience). The participants were also asked about their level of income, but this was not considered in the subsequent analyses because it was similar among participants (from €20,000 to 40,000 per year). Marked income effects are, therefore, not to be expected.

### Statistical analyses

First, after performing intercorrelations between the variables considered in the present study, we evaluated the effect of experimental conditions on the intention to invest to test the first hypothesis (Hy0). This was done by conducting a multivariate ANOVA considering the three conditions (i.e., opt-out, opt-in, and control) as independent variables, while the intention to invest (i.e., the sum of the three scenario scores) and the related conviction were considered as dependent variables.

Second, the interactions between individual differences and intention and conviction to invest in the three experimental conditions were tested. Thus, to test the other hypotheses (Hy1, Hy2, Hy3, and Hy4), hierarchical multiple regressions were performed separately within each condition (i.e., opt-out, opt-in, and control). The explanatory variables were trait anxiety and decision-making styles (rational, spontaneous, avoidant, intuitive, and dependent), controlling for demographics (i.e., age, gender, level of education, or experience in the financial field), and the dependent variables were intention/preference and conviction to invest.

Finally, to analyze the significant interactions between treatment factors and individual characteristics, we performed a multiple regression analysis, controlling for demographics and experience in the financial field. We considered the following as explanatory variables: treatment factors (i.e., opt-in or opt-out condition) in Step 1, individual characteristics found to be significant in the previous regression analyses on investment intentions in Step 2, Condition X individual characteristics (considered individually) in Step 3, and Condition X individual characteristics (considered together) in Step 4. The dependent variable was the intention/preference to invest. We considered all the assumptions before applying all the regression analyses: the relationship between the independent and dependent variables was linear, the values of both predictors and residuals were independent, the variance of residuals was constant, the values of the residuals were normally distributed, and there were no influential cases biasing the models.

## Results

### Preliminary analyses

As shown in Table 1, no significant differences among the three experimental groups (i.e., opt-out, opt-in, and control conditions) were found regarding age, gender, level of education, or experience in the financial field. Moreover, the three groups did not differ for T-Anxiety or any of the decision-making styles ( $F_{12,182} = .70, p = .74$ ; see Table 1).

The descriptions and intercorrelations of the measures for the total sample are shown in Table 2. As shown in the literature (e.g., Gambetti and Giusberti 2019), trait anxiety was positively correlated with dependent and avoidant decision-making styles. With regard to decision-making styles, the rational type was negatively correlated with spontaneous and positively with dependent, whereas the dependent and avoidant types were positively correlated, as were intuitive and spontaneous (Riaz et al. 2012). The present sample differed from previous studies about GDMS (Scott and Bruce 1995; Gambetti et al. 2008) in that rational and intuitive styles did not show any significant negative correlation. Actually, these two styles are independent constructs and, ideally, individuals should find a balance between rational and intuitive decision-making (Spicer and Sadler-Smith 2005). The intention to invest was negatively correlated with trait anxiety and avoidant style, and positively correlated with rational and dependent styles, as shown by Gambetti and Giusberti (2019).

### Nudge effect

The results of ANOVA only partially confirmed the first hypothesis (Hy0), showing a significant effect of the condition on the intention to invest ( $F_{2,192} = 11.99, p = .000, \eta^2_p = .21$ ; see Fig. 1), but not on the conviction ( $F_{2,192} = .02, p = .97$ ), which was high in

**Table 1** Descriptives and statistical comparisons among the three experimental groups regarding demographics and experience in the financial field

Dependent variable	Condition	Mean (SD)	F	p
T-Anxiety	Opt-out	38.51 (7.00)	1.02	.36
	Opt-in	38.16 (10.26)		
	Control	41.12 (9.36)		
Rational	Opt-out	19.30 (2.63)	.30	.74
	Opt-in	18.80 (2.40)		
	Control	19.03 (2.65)		
Intuitive	Opt-out	16.90 (2.97)	.00	.99
	Opt-in	16.93 (2.47)		
	Control	16.93 (2.55)		
Dependent	Opt-out	16.42 (3.70)	.75	.47
	Opt-in	15.77 (3.76)		
	Control	16.96 (4.05)		
Avoidant	Opt-out	13.60 (3.79)	.09	.91
	Opt-in	13.54 (4.63)		
	Control	13.19 (4.02)		
Spontaneous	Opt-out	14.45 (3.14)	.94	.39
	Opt-in	13.77 (3.47)		
	Control	13.32 (3.37)		
Age	Opt-out	55.33 (10.16)	2.12	.12
	Opt-in	53.46 (11.02)		
	Control	57.13 (8.01)		
Gender	Opt-out	.57 (.49)	2.51	.13
	Opt-in	.43 (.37)		
	Control	.49 (.44)		
Level of education	Opt-out	3.72 (.93)	.18	.83
	Opt-in	3.63 (.95)		
	Control	3.67 (.69)		
Financial experience	Opt-out	.72 (.79)	.52	.59
	Opt-in	.66 (.83)		
	Control	.58 (.80)		

