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Towards a more refined insight in the critical motivating features of choice: An experimental study among recreational rope skippers

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ABSTRACT

Objective: The question whether choice is a motivation and engagement-enhancing practice is a much debated subject, both theoretically as well as in practice. Therefore, the present study examined the impact of different types of choice on engagement and intended perseverance.
Design: and method: In a sample of Belgian rope skippers (n = 159; M_{age} = 17.17; SD_{age} = 8.43) an experimental field design was implemented, in which three different choice conditions were compared to a no-choice comparison group.
Results: Results indicated that being offered choice with regard the type of exercises (i.e. *option choice*) were mixed, with choice yielding a clear engagement and perseverance-enhancing effect compared to a no choice control group in cases the offered options differed clearly from one another (i.e., *high contrast option choice*), while no benefits were observed in case choice options leaned closely to one another (i.e. *low contrast option choice*). Athletes' involvement in the order of exercises during a training session (i.e. *action choice*) tended to enhance athletes' engagement, but not their intentional perseverance, compared to a no choice control group. Finally, all experimentally offered choices yielded a positive effect on two aspects of autonomy need satisfaction, that is, perceived choice and felt volition. These two variables functioned as a chain of mechanisms through which different types of choice related to athlete engagement and intended perseverance. These effects emerged irrespective of rope-skippers' dispositional indecisiveness.
Conclusion: The discussion highlights the importance of a nuanced discussion regarding the topic of choice, thereby contrasting the different pros and cons associated with each type of choice.

1. Introduction

The advantages and pitfalls associated with the provision of choice are heavily debated (Markus & Schwartz, 2010; Ryan & Deci, 2006; Schwartz, 2006). Paralleling the different viewpoints in academia, anecdotal and empirical evidence suggest that sport coaches and authority figures in general vary widely in the extent to which they believe in the motivating power of choice (Reeve et al., 2014). Some coaches hold the belief that choice fosters athlete engagement, whereas others are more sceptic about its benefits, arguing that choice is time- and energy-consuming and may come with a loss of authority. Indeed, research shows that coaches report using participative strategies, like the provision of choice, to a far lesser extent compared with other motivating strategies (Delrue et al., 2019). Further, there is wide variety in the type of choices being offered by coaches. Some coaches provide option choice, thereby allowing athletes to decide for themselves which exercises to perform, whereas other coaches provide action choice, which involves offering choice regarding how exercises are performed. In the latter case, athletes can decide, for example, the order in which they perform exercises (Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011) or the rate at which they shift from one exercise to another (Reeve, Nix, & Hamm, 2003).

Although these different types of choice can be distinguished conceptually (Reeve et al., 2003), their unique and differential effects on athlete motivation have received little prior attention. Therefore, the primary aim of the present study was to examine in detail when and for whom choice provision is beneficial. Specifically, we examined both the effects of the type of choice and the type of options being offered on

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rope skippers' experience of autonomy, activity engagement, and persistence. We also considered the role of interindividual differences in dispositional indecisiveness in effects of choice (Germeijs & De Boeck, 2003). The research questions were addressed in the context of sport, a life domain in which effects of choice are rarely examined (e.g., Prusak, Treasure, Darst, & Pangrazi, 2004). Indeed, contemporary studies on choice are predominantly conducted in the domains of (physical) education (Patall, Cooper, & Wynn, 2010), child development (Cote-Lecaldare, Joussemet, & Dufour, 2016), and health care (McKay et al., 2015; Vandereycken & Vansteenkiste, 2009).

1.1. Choice as an autonomy-supportive coaching strategy

The role of choice has been examined intensively in research on intrinsic motivation and related constructs from a Self-Determination Theory perspective (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017). According to SDT, choice provision is one specific strategy within the broader concept of an autonomy-supportive socialization style (Vansteenkiste, Aelterman, Haerens, & Soenens, 2019). When autonomy-supportive, coaches are interested in athletes' point of view, they promote athletes' self-initiation, they use inviting language, and they offer a meaningful rationale for introduced requests and tasks (Mageau & Vallerand, 2003). Ample evidence has demonstrated the benefits of perceived autonomy-supportive coaching for athletes' well-being (Adie, Duda, & Ntoumanis, 2008), quality of motivation (Delrue et al., 2019), engagement (Curran, Hill, Ntoumanis, Hall, & Jowett, 2016), and perseverance (Pelletier, Fortier, Vallerand, & Briere, 2001). However, the effects of specific autonomy-supportive strategies, such as the offer of choice, have been under-examined, at least in the sport domain.

In contrast to the sport domain, the topic of choice has received considerable attention in educational research (e.g., Patall et al., 2010). A meta-analysis encompassing more than 40 experimental studies on choice showed that the provision of choice yields multiple benefits, including enhanced intrinsic motivation, effort-expenditure, performance, and preference for challenge (Patall, Cooper, & Robinson, 2008). Importantly, observed effect sizes were small-to-moderate and large heterogeneity was found in the observed effects across studies. In fact, some studies even reported negative effects of choice provision (Overskeid & Svartdal, 1996; Parker & Lepper, 1992), indicating that not all choices are equally motivating. Since the publication of this meta-analysis more than a decade ago, the empirical work on choice has exponentially increased. While many studies continue to demonstrate that choice promotes desirable outcomes, including engagement (Patall et al., 2018), well-being (Van der Kaap-Deeder et al., 2017) and durable participation (Mitchell, Gray, & Inchley, 2015), others reported null-findings or even negative effects (e.g., Cosme, Mobasser, Zeithamova, Berkman, & Pfeifer, 2018).

Because research has shown that effects of choice are not always straightforward, it is important to better understand the complexity of choice provision. SDT provides a nuanced perspective on choice, arguing that contextual choice provision will only be perceived as motivating insofar as choice is conducive to the subjective experience of volition (Katz & Assor, 2007; Patall et al., 2018). Thus, choice represents a *need-enabling* strategy (Aelterman et al., 2019; Vansteenkiste et al., 2019). It has the potential to nurture individuals' psychological needs, yet, does not by definition does so. When the options offered through choice provision appeal to choosers' preferences or interests, the making of a choice will be self-expressive, thereby contributing to a sense of volition. Yet, when offered options do not appeal to choosers' preferences, the act of choosing as such may not necessarily translate into feelings of volition and yield less benefits or even no benefits at all (Wilde et al., 2018). Based on a series of choice experiments, Reeve et al. (2003) concluded that the experience of volition – more so than the degree of perceived choice - yields the most robust association with individuals' intrinsic motivation and perseverance.

