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ORIGINAL ARTICLE

Facilitating dual careers by improving resistance to chronic stress: effects of an intervention programme for elite student athletes

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Abstract
The starting point of this contribution is the potential risk to health and performance from the combination of elite sporting careers with the pursuit of education. In European sport science and politics, structural measures to promote dual careers in elite sports have been discussed increasingly of late. In addition to organisational measures, there are calls for educational-psychological intervention programmes supporting the successful management of dual careers at the individual level. This paper presents an appropriate intervention programme and its evaluation: stress-resistance training for elite athletes (SRT-EA). It comprises 10 units, each lasting 90 minutes. It is intended for athletes and aims to improve their resistance to chronic stress. The evaluation was carried out in a quasi-experimental design, with three points of measurement (baseline, immediately after, and three months after) and two non-randomised groups: an intervention group ($n = 128$) and an untreated control group ($n = 117$). Participants were between 13 and 20 years of age (53.5% male) and represented various Olympic sports. Outcome variables were assessed with questionnaires. Significant short- and mid-term intervention effects were explored. The intervention increased stress-related knowledge, general self-efficacy, and stress sensitivity. Chronic stress level, stress symptoms, and stress reactivity were reduced. In line with the intention of the intervention, the results showed short- and mid-term, small to medium-sized effects. Accordingly, separate measurements at the end of the intervention and three months later showed mostly positive subjective experiences. Thus, the results reinforce the hope that educational-psychological stress-management interventions can support dual careers.

Keywords: *Chronic stress, stress-resistance, elite athletes, intervention, evaluation*

Highlights
- In European sport science and politics, educational-psychological intervention programmes to support the individual management of dual careers in elite sports are being discussed increasingly. However, the development and evaluation of suitable intervention programmes are just at the beginning.
- This article presents a group intervention programme for elite student athletes to improve their personal resistance to chronic stress. With the improvement of stressresistance, daily stressors and personal stress reactions become less chronic. Also, the risk of stress-related impairments regarding health, well-being and performance should be reduced.
- In line with the intention of the intervention, the results of the quasi-experimental evaluation study showed short- and mid-term, small to medium-sized effects. The subjective experiences of the participants with the intervention programme are mostly positive.

Introduction

The notion of "dual careers" has been coined in sport science to address the fact that young athletes are obligated to balance the demands of two paths they pursue simultaneously – their educational/vocational careers and their sports careers. In sport disciplines with early specialisation, problems may already arise in primary school, but will inevitably escalate in adolescence and early adulthood, when increasing weekly training duration and competition requirements are accompanied by a rising cognitive load in education. Research and experience by practitioners have shown that a peak in multiple demands and

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perceived problem accumulation can be expected in the later school years, during vocational training or university studies (Aquilina & Henry, 2010; Brettschneider, 1999). When examining the experience of chronic stress for athletes, individual differences become apparent. Stress values mostly fall on the moderate side, yet athletes are significantly more stressed on average than people from the general population; whereas athletes with alarmingly high indicators of stress are mainly elite student athletes (shortly EA) who pursue a school or university career in addition to their elite-level sport (Richartz & Sallen, 2017). In this context, chronic stress is based on the frequency of perceived stressful situations in daily routines. Starting points of chronic stress, however, include recurrent, routine demands with a subtle beginning and end, and with increasing presence in everyday life (Wheaton, 1997). Chronic stress seems to play an important role in the dropout of athletic careers (Baron-Thiene & Alfermann, 2015). Exhaustion, depression, and burnout are some of the symptoms often mentioned in connection with chronic stress (Gustafsson, Madigan, & Lundkvist, 2017; Wheaton, 1997).

To safeguard the development of young athletes at the educational, psychological, and social levels in combination with success at the elite sports level, many societies have implemented special institutions and/or networks to facilitate such "dual careers". Basic requirements and recommendations have been propositioned by European experts (EU Expert Group, 2012). Despite various supportive activities and arrangements, pursuing a dual career still leaves adolescent EA facing a high-risk challenge.

In sport policy and sport science discourses, educational-psychological interventions based on empirical findings are more strongly suggested, as well as demanded, with emphasis on the promotion of mental health and holistic personality development. Guidotti, Cortis, and Capranica (2015, p. 13) summarised with their literature review, that interventions on the "micro dimension" (e. g. career support to promote life skills, psychological skills, and/or coping skills) "were considered crucial helping athletes to prepare for and/or cope with career transitions". The main factors involved in the demand for such interventions include chronic stress and demanding developmental transition periods in the context of dual careers for youth and young adults in elite sports (EU Expert Group, 2012; Stambulova, Alfermann, Statler, & Côté, 2009).