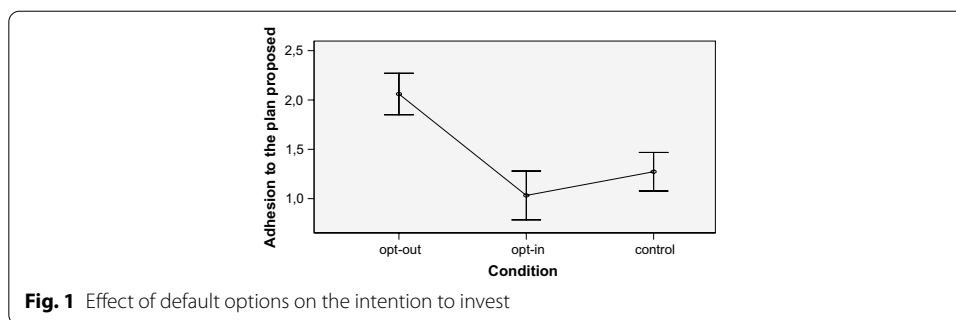
Gender was coded as 1 for females and as 0 for males; the level of education was coded as 1 for primary school, 2 for middle school, 3 for high school and 4 for bachelor's or graduate degree; financial experience was coded as 0 for inexperienced individuals, 1 for people without specific training but who have previous personal experience, and 2 for participants who had studied financial topics or worked in the field of economics. N = 194

**Table 2** Means, standard deviations and inter-correlations of all the measures

	Mean (SD)	Inter-correlations						
		1	2	3	4	5	6	7
1. Intention to invest	2.00 (.97)	–						
2. Conviction	24.30 (5.43)	–.05	–					
3. Trait Anxiety	39.00 (8.94)	–.21*	–.22*	–				
4. Rational	19.00 (2.53)	.19*	.22*	–.07	–			
5. Intuitive	17.00 (2.65)	–.05	.02	.03	–.10	–		
6. Dependent	16.00 (3.80)	.28**	–.03	.39**	.23*	–.07	–	
7. Avoidant	13.00 (4.10)	–.20*	–.04	.46**	–.09	.09	.45**	–
8. Spontaneous	13.00 (3.29)	.03	–.04	.07	–.24*	.48**	–.11	.10

"Intention to invest" (score from 0 to 3); "conviction" (scores from 3 to 30)

\*  $p < .05$ , \*\*  $p < .01$ . N = 194



**Table 3** Interactions between individual differences and experimental conditions

	Opt-out (N = 66)		Opt-in (N = 62)		Control (N = 66)	
	Intention	Conviction	Intention	Conviction	Intention	Conviction
Trait anxiety	.25*	.01	-.29*	-.12	-.41**	-.53
Rational	.31*	-.47**	.03	-.09	.21*	-.11
Intuitive	-.09	.04	.17	-.10	.27*	.12
Dependent	.30*	.22*	.11	.05	.50**	-.34*
Avoidant	.43*	.41**	-.28*	-.09	-.28*	-.32**
Spontaneous	-.02	.02	.01	-.15	-.07	.01

"Intention" is the intention to invest (scores from 0 to 3); "conviction" is the conviction to make the investment decision (scores from 3 to 30)

\*  $p < .05$ , \*\*  $p < .01$

all three conditions (opt-out:  $M = 23.51$ ,  $SD = 5.05$ ; opt-in:  $M = 23.79$ ,  $SD = 5.82$ ; control:  $M = 23.70$ ,  $SD = 5.59$ ). Bonferroni *post-hoc* comparisons showed that the opt-out condition significantly differed from the opt-in ( $p = .000$ ) and control ( $p = .000$ ) conditions, whereas the opt-in and control conditions did not show any significant differences ( $p = .83$ ). Default treatment had the same effect on intention for each scenario (Scenario 1:  $F_{2,192} = 24.11$ ,  $p = .000$ ,  $\eta^2_p = .20$ ; Scenario 2:  $F_{2,192} = 10.38$ ,  $p = .000$ ,  $\eta^2_p = .09$ ; Scenario 3:  $F_{2,192} = 15.26$ ,  $p = .000$ ,  $\eta^2_p = .14$ ).

**Individual differences in the experimental conditions**

Interaction analyses between individual differences and the intention/conviction to invest in the three experimental conditions were conducted (see Table 3). The results showed that in the opt-out condition, trait anxiety, rational, dependent, and avoidant styles were positively correlated with the intention to invest. The three styles were also correlated with the level of conviction to invest. In the opt-in condition, trait-anxiety and avoidant style were negatively associated with the intention to invest, and in the control condition, trait anxiety and avoidant style were negatively associated with a preference for investments, whereas rational, intuitive, and dependent decision-making styles were positively associated with this preference. These initial results are consistent with the expected results (see Hy1, Hy2, and Hy4) of the present study, besides the lack of significant correlations between intuitive/spontaneous styles and intention/conviction to invest in the opt-out condition (see Hy3) and between rational and intuitive/spontaneous styles and intention/conviction to invest in the opt-in condition (see Hy2 and Hy3).