Thus, from the SDT-perspective, the critical question is how the provision of choice is interpreted (Deci & Ryan, 1985; Patall et al., 2018; Soenens, Vansteenkiste, & Van Petegem, 2015). The extent to which the contextual provision of choice enables choosers to subjectively experience a sense of choice and volition depends upon several factors. Some of these factors deal with characteristics of the type of choice provided and with the nature of the options offered. Other factors involve more personal characteristics of the choosers. We discuss these factors that potentially affect the appraisal of choice next.

1.2. Characteristics of the provided choices and options: which types of choice are beneficial?

Effects of choice depend on a number of factors, including (a) the number of sequential choices that are being offered within a given timeframe, (b) the number of options that are provided within a given choice, (c) the type of choice that is provided, and (d) the nature of the options that are provided within a choice (Patall et al., 2018). Regarding the number of sequential choices, two to four choices have been found to be optimally motivating (Patall et al., 2008). When people need to choose more than 4 times, the act of choosing becomes energy-draining rather than energizing and motivating (Vohs et al., 2008). Regarding the number of options within a given choice, effects of choice provision are most beneficial for intrinsic motivation and well-being when three to five alternatives are offered within one discrete act of choosing (Patall et al., 2008). With fewer alternatives, choices may not allow choosers to act according to their preferences, thereby failing to support their sense of volition. With more alternatives, the abundance of options may become overwhelming and, as a result, impair effective decision making (Botti & Iyengar, 2006).

To date, research regarding the type of choices and the type of options is scarcer. Both the type of choice provided as well as of the nature of the options involved may, in conjunction, determine whether the motivating potential of choice gets actualized. As for the specific type of choice involved, a distinction has been proposed between option choice and action choice (Reeve et al., 2003). In the case of option choice, individuals are allowed to (repeatedly) pick one or more options from a predetermined list of options (Schraw, Flowerday, & Reisetter, 1998). An example is allowing athletes to pick one out of three different game-based exercises for closing a training session. The effects of this type of choice are rather mixed. Undergraduate students who were given choice about which of three texts to read did not display heightened interest and retention (Schraw et al., 1998). In contrast, 9th to 12th grade students who were provided choice about two similar homework assignments did report increased intrinsic motivation and performed better on test scores (Patall et al, 2010).

While option choice provides choosers with a chance to decide what they can do, action choice allows choosers to decide *how* a particular activity is conducted (Reeve et al., 2003). With action choice, what needs to be done is predetermined, but how the activity is executed can be decided upon by the chooser. Different types of action choice can be offered, such as a choice with respect to the difficulty level of a task (Leiker, et al., 2016), the persons with whom to cooperate, the order and pace in which to perform a series of activities (Mouratidis et al., 2011), and how a learning topic is taught (Jang, Reeve, & Halusic, 2016). As for the effects of action choice, a quasi-experimental study with young female volleyball players showed that an intervention encompassing action choices (e.g., choosing between hitting down the line or cross-court in an attacking drill) in combination with stimulating self-reflection enhanced need satisfaction, motivation, and sport commitment (Claver, Jiménez, Gil-Arias, Moreno, & Moreno, 2017). Likewise, when students in a physical education class could choose the order in which they complete predetermined exercises as well as the amount of time they allocate to each of the exercises, they reported greater enjoyment and vitality compared to classes during which such action choices were denied (Mouratidis et al., 2011). Similarly, offering

students the possibility to choose whether to use ski poles as an assistance device on a ski-simulator resulted in better performance (Wulf & Toole, 1999). Thus, whereas the effects of option choice are rather mixed, action choice seems to yield more pronounced benefits.

Not only the type of provided choice can differ, but also the nature of options offered can vary, an issue that applies both to action and option choice. With low contrast options, there are only minimal differences between options. When low contrast options are offered, options lean so close to one another that choices are more difficult to make. Low contrast options may impair choice-making both when choosers need to choose between only attractive options (Luce, 1998) and when they choose between only unattractive options (Higgins, 1998). Both choosing between desirable alternatives and choosing between the pest and cholera may appear difficult. In one illustrative study, children were found to report less intrinsic motivation when they were offered two equally appealing activities to choose from compared to when just one of those activities was offered (Higgins, Trope, & Kwon, 1999). In contrast, when offered options differ more strongly from one another, choosing may be less energy consuming. In the case of high-contrast choice, choosers have better opportunities to enact their preferences, thereby experiencing a greater sense of volition. Herein, we will examine the motivational impact of both high- and low-contrast-choice compared to no choice provision, an issue that received no prior empirical attention.

1.3. Personal characteristics of the choosers: the role of indecisiveness

Whereas some people like to make their own choices, feel competent in their ability to choose, and happily consider different alternatives in order to pick one, others are more insecure when offered choice and more readily experience stress when having to choose. Trait-like individual differences in the latter problems with choosing and making decisions are captured with the concept of dispositional indecisiveness (Cooper, Fuqua, & Hartman, 1984; Crites, 1969; Osipow, 1999). Indecisiveness manifests when people need a lot of time to make decisions, perceive making decisions as difficult, allow others to take decisions for them, and tend to worry about or even regret the decision that is made (Cooper et al., 1984; Frost & Shows, 1993; Germeijs & De Boeck, 2002).

Indecisiveness hampers the decision-making process. Experimental studies have shown that people scoring high on indecisiveness need more time to decide (e.g., Rassin, Muris, Booster, & Kolsloot, 2008). Similarly, correlational studies demonstrated that indecisiveness is related to a reduced information search in real-life situations (Ferrari & Dovidio, 2000) and to more difficulties in choosing a college major (Germeijs, Verschueren, & Soenens, 2006). Because indecisive people also experience more problems during everyday decision-making, such as selecting a movie at the cinema or choosing a meal at a restaurant (Germeijs & De Boeck, 2002), the provision of choice might not necessarily be motivating for them. To illustrate, elementary school children scoring high on indecisiveness were found to benefit less from choosing between painting activities in terms of intrinsic motivation, compared to children scoring average or low on indecisiveness (Waterschoot, Vansteenkiste, & Soenens, 2019)

1.4. The present study

The overall aim of the current study is to provide a more refined insight in the motivational effects of choice. Specifically, we considered the role of different types of choice (i.e., option-choice vs. action-choice), different options (i.e., high-versus low-contrast options), and dispositional indecisiveness. The study was conducted among rope skippers in an authentic training context. Such an experimental field study yields high ecological validity and was also chosen because choice has been found to yield greater benefits when provided in a real-life context (Patall, 2012). During the experimental phase, participants performed three single rope exercises with varying types of choice and types of options being provided to participants depending on condition assignment. Specifically, participants in the control group were informed three times (i.e., for every exercise) that the experimenter had selected an exercise for them to perform. This no-choice condition served as a comparison group because an absence of choice is common practice in most sports contexts. In the experimental conditions, three different types of choice were offered. Specifically, participants in the option-choice conditions could each time pick one out of three offered rope exercises, with options being either similar (i.e., low-contrast option choice) or dissimilar (i.e., high-contrast option choice) in terms of attractiveness. In contrast, participants in the action choice group could choose the order of performing the exercises.