In the search for suitable measures within the field of career development/assistance, educational-psychological intervention programmes that improve resistance to chronic stress and support the individual management of dual careers are receiving more

attention. Such programmes can be understood as measures for general health promotion and disease prevention in the context of elite sports. They are highly attractive to EA (Sallen, Hemming, & Richartz, 2015). In scientific literature, intervention programmes with the above-mentioned focus in Germany as well as internationally are rarely described. There is also little known about the effects of such programmes due to the lack of evidence-based research (Alfermann & Preis, 2013; Sallen, 2017; Stambulova & Wyllemann, 2014). Overview papers reveal that the topic of stress in elite sports is almost solely geared towards the process of coping with short-term episodes of stress in sports-related settings (mostly competitive situations), as well as in counselling work with athletes, with a focus on anxiety and acute stress in relation to athletic performance, fatigue, and recovery (Brown & Fletcher, 2016; Nicholls & Polman, 2007; Rumbold, Fletscher, & Daniels, 2012; Tamminen & Holt, 2010; Thomas, Mellalieu, & Hanton, 2009).

Driven by the high interest of young athletes, the results of research, and the lack of intervention programmes, the authors have developed a stress-resistance training for EA (SRT-EA[1]). SRT-EA is a standardised educational-psychological group intervention programme to improve personal resistance to chronic stress. Stress-resistance stands in a broader sense for the resilience against stress (Holahan & Moos, 1990). An individual's resistance to stress indicates stable interpersonal differences, which lead to different effects of potential sources of stress on the intensity and chronicity of perceived chronic stress. With the improvement of stress-resistance, daily stressors and personal reactions to them should become less chronic. Hence, the risk of stress-related impairments regarding health, well-being and performance will be lower. The transactional stress model (Lazarus & Folkman, 1984) and successfully evaluated stress-management programmes without a specific orientation to elite sports were the basis for the development (Kaluza, 2015; Lohaus, 2011; Manz, Junge, Neumer, & Margraf, 2001; Schulz & Jansen, 2007). SRT-EA is a compilation of proven content of general stress-management programmes, whose shape has been adapted to the characteristics of the developmental stage and the life situation of EA, as well as the application examples and training materials. With the aim of improving stress-resistance, SRT-EA stimulates cognitive-reflective processes referring to knowledge, attitudes, personal demands and beliefs, perceptions of stress, patterns of coping and the assessment of demands and resources.

We expected that SRT-EA can enhance the level of personal stress-resistance. The objective of this study was to evaluate the effectiveness of SRT-EA. The

results are discussed and compared to those of similar programmes for EA and for the general population.

Methods

Design of evaluation study

The evaluation was designed as a quasi-experimental field study with three points of measurement (T1: Pre-test directly before SRT-EA, T2: Post-test directly after SRT-EA, and T3: Follow-up-test three month after SRT-EA) and two non-randomised groups: an intervention group (IG) and an untreated control group (CG). In both groups, the data collections were completed almost simultaneously. The study focused on short-term (directly after) and mid-term effects (three months after) of intervention.

Intervention

Involving psycho-educational and experiential group sessions SRT-EA directly and indirectly targets key characteristics and components of stress-resistance compiled by Schulz and Jansen (2007). A single, 90-minute session was provided once per week over a 10-week period. Table I details the content, activities, and purposes of SRT-EA. The compilation of the content of SRT-EA follows the idea of showing and using possibilities for intervention in different phases of stress genesis by means of the transactional stress model (Lazarus & Folkman, 1984). Various aspects of stress prevention (especially in sessions 6–9) and of coping with stress (especially in sessions 3–5) were selected. The sessions are interrelated and partly build on each other. Each session starts with a repetition of content from previous sessions, continues with new contents, and ends with a summary. The most important material is comprised in a personalised folder containing different sheets for each of the topic (worksheets, practice and summary sheets). The folder is worked through step-by-step during the units and in self-study. In the sessions, the exercises are designed for groups between 4 and 16 persons to support self-awareness and exchange of personal experiences with stress. Fictive examples chosen close to the athletes' reality provide the opportunity to work on personal stresses and strains without sharing too much personal information with other members of the group.

Measures

To test the effectiveness of SRT-EA, a quantitative-additive evaluation was conducted. In relation to the four-level model of programme evaluation (Kirkpatrick & Kirkpatrick, 2006), evaluative criteria were used illustrating different levels of the success of the intervention: (1) reactions (How did the participants like the programme?), (2) learning (What did the participants learn in the course of the programme?), (3) transfer (Will the participants be able to transfer the contents of the programme to their daily lives?), and (4) results (Does the intervention lead to positive changes regarding stressful experiences and behaviour?). If an intervention is successful, the above questions will be answered positively.