Given the previous significant interactions, hierarchical multiple regressions were performed separately within each condition (i.e., opt-out, opt-in and control). Multicollinearity diagnostics suggested an adequate independence of predictors (all tolerance levels:  $< .80$ ; Tabachnick et al. 2007). Demographics and experience in the financial field are entered at Step 1, trait anxiety is added at Step 2, and decision-making styles at Step 3, to evaluate their effects separately, given that decision-making styles assess a narrower construct than personality traits, which are limited to the preferred way of approaching decisions (see Scott and Bruce 1995). The results about intentions (Table 4) and convictions (Table 5) in the three experimental conditions showed that:

(a) in the opt-out condition, controlling for age and experience that were positively associated with the intention to make investments (both in Step 1 and Step 2), trait anxiety, rational, dependent, and avoidant decision-making styles positively predicted the intention to invest. The last two styles were also positively associated with the conviction about investments, whereas rational, intuitive, and spontaneous styles were negatively correlated with this. Interestingly, we found that the association between trait anxiety and intention to invest was no longer statistically significant after entering decision-making styles. These results confirm the hypotheses (Hy1, Hy2, and Hy4), with the exception of Hy3, thus showing a lack of effect of intuitive/spontaneous styles on intention to invest.

(b) In the opt-in condition, controlling for age, level of education (negatively), and experience in the financial field (positively associated with investment intentions), trait anxiety and avoidant decision-making style negatively predicted the intention to invest, thereby confirming Hy1 and Hy4. However, none of the independent variables predicted the conviction about investment intentions, except for age, which was negatively related with this conviction.

(c) In the control condition, controlling for experience that was positively associated with a preference for investments in Step 3, both trait anxiety and avoidant styles negatively predicted the intention to invest, in line with Hy1. However, only trait anxiety was negatively associated with conviction about preference for investments. Moreover, rational, intuitive, and dependent decision-making styles positively predicted the preference for investments, in line with Hy2, Hy4, and merely for the intuitive style, consistent with Hy3. However, only the rational style was positively related to the conviction to invest. As in the opt-out condition, we found that the association between trait anxiety and the intention to invest was no longer statistically significant after entering decision-making styles.

Finally, the results of the last multiple regression analysis are shown in Table 6, and they indicate that: (a) with increasing age, the intention to invest decreases, when age is considered together with opt-out/opt-in conditions, trait anxiety, and decision-making styles; (b) to be enrolled in the opt-out condition positively predicts the intention to invest, while enrolment in the opt-in condition negatively predicts this intention; (c) beyond the default frame, trait anxiety and avoidance negatively predict the intention to invest; (d) there are significant interactions among opt-in/opt-out conditions and both these individual differences (i.e., trait anxiety predicted the drop in investment intentions in the opt-in condition, whereas avoidance style predicts the

**Table 4** Summary of hierarchical regression analyses for variables predicting investment intentions on the three experimental conditions

Variable	Opt-out condition (N = 66)						Control condition (N = 66)											
	Step 1		Step 2		Step 3		Step 1		Step 2		Step 3							
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β						
Age	.03 (.01)	.44**	.04 (.01)	.46**	.03 (.01)	.35**	-.08 (.01)	-.32*	-.03 (.01)	-.40**	.01 (.01)	.02	-.01 (.01)	-.06	-.01 (.01)	-.05		
Gender	-.03 (.21)	-.01	-.01 (.21)	-.00	-.08 (.19)	-.05	-.32 (.32)	-.12	-.03 (.32)	-.01	.18 (.31)	.06	.40 (.22)	.23	.29 (.21)	.16	.16 (.29)	.09
Education	.08 (.11)	.09	.07 (.11)	.08	-.03 (.10)	-.04	-.34 (.14)	-.33*	-.44 (.13)	-.43**	-.36 (.10)	-.35**	-.08 (.14)	-.08	-.05 (.13)	-.04	-.07 (.14)	-.06
Experience	.29 (.14)	.27*	.30 (.14)	.27*	.14 (.14)	.14	.13 (.15)	.11	.16 (.14)	.14	.28 (.11)	.24*	.16 (.12)	.17	.11 (.12)	.11	.28 (.12)	.29*
Trait Anxiety			.02 (.01)	.28*	.02 (.01)	.17			-.03 (.01)	-.37**	-.09 (.01)	-.71**			-.03 (.01)	-.39**	-.01 (.01)	-.06
Rational			.13 (.04)	.42**							-.01 (.04)	-.03					.11 (.04)	.23*
Intuitive			-.08 (.04)	-.28							.09 (.05)	.25					.09 (.04)	.31*
Dependent			.03 (.03)	.24*							.06 (.03)	.22					.08 (.03)	.45**
Avoidant			.10 (.03)	.45**							-.14 (.03)	-.65**					-.09 (.04)	-.31**
Spontaneous			.01 (.03)	.05							.01 (.02)	.02					.01 (.03)	.01
Adjusted R <sup>2</sup>	15	.17	3.62*	.17	.36	.36	.11	.11	.22	.22	.59	.59	.02	.02	.15	.15	.30	.30
F	3.85*	3.62*	4.72**	4.72**	2.95*	2.95*	4.27**	4.27**	9.49**	9.49**	1.34	1.34	3.18**	3.18**	3.68**	3.68**		