Three main hypotheses were formulated. First, we expected that low-contrast option choice would have no, or only small effects in terms of autonomy need satisfaction, engagement and intended perseverance, compared to a no choice control group (Hypothesis 1a). Previous studies showed that choices are less beneficial if they provide limited possibilities to enact one's personal preferences (Katz & Assor, 2007). Because high-contrast option choices may yield a greater chance to pursue one's preferences, we hypothesized that this type of choice would enhance athletes' motivational functioning compared to a no-choice comparison group (Hypothesis 1b). Regarding action choice, we hypothesized in accordance with previous research in the educational domain (Reeve, et al., 2003) that action choice would promote athlete autonomy need satisfaction, engagement, and intended persistence (Hypothesis 1c).

The second research question is whether autonomy need satisfaction serves as an intervening variable between the experimentally induced choice (versus the no-choice control group) and each of the outcome variables (Hypothesis 2). In doing so, we adopted a differentiated approach, thereby examining whether both the perception of choice and the experience of volition would in tandem explain the benefits of contextual choice provision on engagement and intended perseverance.

The third goal of the current study is to examine whether effects of choice depend on athletes' trait levels of indecisiveness. We hypothesized that individuals high on indecisiveness would benefit less from the opportunity to choose because choosing may appear difficult and require greater effort and self-regulation in their case. Also, athletes high on indecisiveness may more easily experience post-decisional regret, which may hamper their engagement and intended perseverance (Hypothesis 3).

2. Method

2.1. Participants

Participants were recreational Belgian rope skippers (n = 159; M_{age} = 17.17; SD_{age} = 8.43) with, on average, 4.5 years of rope skipping experience (SD = 2.96). The sample was predominantly female (154 females; 96.9%), with all rope skippers being an active member of a rope skipping club at the time of the study. A balanced number of participants below and above fifteen years (M = 12.28; SD = 1.05; M = 22.12; SD = 9.68) was sampled. Both age groups received a set of exercises that were matched to their age in terms of interest and challenge involved. This matching procedure was based on a pilot study with 30 rope skippers not included in the main sample (M = 22.12; SD = 9.68). The pilot study aimed to examine the attractiveness of a broad range of rope skipping exercises to be used during the main study. Similar to the main sample, half of the participants in the pilot study were aged between eleven and fourteen years, and half of the participants were fifteen years or older.

Data collection took place on two different moments. At the first moment of data collection, the data for the no-choice, action choice and low-contrast option choice condition were collected. In light of the

obtained findings for the low-contrast choice condition, we proceeded to run an additional high-contrast option choice condition at a later moment.

2.2. Procedure

Pilot study. Participants in the pilot study were recruited in two different rope skipping clubs in Flanders. Rope skipping club managers were contacted by phone, informed about the purpose of the study, and signed an active informed consent upon agreement to participate. Subsequently, active informed consent was obtained from head coaches before contacting the rope skippers. Finally, active informed consent was obtained from rope skippers themselves.

Following informed consent, an experimenter visited a regular training of the participants and took them aside in small groups of three to five randomly chosen persons. Participants viewed instruction videos in which the fifteen exercises were shown one by one through different video fragments. Following each video, participants rated the rope exercise in terms of anticipated (1) enjoyment, (2) challenge and (3) its unattractive character (2 items; i.e., boring and weary; $r = .48$), while also rating (4) their willingness, and (5) perceived competence to perform the exercise. These questions were answered on a 7-point Likert scale ranging from 1(*Not at all*) to 7 (*very much*). To match exercises to participants' skill level, both age groups were offered a different set of exercises. To avoid order-effects in participants' evaluation of exercises, three video files were created, differing the order in which exercises were presented. Participants were randomly assigned to one of the three files.

Based on the mean scores for each exercise, six attractive and three unattractive exercises were retained for the main study. Attractive exercises were rated as fun and challenging, were not perceived as boring/repetitive, and participants expressed strong intentions to perform them. The unattractive exercises were rated as repetitive and boring, were perceived to be rather low in fun and challenge, and participants' intentions to perform them were low.

Experimental study. Participants were recruited from nine rope skipping clubs in Flanders, the Dutch speaking part of Belgium. After head coaches of these clubs granted informed consent to invite rope skippers of their club, the rope skippers themselves were provided detailed information about the study either before or after regular training sessions. Rope skippers interested in participating signed an informed consent form, with active parental informed consent also being obtained for under-aged participants. Upon retrieval of the informed consents, rope skippers filled out a baseline questionnaire measuring relevant background characteristics and dispositional indecisiveness.

At least one day after completion of the baseline questionnaire, the experimental phase was organized during rope skippers' regular training. Specifically, rope skippers were taken aside in small groups of three to five randomly chosen persons to perform a series of three rope skipping exercises that lasted 5 min each. These small groups were randomly assigned to one out of four conditions, so that all participants within the same group were allocated to the same experimental or control condition. Immediately following the completion of the three exercises, participants filled out a post-experimental questionnaire that tapped into their perceived choice, volition, engagement, and intentions to persevere. Upon handing in the post-experimental questionnaire, rope skippers were debriefed within their small group and asked not to discuss the experiment with other skippers in order to minimize contamination across conditions.