OLS regressions of trait anxiety and decision-making styles, controlling for socio-demographics variables, on investment intentions/preferences in each experimental condition. The dependent variable was the sum of the three scenarios and ranged from 0 to 3

\*  $p < .05$ . \*\*  $p < .01$

**Table 5** Summary of hierarchical regression analyses for variables predicting conviction in making investments on the three experimental conditions

Variable	Opt-out condition (N = 66)			Opt-in condition (N = 62)			Control condition (N = 66)				
	Step 1 B (SE)	Step 2 B (SE)	Step 3 B (SE)	Step 1 B (SE)	Step 2 B (SE)	Step 3 B (SE)	Step 1 B (SE)	Step 2 B (SE)	Step 3 B (SE)		
Age	.28 (.05)	.56**	.22 (.04)	.44**	-.13 (.06)	-.24 (-.14 (.07))	-.27* (-.17 (.07))	.14	.17 (.06)	.26* (.24 (.07))	.38**
Gender	-1.88 (1.01)	-.18 (1.02)	-1.32 (.91)	-.13 (1.02)	-1.43 (2.05)	-.09 (-.71 (2.15))	-.04 (-.54 (2.95))	-.30* (-1.44)	-2.49 (1.20)	-.21* (-2.55 (1.76))	-.21
Education	1.09 (.52)	.20*	.88 (.49)	.16	.45 (.85)	.07 (.18 (.89))	.03 (.23 (.92))	-.16 (-.92)	-1.56 (.76)	-.20* (-2.29 (.89))	-.30*
Experience	1.51 (.68)	.24*	.61 (.63)	.09	.48 (.96)	.07 (.56 (.96))	.08 (.59 (1.02))	-.33** (-.79)	-1.68 (.65)	-.25* (-2.27 (.76))	-.34**
Trait Anxiety		-.02 (.06)	-.04	-.14	-.09 (.06)	-.04 (-.08 (.08))	-.15 (-.12 (.12))	-.20	-.30 (.05)	-.53** (-.26 (.09))	-.46**
Rational			-.90 (.19)	-.47**			-.59 (.35)	-.24		.61 (.25)	.30**
Intuitive			-.46 (.20)	-.27*			-.19 (.46)	-.08		.02 (.22)	.01
Dependent			.29 (.14)	.21*			.37 (.28)	.23		-.24 (.19)	-.19
Avoidant			.12 (.14)	.24*			-.13 (.24)	-.10		-.06 (.24)	-.04
Spontaneous			-.46 (.19)	-.29*			-.20 (.26)	-.12		.08 (.19)	.05
Adjusted R <sup>2</sup>	.47	.47	.47	.65	.09	.11	.19	.14	.42	.44	.44
F	13.62**	10.77**	10.42**	1.44	1.38	1.18	3.67*	9.87**	5.79**	5.79**	5.79**

OLS regressions of trait anxiety (Step 2) and decision-making styles (Step 3) on conviction about investment intentions on each experimental condition, controlling for demographics and experience in financial field (Step 1). The dependent variable ranged from 3 to 30

\*  $p < .05$ . \*\*  $p < .01$

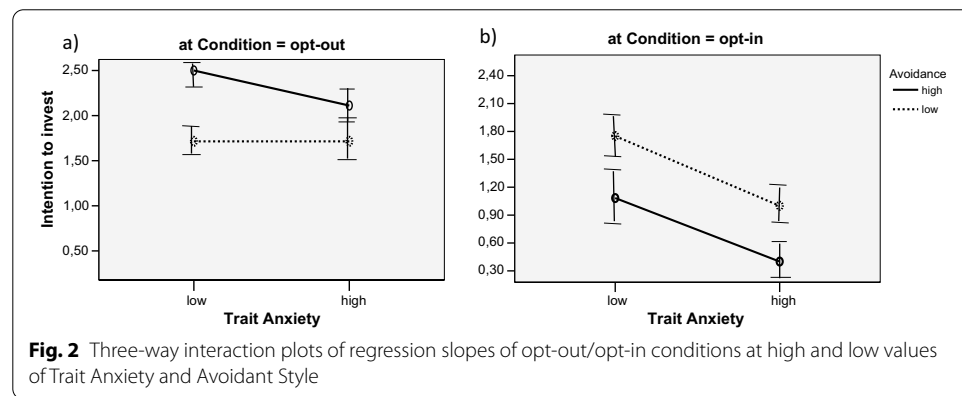


**Table 6** Summary of hierarchical regression analyses for trait anxiety, rational, dependent and avoidant styles on intention to invest, controlling for demographics

Variable	Step 1		Step 2		Step 3		Step 4	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Age	.01 (.01)	-.01	-.01 (.01)	-.12	-.01 (.01)	-.16*	-.02 (.01)	-.18*
Gender	-.28 (.19)	-.12	-.11 (.17)	-.06	-.07 (.17)	-.03	-.04 (.17)	-.02
Education	-.08 (.09)	-.07	-.13 (.08)	-.12	-.15 (.08)	-.14	-.10 (.08)	-.09
Experience	-.04 (.10)	-.03	.02 (.09)	.01	.02 (.09)	.01	.01 (.09)	.01
Condition	.49 (.08)	.47**	.52 (.07)	.49**	-.23 (.39)	-.22	.38 (.55)	.36*
Trait Anxiety			-.04 (.01)	-.34*	-.02 (.03)	-.21	-.01 (.03)	-.14
Rational			.03 (.03)	.08	.03 (.03)	.08	.03 (.03)	.08
Dependent			.03 (.02)	.10	.04 (.02)	.12	.03 (.02)	.12
Avoidant			-.09 (.02)	-.39**	-.09 (.06)	-.38*	-.09 (.06)	-.35*
CondXTA					-.04 (.02)	-1.00*	-.01 (.03)	-.27*
CondXAV					.01 (.04)	.61**	.08 (.06)	.79**
CondXTAXAV							-.01 (.01)	-.91**
Adjusted R <sup>2</sup>		.27		.41		.42		.43
F		8.99**		10.68**		9.40**		8.93**

The dependent variable ranged from 0 to 3. Condition was coded as 1 (opt-out) and -1 (opt-in). CondXTA = interaction between condition and Trait Anxiety; CondXAV = interaction between condition and Avoidance. CondXTAXAV = interaction between condition, Trait Anxiety and Avoidant style

\*  $p < .05$ . \*\*  $p < .01$ . N = 194



increase in the intention to invest in the opt-out condition); and (e) there was a three-way interaction among conditions, trait anxiety, and avoidant style.

The three-way interaction showed that for the opt-out condition, differences in the intention to invest were related to differences in trait anxiety but this association depended on the propensity to avoid making decisions (see Fig. 2a). In particular, when included in the nudge frame, people with a high level of the avoidant style were more prone to invest when they had low trait anxiety, whereas people with high anxiety invested in the same way, regardless of the level of avoidance. Turning to the opt-in condition (Fig. 2b), trait anxiety and avoidant style were both negatively related to the intention to invest. Thus, there was evidence for a nudge effect in people with low trait anxiety and high avoidant style.

## Discussion

This study confirms the importance and the effectiveness of changing how a choice is presented to affect the actions of decision makers in the financial field, who generally have a tendency to stick with the default option (e.g., Benartzi and Thaler 2004; Bruns et al. 2018). Specifically, investment rates are much higher in an opt-out frame (i.e., the investment plan is the default, explicitly opting out is required if an individual does not want to invest) than in an opt-in frame (i.e., non-investment status is the default, explicitly opting in is required if a person wants to enroll in an investment plan). Both decisional frames give decision makers the autonomy to choose according to their personal intentions, but the opt-out frame provides a “nudge” toward investments (Johnson and Goldstein 2003). In this sense, the first hypothesis (Hy0) about the nudge effect on intention to invest (but not on conviction) was confirmed in the present study. This is because conviction to invest remains high in all three experimental conditions. This result could be interpreted in two ways, considering the conceptual difference between intention and conviction. On the one hand, the respondents felt that the investment plans proposed would be a suitable choice for them; on the other hand, defaults influenced the will to invest in these plans that, in turn, predicted individuals’ decisions to invest their money.

The novelty of the present research is the focus on trait anxiety and decision-making styles, which have not been considered in the previous literature about nudge. Individual differences can deeply change an individual’s response to the same prompts; this study considers this variance to better understand the effect of nudges on specific individual characteristics. Trait anxiety and decision-making styles were tested, while controlling for gender, financial experience, age, and level of education. While no significant gender-related effect has been found in this study, the significant results given by financial experience, as obtained in the opt-in and control conditions, are in line with previous research, thus showing that respondents with more investment experience have more risk-tolerant responses and are more prone to invest than less experienced investors (Chen and Corter 2006; Gambetti and Giusberti 2012, 2019). This result emphasizes the role of financial literacy, which is a well-known and relevant factor in understanding financial decision-making (e.g., Hastings et al. 2013): the greater the financial literacy, the less the need to use nudges, such as default rules, to improve financial outcomes. Another interesting result is that in the present sample, age becomes significant and predicts the intention to invest only when it is considered together with conditional and individual characteristics. In particular, in the opt-in condition, age negatively predicted the intention to invest. This result can be explained by research that showed the older the person, the greater the propensity to follow commonly prescribed rules of thumb recommended by investment advisors, such as investing in more diverse (by country and by degree of risk) financial products (Korniotis and Kumar 2011). Moreover, it was evident that the avoidant style was positively associated with age in the present sample ( $r = .20, p < .001$ ); therefore, with increasing age, the tendency to avoid and/or delay decisions increased. Importantly, when introducing the nudge frame, this trend reverses, and older people become more prone to making investments too. This issue could be further investigated in future research.