Choice manipulation. The study consisted of three experimental conditions (i.e., low-contrast option choice, high-contrast option choice, and action choice) and one control condition. Using a yoked design, the four conditions differed in terms of the choice provided. Although participants were run in small groups, in each choice condition participants were required to make individual decisions. To limit the role of social pressure in the choice process, participants saw the videotaped exercises individually and made their choice in absence of the others. This was achieved by embedding video presentations within a PowerPoint slide set presented to each of the participants individually. In each condition, participants were provided with three series of video demonstrations. Depending on the condition they were in, participants then were told which exercise to do (in the no-choice condition) or received different types of choice and options (in the choice conditions). After having watched the video demonstration, participants performed a rope skipping exercise for 5 min. Hence, in total, three consecutive choice units were offered to participants in the experimental conditions, with each unit involving a video demonstration, a choice, and the performance of the chosen exercise. During each of the exercises, the experimenter gave each participant one standardized verbal instruction regarding the chosen activity. This was done to ensure that participants would perform the rope skipping exercise during the entire 5 min.

In the two option choice conditions, each participant was provided with three consecutive choices, each of which encompassed three options (cfr. Patall et al., 2008). The type of options offered differed between both option choice conditions. In the low-contrast condition, the offered options closely resembled each other in terms of attractiveness. That is, during the first, second, and third choice, rope skippers needed to pick one exercise out of, respectively, three attractive, three unattractive, and three attractive options. In the high-contrast option choice condition, rope skippers picked each time one exercise out of a series of two unattractive and one attractive exercise, presumably making it easier for participants to pick one option.

While participants could choose the type of exercise in both option choice conditions, the order of executing the exercises was predetermined. In contrast, participants in the action choice condition could choose the order in which exercises were performed but the type of exercises was predetermined. Specifically, the exercises chosen by participants in the low-contrast option choice condition were yoked to those presented to participants in the action choice condition. For the first choice, a set of three exercises was presented accompanied by the request to indicate which exercise they wanted to begin with. Having executed the exercise, the two remaining options were offered, thereby asking participants to select one of both. Having executed the second exercise, they proceeded to viewing and executing the third and final exercise.

Participants in the control group were not provided any choice. They were informed that the experimenter had chosen which exercises they needed to execute. They viewed one video demonstration at a time and, having watched the exercises, they performed the requested exercise for 5 min. Subsequently, they repeated the process for the second and third exercise. While the type of exercises in this condition was yoked to the choices made by participants in the low-contrast choice condition, the order was yoked with the order preferred by participants in the action choice condition.

To realize this yoking procedure the different conditions needed to be ran in a fixed order, beginning with low-option choice, moving to action choice and ending with the control group. Because control group participants were matched with those in these two choice conditions, they were not yoked to those in the high-option contrast condition. Thus, participants in the high-option contrast condition performed a (partially) different set of exercises compared to control group participants and also the order of exercise execution likely deviated from the control group participants, which may possibly explain any observed differences between both groups. Notably, this lack of yoking also resulted from the fact that this condition was run at a later moment in time.

2.3. Measurements

Questionnaires were administered at two different moments. Background characteristics and indecisiveness were part of the baseline

assessment. The post-experimental measure tapped into perceived choice, volition, engagement, and intentions to persevere. Except when indicated otherwise, response scales ranged from 1 (*totally disagree*) to 5 (*totally agree*).

Indecisiveness. The degree to which rope skipping participants were indecisive was measured by a well-validated 22 item questionnaire created by Germeijs and De Boeck (2003) (e.g., "*I often require a lot of time to make a choice"*). An indication of indecisiveness was obtained by averaging responses on all 22 items, which showed a good internal reliability (α = .91).

Autonomy need satisfaction. To tap into participants' experience of autonomy, participants completed two questionnaires, that is, the 7-item perceived choice subscale from the Intrinsic Motivation Inventory (Ryan, 1982) and the 4-item autonomy need satisfaction subscale of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015). Because the BPNSFS focuses on individuals' need-based experiences in general, the items needed to be slightly adapted to capture state experiences of autonomy need satisfaction (see also Van Petegem et al., 2017).

To examine whether these 11 items would capture the distinction between perceived choice and volition (Reeve et al., 2003), both an exploratory and a confirmatory factor analysis were performed on the entire set of items. Using the Lavaan package in R (Rosseel, 2012), results of an exploratory factor analysis provided evidence for the extraction of two factors (see Appendix 1). Using a cut-off value of 0.30 to identify substantial loadings, 8 items yielded a unique loading on one of both loadings and three items showed a cross-loading. Factor 1, containing three items of the BPNSNF and two items of the IMI, could be interpreted as reflecting participants' sense of volition during task engagement (e.g. "*I performed the exercises during the previous training session because I wanted this*"). The second factor contained three items, all of which were part of the IMI, and denoted participants' perceived choice (e.g. "*I did not experience performing the exercise as my own choice*" – reversed). Based on these results, a confirmatory factor analysis (CFA) was performed including two factors and eight items, which yielded the following fit ($\chi^2(18) = 52.49$, $p < .001$; CFI= .90; RMSEA = .11; SRMR = .06). The fit of this two-factor model was significantly better than the fit of a one-factor model ($\chi^2_{\text{difference}}$ (17) = 99.70, $p < .001$). The reliabilities for experienced volition (α = .77) and perceived choice (α = .72) were satisfying.

Engagement. Three facets of engagement, that is, behavioral, emotional and cognitive engagement, were measured. Behavioral and emotional engagement were measured with four items each, taken from the Engagement vs. Disaffection with Learning Questionnaire (Skinner, Kindermann, & Furrer, 2009). The items were slightly adapted to fit into the context of rope skippers. Both the measure for behavioral engagement (e.g., "*During the past single rope training I gave as much effort as possible*") and the measure for emotional engagement (e.g., *"During the past single rope training, I had fun")* displayed adequate internal reliability (α = .78 and α = .86, respectively). Cognitive engagement was measured with four items taken from the Metacognitive Strategies Questionnaire (Wolters, 2004; "*During the past single rope training, I tried to connect what I was learning to what I already knew*"; α = .60). All engagement indicators were measured on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Because of their high intercorrelations and consistent with previous research (Cheon, Reeve, Lee, & Lee, 2015), the three facets were averaged to form a single engagement composite score (α = .83)

Intended perseverance. Following previous research (e.g., Vansteenkiste, Simons, Soenens, & Lens, 2004), three items were used to tap into participants' intended perseverance (e.g., "*I would like to join a rope skipping day that is organized like today's single rope training*"). Responses were recorded on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Internal reliability of the scale was good (α = .73)

Table 1
Means, standard deviations, and correlations among measured variables.

Variable	*M*	*SD*	1	2	3	4	5
1. Age	17.17	8.43					
2. Indecisiveness	2.92	0.69	-.05				
3. Perceived choice	3.40	0.95	-.20**	.05			
4. Felt volition	3.58	0.71	-.21*	.08	.44**		
5. Engagement	5.30	0.74	-.05	.04	.24**	.58**	
6. Intended perseverance	3.44	0.93	-.41**	.07	.18**	.48**	.35**

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. *$p < .05$. **$p < .01$.

3. Results

3.1. Preliminary analyses

Background characteristics. Table 1 shows descriptive statistics and bivariate correlations among the study variables. As can be seen, older participants perceived less choice, reported less volition, and showed lower intentions to persevere. However, because participants fifteen years of age and older performed different rope skipping exercises than their younger counterparts, we also conducted a MANOVA with follow-up univariate ANOVAs with age as a categorical variable. Results showed a significant multivariate effect (Wilks's λ = .90, $F(1, 153) = 3.99$, p = .004), with follow-up analyses indicating that both age groups differed in terms of their intended perseverance ($F(1,153) = 11.70$, $p < .001$). Rope skippers younger than fifteen year showed greater intentions to persevere compared with rope skippers older than fifteen years (M_{young} = 3.70, SD_{young} = .84; M_{old} = 3.15, SD_{old} = .93). Given that provided exercises differed for younger relative to older participants and age related to perceived choice, perceived volition and intentions to persevere, all analyses systematically controlled for the categorical variable of age (contrasting rope skippers younger than 15 with those 15 or older). In addition, we systematically controlled for participants' indecisiveness due to its potential role during and after the decision making process (Rassin, 2007).

Differences between the conditions. Table 2 shows the means and standard deviations of the study variables for each of the conditions. To obtain a first view on between-condition differences in the dependent variables, we began with performing a MANCOVA-analysis (controlling for indecisiveness), thereby examining whether there were mean-level differences between the four conditions across all outcomes. The multivariate effect was significant (Wilks' λ = .60, $F(3,146) = 6.69$, $p < .001$), with each of the four follow-up ANOVAs (one for each dependent variable) also being significant (see Table 2, right column). Next, follow-up post-hoc comparisons using the Tukey procedure indicated that participants in the no-choice control group perceived less choice compared to participants in the three choice conditions (who did not differ among each other in terms of perceived choice). Perceptions of volition were significantly higher in the high-contrast option choice condition compared to the no choice condition, with the action choice and low-contrast option choice conditions falling in between. Furthermore, participants in the high-contrast option choice condition reported more engagement compared to those in the low-contrast option choice, with participants in the no choice and action choice conditions falling in between. Finally, participants in the high-contrast option choice condition reported more intended perseverance compared to participants in the three other conditions, who showed similar intentions to persevere.

3.2. Primary analyses

Hypothesis 1. Choice versus the Lack of Choice. Because we had a set of a priori hypotheses that pitted each of the choice groups against the control group, we proceeded with creating three dummy coding

Table 2
Description of Key Features of Conditions together with Means and Standard Deviations for the Variables of Interest.

Label condition	Control group	Action choice	Low-contrast option choice	High-contrast option choice		
Description						
Type of choice	Lack of	Order	Exercise type	Exercise type		
Type of options	Predetermined	Dissimilar	Similar	Dissimilar		
Number of choices	Zero	Two	Three	Three		
Outcomes	M (*SD*)	M (*SD*)	M (*SD*)	M (*SD*)	*F* (4, 148)	η^2
Perceived choice	2.57 (*.96*) [a]	3.53 (*.81*) [b]	3.76 (*.75*) [b]	3.82 (*.80*) [b]	19.29***	.27
Felt volition	3.26 (*.82*) [a]	3.62 (*.61*) [a, b]	3.59 (*.62*) [a, b]	3.88 (*.66*) [b]	4.80**	.09
Engagement	5.18 (*.72*) [a, b]	5.45 (*.60*) [a, b]	5.05 (*.82*) [a]	5.57 (*.69*) [b]	4.07**	.08
Intended Perseverance	3.32 (*1.06*) [a]	3.20 (*.75*) [a]	3.30 (*.93*) [a]	4.0 (*.73*) [b]	6.76***	.11

Table 3
Created dummy codes as a function of condition inclusion.

	Action choice dummy	Low-contrast option choice dummy	High-contrast option choice dummy
Control group	0	0	0
Action choice	1	0	0
Low-contrast option choice	0	1	0
High-contrast option choice	0	0	1

Table 4
Standardized regression coefficients of the dummy-coded choice variables in the prediction of outcome variables.

Predictor	Perceived choice	Volition	Engagement	Intended perseverance
Action choice dummy	.48*** [0.32, 0.64]	.23* [0.04, 0.41]	.17$^+$ [-0.02, 0.36]	-.05 [-0.23; 0.13]
Low-contrast option choice dummy	.61*** [0.45, 0.77]	.21* [0.03, 0.40]	-.07 [-0.26, 0.12]	.01 [-0.17, 0.19]
High- contrast option choice dummy	.54*** [0.38, 0.70]	.35*** [0.16, 0.54]	.22* [0.03, 0.41]	.31*** [0.14, 0.49]
R^2	.33	.11	.08	.21
F(df), *p*-value	14.73 (5, 148), $p < .001$***	3.65 (5, 148), $p = .004$**	2.71 (5, 145), $p = .02$*	7.94 (5, 146), $p < .001$***

Note. b represents the standardized regression weights; ***$p < .001$, **$p < .01$, *$p < .05$, $^+ < .10$

variables, each time contrasting a specific choice condition with the no choice control condition as a reference category. The specific contrast codes can be found in Table 3. These dummy coding variables were included as predictors in four separate regression models, one for each of the outcomes. As shown in Table 4, all three contrasts significantly predicted both indicators of autonomy need satisfaction, indicating that participants in each of the choice conditions reported a greater level of both felt choice and volition relative to participants in the no choice condition. Next, only participants in the high-contrast option choice condition showed higher engagement and intention to persevere compared to participants in the no choice control condition, while the two other contrast codes were non-significant.