In the present study, anxious and avoidant individuals were expected to adhere to investment plans in the opt-out condition, and, to a lesser extent, in the opt-in and

control conditions (Hy1). This hypothesis was partially confirmed. The opt-out condition drives anxious people into investing, rather than withdrawing from the investment plans to which they have been assigned by default. In this situation, anxious individuals are unable to detect threat stimuli, thus leading them to decide slowly or to procrastinate decisions (Bar-Haim et al. 2007; Hartley and Phelps 2012). On the contrary, when they perceive uncertainty, they make quick decisions to avoid potentially dangerous situations (e.g., Mogg and Bradley 1998; Bensi et al. 2010). Being enrolled in investment plans (i.e., opt-out condition), could in fact be perceived by anxious people as a neutral situation, while the intention to invest (i.e., opt-in condition) could be perceived as riskier because it evokes potential economic losses. However, the results of this study show that the correlation between trait anxiety and the intention to invest is no longer significant with the introduction of decision-making styles, both in the opt-out and control conditions. This means that decision-making styles, and in particular avoidance, which positively correlates with trait anxiety, fully mediate this relationship. This result highlights that decision-making styles add a relevant perspective toward understanding how personality influences decisions, thus suggesting that not only do individual characteristics jointly predict substantial variance in decision outcomes (see Dewberry et al. 2013), but also how crucial the role of avoidant style is in explaining the relation between trait anxiety and investment intentions and decisions (see also Gambetti and Giusberti 2019). This is in line with the previous research showing that trait anxiety is positively linked to risk-avoidance and, in general, with the tendency to avoid decisions (Maner et al. 2007). Nonetheless, the avoidant decision-making style is associated with not only the tendency to feel anxious about decisions, but also the propensity to have bad moods, as it positively correlates with neuroticism (Riaz et al. 2012), and to reflect retrospectively on decision-making errors, that is, brooding (Dewberry et al. 2013). Thus, in the opt-out condition, avoidant individuals are led by the frame to adhere to investment plans, which they would not usually make (see also Gambetti and Giusberti 2019), and they put in place their distinctive tendency to avoid deciding, thus maintaining (with high conviction) their investments. Default investments can change the *status quo* of avoidant individuals, especially if they have low levels of trait anxiety, by overcoming their fear of losses and their despondency regarding gains (see the prospect theory proposed by Tversky and Kahneman 1981), thus confirming the close intercorrelation between personality traits and decision-making styles. In the opt-in and control conditions, however, neither anxious, nor avoidant individuals, voluntarily enroll in investment plans, thereby adhering to their preference not to invest, perhaps because they perceive uncertainty in stock trends, as suggested by previous research (e.g., Shih and Ke 2014; Gambetti and Giusberti 2019). Future studies may measure time preference and procrastination, which is described as a tendency to constantly delay decisions (Klingsieck 2013). It is a problem for approximately 15–25% of the adult population (Tibbett and Ferrari 2015) and is linked with personality traits, especially high neuroticism and low extraversion and diligence (e.g., Dzielulska and Markiewicz 2018). Procrastination is due to the divergence between intention and behavior, resulting from disorders in self-regulation that is connected with behaviors aimed at achieving personal goals (e.g., Zimmerman 2002). For these reasons, procrastination can be an important mediator in the relationship between defaults and avoidant styles and/or trait anxiety on investment decisions.

Rational individuals were expected to adhere to investment plans in all the experimental conditions (Hy2), whereas dependent individuals could be supported by default options in choosing to invest (Hy4). Hypothesis 2 was only partially confirmed, whereas Hypothesis 4 was fully confirmed: both rational and dependent individuals were prone to invest on their own (as in the control condition), but they could also be supported by default options in investment decision-making for various reasons. Rational individuals decide to remain in the default investment plans, considering them advantageous, although they are unconvinced probably because they see them as externally induced rather than the result of their own subjective evaluations. This inconsistent result regarding the effect of the rational decision-making style on opt-out intention and conviction, which had opposite signs, could be interpreted based on different constructs, subtended intention and conviction. In particular, on the one hand, rational individuals seem unwilling to withdraw from the investment plan when they have already joined it, but they do not feel that this situation is entirely suitable for them. Although the present results do not show a significant association between this decision-making style and investment intentions in the opt-in condition, it should be noted that, on the other hand, rational people have both the intention and conviction to invest when they are free to decide (see the control condition), as shown in previous studies (Donnelly et al. 2012; Gambetti and Giusberti 2019; Cosenza et al. 2019). Regarding dependent individuals, they tend to adhere to the default investment plans with high conviction, relying on the frame (see the opt-out condition). This is probably because they lack personal certainty and self-efficacy and feel safer when they bear no responsibility for the consequences of their decisions, attributing them to the situation in which they find themselves (Rahman 2014; Gambetti et al. 2008; Thunholm 2004). In the control condition of the present study, dependent individuals displayed an interest in investing their money, although they were not convinced of their intention. This result is contrariwise to some previous studies, wherein dependent individuals, principally defined by decision-making procrastination, tended to avoid the decision to invest, thus resulting in negative outcomes (Wood and Highhouse 2014; Gambetti and Giusberti 2019). Therefore, the contrasting results about intention (positively related to dependent style) and conviction (negatively related to dependent style) on the control condition could be interpreted in the light of the different constructs underlying these concepts. When dependent individuals are free to decide about their investments, they show the intention to invest, but they probably tend to procrastinate their decision, showing low conviction. In this case, conviction seems more closely related to behavior than mere intention, which does not lead to actual behavior (see Davidsson 1995). In conclusion, default options can help both rational and dependent individuals to make advantageous financial decisions. Following this reasoning, the decisional frame, which relies on how a problem is posed, becomes decisive for investment decision-making, as suggested by behavioral finance (e.g., Barberis and Thaler 2003), and may interact in specific ways with the personal characteristics of the decision-maker.