Hypothesis 2. Aspects of autonomy as intervening variables. Structural equation modelling analyses using lavaan (Rosseel, 2012) were used to test whether perceived choice and volition serve as intervening variables in the effects of choice provision on engagement and intended perseverance. Although two of the contrasts (i.e., low-control option choice; action choice) did not yield direct relations with either engagement or intended perseverance, they may yield an indirect effect via the promotion of participants' autonomy. We tested a model with a sequence of mediators, where the experimental induction of choice first predicts perceived choice, as the most proximal outcome of the actual manipulation. In turn, perceived choice was expected to relate to higher experienced volition, which was expected to relate to engagement and perseverance. As can be noticed in Figure 1, after controlling for indecisiveness and the categorical age variable, the parameter estimates revealed significant pathways between the three modelled dummy-variables and perceived choice, which, in turn related to felt volition. Finally, felt volition was significantly related to both engagement and intended perseverance. Adding direct paths from the three contrast codes to either volition or the two outcomes and from perceived choice to the two outcomes did not result in a significant change in model fit and none of these direct effects were significant (all *p*'s $> .10$). The final model had an adequate fit ($\chi^2(11) = 27.91$; RMSEA = .09; CFI = .92; SRMR = .08). Finally, tests of indirect effects (MacKinnon, Lockwood, & Williams, 2004) indicated that action choice indirectly enhanced participants' engagement ($\beta = .10$, $p = .006$, [.03; .18]) and intended perseverance ($\beta = .11$, $p = .006$, [.03; .19]) via perceived choice and volition. Likewise, similar indirect effects via the sequence of both intervening variables were found for low-contrast option choice (resp. $\beta = .16$, $p = .002$, [.06; .26]; $\beta = .15$, $p = .003$, [.05; .25] in the prediction of engagement and perseverance) and high-contrast option choice (resp. $\beta = .13$, $p = .006$, [.04; .22]; $\beta = .12$ $p = .010$, [.03; .22] in the prediction of engagement and perseverance). These results suggest that an increase in felt choice and volition in combination could account for the direct benefits of high-contrast choice on both engagement and perseverance, while both indicators of autonomy need satisfaction also helped to explain why low-contrast option choice and action choice were related indirectly to participants' engagement and perseverance.

Hypothesis 3. Moderation by indecisiveness. To examine the moderating role of indecisiveness regarding the motivating impact of choice provision, a series of regression analyses were conducted (see Supplementary Table 1). To do so, we computed standardized scores for indecisiveness and for the contrast codes. These standardized scores were multiplied to create interaction terms. The three interaction terms were then entered as additional predictors above and beyond the main

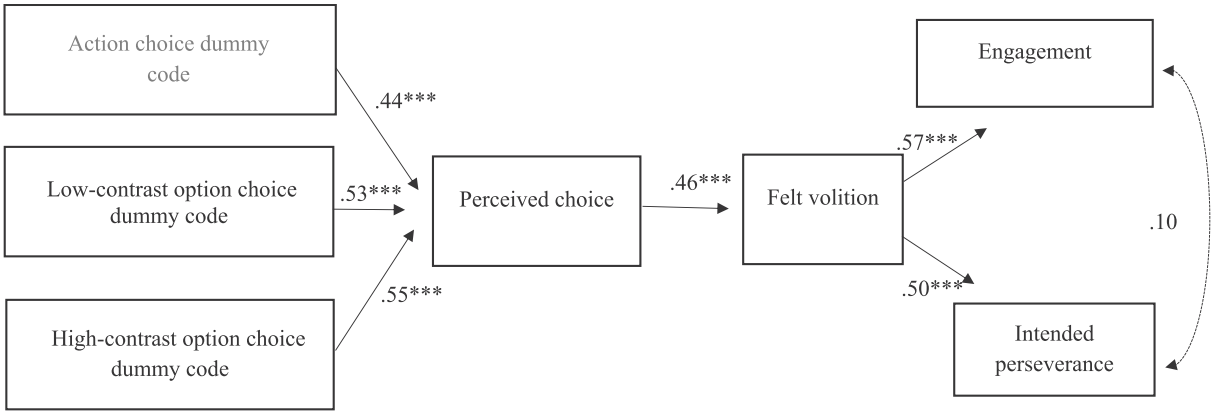

Figure 1. Graphical representation of the structural equation model regarding the intervening role of perceived choice and volition

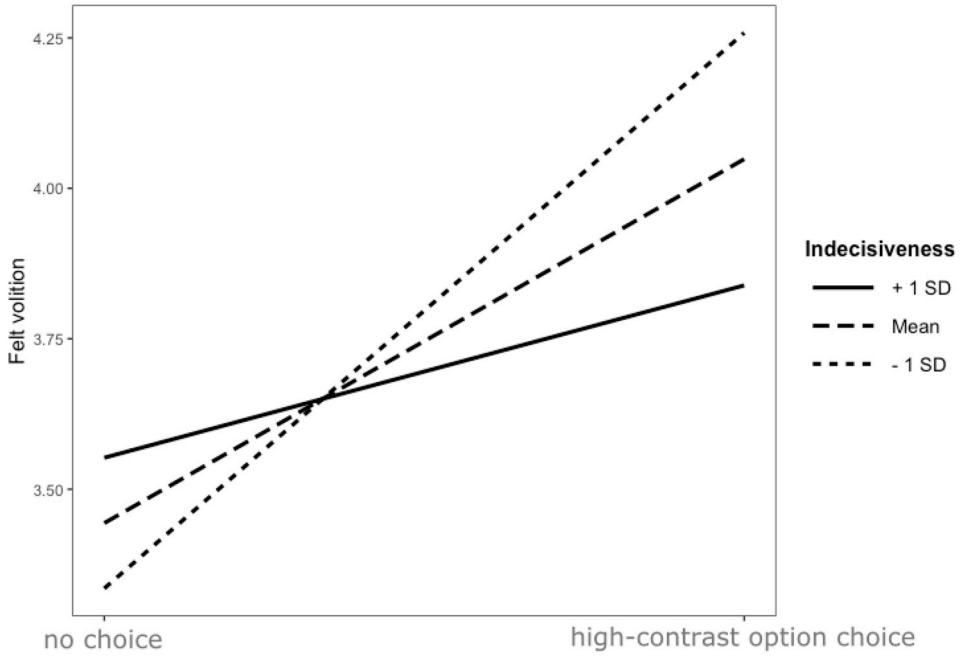

Figure 2. Graphical representation of the interaction between high-contrast option choice dummy and dispositional indecisiveness on volition

effects in a series of regression analyses. Out of 12 possible interactions (four outcomes by three contrasts), only one interaction effect turned out to be marginally significant. Specifically, indecisiveness tended to interact with high-contrast option choice in the prediction of rope skippers' sense of volition ($\beta = -.20; p = .06$). As indicated in Figure 2, this interaction shows that providing high contrast option choice tended to increase participants' volition to a greater extent for participants scoring low, compared to participants scoring on average ($t(11.8) = 5.37$, $p < .001$) and high ($t(8.97) = 9.86$, $p < .001$), on indecisiveness.

3.3. Supplementary analyses

In a series of supplementary analyses, age group was considered as a potential moderator of the different contrast codes. After standardizing age group and contrast codes, they were multiplied to create an interaction variable. The three interaction terms were then inserted as additional predictors in a series of regression analyses. Four significant interactions emerged, with one of them being presented for illustrative purposes in Appendix 1. Specifically, after controlling for indecisiveness, age group and the three contrast codes, the high-contrast option choice was found to especially promote a sense of choice ($\beta = .40$, $p = < .01$, [0.15; 0.64]), volition ($\beta = .64$, $p < .05$, [0.02; 1.27]), and engagement ($\beta = .82$, $p = < .01$, [0.15; 1.48]) in the older, compared to the younger, age group. Similarly, also low-contrast option choice promoted a greater sense of volition in the older, when compared to the younger age group ($\beta = .35$, $p < .01$, [0.09; 0.60]). Yet, because both subgroups differ in two respects (i.e., terms of developmental age and in terms of the type of exercises presented), it is not possible to provide a straightforward interpretation of the obtained interactions, which are in need of replication.

4. Discussion

The primary aim of the current study was to examine the motivating effect of different types of choice (relative to the lack thereof) in the context of sports. To do so, recreational rope skippers participated in an ecologically valid experimental field study. Results showed that not all choices are equally beneficial, calling for a differentiated stance towards the motivational practice of choice provision.

4.1. Is option choice effective?

Previous research indicated that, compared to the use of other autonomy-supportive strategies (e.g., providing a rationale, empathizing with the athlete), coaches are more reluctant to provide their athletes with choices (Delrue et al., 2019). One of the reasons for the more limited use of choice may involve the belief that choice is not necessarily effective. Several reasons can lead coaches to question the effectiveness of choice, such as the idea that athletes lack the expertise to decide which option is best for them or the fact that choice may elicit endless discussions and negotiation with team members and the coach. Overall then, by offering choice, some coaches may fear that they lose control over the content and the organization of the training sessions.

The present findings confirm that not all choices are created equal: the type of options being offered partially determined the effectiveness of choice. Specifically, in two different option choice conditions, participants were allowed to choose the content of the single rope training they performed. With the provision of low-contrast option choice, coaches remain in charge of the training content because they provide only options that slightly differ from one another. However, the results of this study showed that low-contrast option choice, where athletes repeatedly choose between alternatives that are very similar in content and perceived attractiveness, did not elicit extra effort or promote greater intentions to participate in similar rope skipping exercises in the future. Low-contrast option choice did relate indirectly to these outcomes through its facilitative effect on felt choice and volition. This finding is in line with studies indicating that the mere act of choosing is not by definition motivating (Flowerday, Schraw, & Stevens, 2004). Indeed, when options are hard to discriminate from each other, the act of choosing may be more difficult and energy-consuming, thereby minimizing the benefits associated with choice (Higgins, 1998; Luce, 1998). Also, under these circumstances, the offered options may entail fewer opportunities for the expression of personal preferences, which is critical to foster enduring motivation and engagement (Katz & Assor, 2007).

Opportunities for self-realization are more evident when provided options within a given choice differ to a greater extent, such as in the high-contrast option choice condition. When the options are opposite valenced with only one attractive and two unattractive options, the act of choosing may also require less mental effort such that choosing is less demanding to individuals' limited resources for self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Shafir, Simonson, & Tversky, 1993). This type of choice was found to enhance not only athletes' felt choice and volition, but also their engagement and their intentions to persevere, compared to when no choice was provided. In this case, a chain of mediators, that is, felt choice and experienced volition appeared to play a truly mediating role as these experiences accounted for the direct effects of high-contrast option choice on the outcomes. Although the present findings indicate that high-contrast option choice yields an engagement-boosting effect, it remains to be seen whether offering choice also contributes to athletes' actual skill development. As such, future research would do well to include performance measures. Meta-analytic evidence across various life domains showed that choice of activities in general enhanced task performance (Patall et al., 2008), although no studies in the sports domain were included. Therefore, an avenue for future research is to examine the effect of different types of choice on competence need satisfaction and actual skill development.

4.2. Is action choice effective?

Although the provision of choice is often understood and operationalized as the provision of a menu of options (Sebire et al., 2016), sport coaches can provide choice in other ways as well. That is, rather than allowing their athletes to choose which exercises, programs, or seasonal goals to pursue, coaches could allow choice about how activities are undertaken. Action choice (Reeve et al., 2003) can be operationalized in different ways, including the order of doing activities (Wulf & Adams, 2014), the pace of switching between activities (Mouratidis et al., 2011), when to use assistance devices (Wulf & Toole, 1999), or when to receive feedback (Janelle, Kim, & Singer, 1995). Action choice may be a more feasible strategy from the perspective of coaches because coaches remain in charge of determining the content of the training (i.e., the type of exercises offered).

Findings of the current study indicate that action choice, which involved allowing participants to have a say in the order in which exercises are performed, promoted a greater sense of choice and volition compared to not providing any type of choice. Such direct beneficial effects were not observed on engagement or intended perseverance. However, as was the case for low-contrast choice, action choice was related to these outcomes indirectly, through the enhancement of perceived choice and felt volition. Also in this case, it needs to be examined whether the benefits of this type of action choice extend to athletes' skill-development. Wulf and Toole (1999) already reported that action choice about when to use assistance devices enhanced complex motor skill retention. Likewise, providing gym attendants and kinesiology students the opportunity to choose the order of balance exercises resulted in less errors during practice and during retention (Wulf & Adams, 2014). Future research may examine whether similar performance-enhancing effects of action choice can be found in sports that require more complex motor skills.