Finally, Hypothesis 3 (Hy3) is confirmed: intuitive and spontaneous decision-makers, who do not have any specific strategy to search for information, are not influenced by default options in making investments, probably because they tend to make financial decisions based on their sensations, feelings, and emotions, regardless of frame

(see Muhammad and Abdullah 2009; Jamal et al. 2014). With regard to this, it should be considered that intuitive and spontaneous decision-making styles are positively correlated with openness to experience and extroversion, respectively (Riaz et al. 2012). Consequently, these specific personality traits are positively associated with the disposition to trade and make short-term investments (Mayfield et al. 2008; Fenton O’Creevy et al. 2004). In this sense, intuitive and spontaneous people are already more likely to invest without needing to be induced by the decisional frame, as found in the present research only for intuitive people (see control condition). This result is also in line with Tversky and Kahneman (1981), who suggest that people act in terms of their preference and independently of the frame (except when they have some difficulties in resolving inconsistency). This implies that default options do not have the power to support everyone, but only specific people. For spontaneous and intuitive individuals, other types of nudges could be more beneficial than default options, such as making certain salient self-images that favor ethical behavior (see Lades 2014).

## Conclusion

The present study offers a fresh insight into the potential different effects (and the lack thereof) of nudges, and specifically default rules for individuals with different personal characteristics. The results support the suggestion that using default options as a nudge can assist people with specific personality traits and decision-making styles, who also usually make excessively prudential choices or avoid making decisions, thus improving investment decisions without compromising their autonomy. The results could be of considerable importance both at the theoretical and applicative levels. At the theoretical level, the data obtained could contribute to the research on framing effects and choice architecture (i.e., the influence of how information is presented), as well as the role of individual differences in decision-making (e.g., Levin et al. 2002). At the applicative level, the results could provide useful methods and indications about specific default proposals that could encourage people, according to their individual characteristics, to make more favorable choices concerning the financial area of their life. For example, default proposals can have a positive impact on the ease of bank’ receivable collection. This is in line with recent surveys and empirical papers (Peng et al. 2021; Zhang et al. 2020; Dinçer et al. 2021; Li et al. 2021), thus suggesting that banks should mainly focus on payment and money transferring alternatives to attract the attention of customers and satisfy their expectations. Therefore, future research on the prediction and explanation of individual differences in various types of nudges is likely to benefit from a focus on personality as well as on decision-making styles. Moreover, the results of this study are applicable to the improvement of specific questionnaires, such as MiFID, which are generally used to assess the suitability of investment decisions. In particular, the addition of specific psychological questions can, via the questionnaire, present an opportunity to increase clients’ awareness of their individual tendencies with regard to investments and, thus, help them to make better decisions.

However, there are some limitations to consider. First, the results of this study can only be generalized to a certain extent, because what people do in hypothetical scenarios may differ from what they actually do. However, many studies have shown that people’s reports of their choices in hypothetical situations do largely correspond with

their actions in real life (see Armitage and Conner 2000 for a review). Moreover, it might be interesting to determine whether the present data will be replicated in future studies conducted on a larger and more representative sample of the Italian population, as well as using investment scenarios with different risk-return and time horizon profiles. Second, nudges have been shown to be the first of many interventions meant to improve the functioning of a market by changing actors' behaviors. They trigger a long chain of factors, which are not easily identifiable, and with consequences that are not always predictable. Third, nudges are just part of a wider spectrum of interventions in the financial field. For example, in both the great global financial crisis of 2007–2009 and in the most recent Italian cases (e.g., Banca Etruria), those who paid the highest price were those who had fewer economic resources (and therefore only access to the least competent staff in the banks) as well as less financial knowledge. Therefore, albeit default options can be significantly beneficial to some specific groups of people, on their own, they are insufficient, as they have to be supplemented by medium and long-term interventions, such as financial training, and shorter-term ones, such as regulations and penalties for financial institutions. Finally, it should be noted that monetary incentives were not provided to the participants in the present study. This is a potential shortcoming because individuals are less likely to commit errors under monetary conditions (see Van den Berg et al. 2012). However, another incentive beyond nudge can be a confounded variable. Future research may be conducted using financial incentives to replicate the present results, thus encouraging the participants to make honest choices that reveal the truthful characteristics about their preferences (e.g., Charness et al. 2016).