4.3. The role of indecisiveness as a personal factor

A final research question addressed in the current study was whether effects of choice depend on athletes' dispositional indecisiveness. Results showed that effects of choice provision generally did not depend on athletes' indecisiveness. A minor exception is that highly indecisive rope skippers tended to benefit less from high-contrast option choice in terms of experienced volition.

Given that indecisiveness was found to relate to impaired decision-making in past research (e.g., Rassin et al., 2008), the limited number of interactions is remarkable. One possible explanation for this finding is that the rope skippers in the current study perceived the choice as rather trivial. The experimenter was a stranger to them and they were taken aside only for a short period in time. Therefore, it may have been clear to them that the choice they made would have little or no impact on their future engagement in rope-skipping. Indeed, previous research indicated that indecisiveness was more strongly related to difficulties regarding career choices, compared to everyday choices (Germeijs & De Boeck, 2002). Future research might investigate whether findings are different when choices have greater importance for individuals' future endeavors. Another possible explanation is that the number of options provided was too small for the costs of indecisiveness to emerge. Dispositional indecisiveness has previously been shown to hamper decision-making about which movie to watch at the movies or what dish to order in the restaurant (Germeijs & De Boeck, 2002). Because such situations typically entail a larger number of options than the three options provided in the current study, it could be the case that highly indecisive people have a harder time choosing when a more extensive set of options are offered. This possibility could be examined in future research.

To date, only few studies are available regarding the role of dispositional indecisiveness in action choice. In the study by Germeijs and De Boeck (2002) indecisiveness did not affect the one action choice under examination (i.e., the order in which lessons were studied). One reason why highly indecisive people may also benefit from action choice is that they do not miss any chosen option; in fact, because only the order varies as a function of their choice, they perform all offered exercises. The situation is different in the case of option choice, in which case indecisive people might regret not being able to participate in a certain activity due to their choice. Given that the role of

indecisiveness as a potential moderator of different types of choice has received limited attention, the present findings are in need of replication and extension.

4.4. Limitations and strengths

A first limitation concerns the generalizability of the current findings. As only recreational rope-skippers participated in the study, the question remains whether similar findings would be obtained among athletes from other individual or team sports or for competitive athletes. Future research also needs to examine the generalizability of the findings across developmental periods. Although we found some evidence for the moderating role of age in a series of supplementary analyses, the use of different exercises in both age categories provides an alternative account for the obtained interactions. Thus, future research among athletes faces the challenge of identifying an age-invariant set of exercises to examine whether the effects of choice vary as a function of age or developmental level.

Second, the study suffers from three methodological limitations. While we made use of self-reported outcomes only, future research could include observed ratings of engagement or behavioral indicators of persistence. For instance, persistence could be assessed by building in a free-choice period during which participants can freely decide to continue or disengage from the activity (Deci, 1971). Also, because the exercises offered in the high-contrast option choice condition were not yoked with those performed by participants in the control group, the difference between both conditions might also be accounted for by the different exercises performed by both groups of athletes. Third, participants were run in small groups. Although they were not allowed to talk to each other, there is still a small chance that their perceptions of choice, felt volition, engagement and intended perseverance had spread throughout the small groups, requiring multilevel analyses.

Finally, apart from autonomy need satisfaction, future research could also address the role of competence (Ryan & Deci, 2017). Two aspects of competence could be considered, that is, whether athletes feel capable to make a suitable choice and whether they feel capable to successfully perform the chosen activity. With regard to choice-related competence, previous studies indeed showed that choice yields fewer benefits if more effort is required to choose (Vohs et al., 2008), for example because of an overload of alternatives (Iyengar, Jiang, & Huberman, 2004) or because the offered alternatives are very similar (Luce, 1998). With regard to activity-related competence, previous research showed that individuals' choices are partially reflective of their expectations to perform well on the chosen activity (e.g., Feather, 1988). As the low-contrast option choices provide rope-skippers with similar alternatives, this type of choice may have required more effort and may have compromised the possibility to choose an activity that matches with their skill level. Future research may examine whether the lack of direct effects of low-contrast option choice on engagement and perseverance may be accounted for by reduced competence, either for the process of choosing itself or for the type of activity chosen.

4.5. Practical implications

Choice provision is considered as an ambivalent practice by coaches, with some coaches advocating its use, while other coaches advise against it. The current study allows for a more nuanced perspective on the applied benefits and drawbacks of choice provision. The current findings suggest that action choice might be a useful strategy for sport coaches: action choice indirectly contributed to athletes' engagement and perseverance, while it allows coaches to remain in control of the exercises they offer during training. Although low-contrast option choices yielded similar indirect benefits on engagement and perseverance, the question can be raised whether low-contrast option choice suffices to increase athletes' motivation. In particular when stimulating their athletes to perform rather repetitive or boring activities, coaches may need to use additional motivating strategies. For instance, if athletes are required to engage in the same repetitive exercises, with only slight variations between exercises, coaches may highlight the added value of the exercises (Jang, 2008) or validate the resistance that athletes display against the exercises (Deci, Egharri, Patrick, & Leone, 1994; Vansteenkiste et al., 2018).

Finally, high-contrast option choice provision can be beneficial in the context of sports, perhaps on the condition that it is used in moderation. For example, to end a training session coaches may allow athletes to choose an activity. The current study clearly showed that providing athletes with a handful of sufficiently distinct alternatives spurs their engagement and intentions to persevere. However, when this type of choice is used too frequently, coaches might lose control over their training content and be perceived as rather permissive, which might hamper skill and competence development in athletes (Delrue et al., 2019). On the other hand, with increasing age, athletes may come to select more routine-based, yet important exercises themselves rather than only sticking with the more attractive ones. Indeed, more experienced athletes would know that to perform at a high level, they cannot avoid the repetitive but critical exercises, which they may eventually engage in more willingly.

5. Conclusion

Offering choice to athletes is not an easy endeavor for coaches. Some coaches may consider themselves as an expert fully in charge of making decisions for their athletes. Other coaches may find it too difficult to offer their athletes choice or they may question the potential benefits associated with choice. The current experimental field study showed that action choice, low-contrast- and high-contrast option choices all nurtured recreational rope skippers' felt choice and volition. However, only high-contrast option choices directly enhanced rope skippers' training engagement and intended perseverance, while the other two forms of choice yielded only an indirect effect. Although some rope skippers may have more difficulty to make choices than others, the observed benefits of choice were largely unaffected by athletes' interindividual differences in dispositional indecisiveness.

Declarations of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.psychsport.2019.101561.

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