## Appendix

	Opt-out	Opt-in	Control
Scenario 1	Your employment contract stipulates that you receive a modest salary increase each year and, at the same time, your company automatically pays into an investment plan, lasting 10 years, respectively 10% of the salary increase in the first year, 20% in the second year, 30% in the third year, etc., up to the 10th year (reaching 100% of the salary increase). Upon renewal of the investment plan, you are asked if you want to confirm your adhesion or not. What do you do?	Your employment contract stipulates that you receive a modest salary increase each year. When renewing the contract, you are asked if you want to keep your current contract or activate a new one that also includes joining a restricted investment plan, lasting 10 years. The investment plan requires you to pay 10% of the salary increase in the first year, 20% in the second year, 30% the third year, etc., up to the 10th year (reaching 100% of the salary increase). What do you do?	Your employment contract stipulates that, every 3 years, you receive a modest salary increase. Would you like to join a 10-year tied investment plan that provides for the payment of 10% of the salary increase in the first year, 20% the second, 30% the third up to the 10th year (reaching 100% of the salary increase)?
	Confirm your adhesion to the investment plan	Confirm that you want to keep your current employment contract by not joining the investment plan	Yes, I would like to join the investment plan
	Request to be excluded from the investment plan	Ask to activate the new business contract by joining the investment plan	No, I would not like to join the investment plan

	Opt-out	Opt-in	Control
Scenario 2	<p>You have invested €10,000 in a 10-year investment fund, which gives you quarterly coupons of 50 euros. Your bank reinvests the coupons, automatically, in the same investment fund (instead of paying them into your own current account) increasing the invested capital. A regulation has come out from the European Union which obliges the bank to ask customers if they want to confirm or change this automatic mode. What do you do?</p> <p>Confirm that you want to reinvest the coupons in the investment fund</p> <p>Change your status, asking the bank to pay the coupons into the current account without reinvesting them</p>	<p>You have invested €10,000 in a 10-year investment fund, which gives you quarterly coupons of 50 euros. Coupons are deposited into your bank account. A European regulation has come out that obliges the bank to ask customers if they want to confirm the payment of the coupons into their current account or if they want to invest them in the fund, to increase the capital invested. What do you do?</p> <p>Leave the coupons in the current account, without reinvesting them</p> <p>Reinvest the coupons in the investment fund</p>	<p>You have invested €10,000 in a 10-year investment fund, which gives you quarterly coupons of 50 euros. Coupons can be deposited into your current account or reinvested in the fund you joined, to increase the invested capital. What do you do?</p> <p>Reinvest the coupons in the investment fund</p> <p>Ask the bank to pay the coupons into your current account, without reinvesting them</p>
Scenario 3	<p>The company where you work has activated health insurance for all employees, providing for an automatic deduction of 4% from the annual salary. For example, if your salary is 20,000 euros a year, the company will deduct 800 euros a year. You are asked whether or not you want to confirm adherence to the insurance plan. What do you do?</p> <p>Confirm adherence to the insurance plan</p> <p>Ask to be excluded from the insurance plan</p>	<p>The company where you work does not provide any health insurance for its employees. If you are interested in taking out health insurance, you will need to contact an external insurance company. The payment will be equal to 4% of your annual salary. For example, if your salary is 20,000 euros per year, you will have to pay 800 euros a year. What do you do?</p> <p>Keep your current salary by not joining the insurance plan</p> <p>Look for an external insurance company to take out health insurance</p>	<p>You have become aware of the existence of a health insurance plan, which provides for a payment of 4% of your annual salary. For example, if your salary is 20,000 euros per year, you will have to pay 800 euros a year. Would you like to join that insurance plan?</p> <p>Yes</p> <p>No</p>

### Abbreviations

GDMS: General decision making style; STAI-Y: State trait anxiety inventory-Y form; UK: United Kingdom.

### Acknowledgements

Not applicable.

### Authors' contributions

EG contributed to the development of the conceptual idea, recruited participants, performed the statistical analyses and drafted the manuscript. MMZ contributed to the development of the conceptual idea and helped to recruit participants and performed the statistical analyses. RN participated in the design of the study and contributed to the development of the experiment. FG contributed to conceive the study and participated in its design and coordination. All authors read and approved the final version of manuscript.

### Funding

No specific source of funding.

### Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

### Declarations

#### Competing interests

No potential competing interest was reported by the authors.

Received: 19 April 2021 Accepted: 24 December 2021

Published online: 09 March 2022

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