Three different standardised questionnaires were applied. The main questionnaire was implemented at T1, T2, and T3 for the IG and CG. This questionnaire consisted of sport-related questions, standardised scales of different stress-related indicators, and socio-demographic measures. Table II describes the outcome measurement instruments. Cronbach's α values range between .62 and .90, thus an acceptable internal consistency of all scales can be assumed. The test of stress-related knowledge covers how wide and profound the knowledge of stress is with open questions. It is designed to be answered by both IG and CG. The open answers were rated by two independent reviewers following a guideline (interrater reliability: $\kappa \geq .80$). Points were awarded for appropriate examples, suitable terms, and plausible explanations. All scales in Table II except stress-related knowledge (level 2) were used for measuring intervention effects at level 4. The assumption regarding the analyses was that higher stress-resistance becomes visible indirectly through a reduction in the perception of stress, lower stress symptoms and lower stress reactivity, as well as an improvement in stress-related knowledge, higher stress sensitivity, and a more optimistic general self-efficacy.

In addition to the main questionnaire, a questionnaire on the evaluation of SRT-EA was presented to the IG at T2. For this paper, three core items were selected and presented in the results section. The data were used to evaluate SRT-EA at level 1.

Finally, the IG filled out a questionnaire at T3, asking how successfully the lessons learned were applied in everyday life. For covering the transfer of experiences as widely as possible, nine items were developed that differed in their application of the content of the SRT-EA (Table IV). Participants were able to indicate the extent to which the transfer to everyday life was succeeded in the three months following SRT-EA. The response scale ranged from 1 (do not agree) to 5 (fully agree). The data were used to evaluate SRT-EA at level 3.

Participants

The participation in SRT-EA and the evaluation study was offered (for free) to all adolescent EA in

Table I. Contents, activities, and purposes of stress-resistance training for elite student athletes (SRT-EA)

Session	Topics	Purposes	Content and Activities	References
1	Introduction, stress-related knowledge and experiences	• Promotion of sensitive and early perception of typical personal stressors and reactions to stress • Promotion of stress-related knowledge	• SRT-EA preview • Completion of a self-assessment questionnaire regarding stress, coping, and resources • Definition of different types of chronic stress • Interactive elaboration and discussion of a simplified transactional stress model (Lazarus & Folkman, 1984) with the knowledge and experiences of the participants • Presentation and handing-out of working materials for SRT-EA	Lohaus (2011), Schulz and Jansen (2007)
2	Stress reactions and sources of stress	• See session 1	• Interactive classification and discussion of stress reactions and stress sources with the knowledge and experiences of the participants • Exercises of the evaluation and reflection of self-assessment results regarding stress reactions and sources of stress	Schulz and Jansen (2007)
3	Coping strategies	• Expansion the personal repertoire of coping strategies • Promotion of reflected and flexible use of coping strategies	• Interactive classification and discussion of coping strategies with the knowledge and experiences of the participants • Exercises of reflected using of coping strategies according to the developed classification scheme and selection criteria • Working on fictive and/or real situations from athletes' life	Schulz and Jansen (2007)
4	Coping strategies	• See session 3	• Continuation of exercises of reflected using of coping strategies according to the developed classification scheme and selection criteria • Exercise of the evaluation and reflection of self-assessment results regarding coping behaviour	Schulz and Jansen (2007)
5	Systematic problem solving	• Promotion of ability to approach problems systematically	• Description of the systematic problem solving procedure • Interactive exercise of applying problem solving procedures on fictive and/or real problems from athletes' life	Kaluza (2015), Lohaus (2011), Manz et al. (2001)
6	Stress-related thoughts and beliefs	• Reduction of stress-enhancing beliefs and negative thinking • Promotion of stress-reducing beliefs and positive thinking	• Introduction and exercises to learn how to identify and weaken stress-enhancing beliefs and negative thinking • Introduction and exercises to improve positive thinking	Kaluza (2015) and Lohaus (2011)
7	Personal strengths and weaknesses	• Promotion of positive-realistic self-concept and optimistic self-efficacy	• Exercises to identify, analyse, and discuss personal strengths and weaknesses (personal skills and resources) regarding their importance for stress prevention and coping with stress • Exercises to support optimistic self-efficacy	Lohaus (2011), Schulz and Jansen (2007)
8	Personal goals	• Increase awareness of the importance of personal goals • Promotion of reflected selection/setting of personal goals	• Introduction in and exercises of goal setting (inside and outside of sport) with SMART-criteria, focus on goal conflicts and differentiated work on outcome, performance, and process goals • Exercise of goal realisation and therewith related problems; exercise to develop solutions for anticipated problems • Exercise to reflect personal goals (inside and outside of sport) regarding available resources/skills	Kaluza (2015)

(*Continued*)

Table I. Continued.

Session	Topics	Purposes	Content and Activities	References
9	Time management and work-life-balance	• Increase awareness of the personal management of time and other resources • Promotion of reflected use of time and other resources	• Introduction in and exercises to time management on fictive and/or real problems from athletes' life (identifying causes of time pressure, developing strategies and instruments to prevent time pressure)	Kaluza (2015)
10	Retrospect, training of stress-resistance in daily life, Social support	• Encourage the personal use of stress-resistance training in daily life	• Interactive exercise to summarise and evaluate the content of SRT-EA with focus on developing a concept map (structuring technique) • Exercise of developing intentions and plans to train the personal stress-resistance in the future • Presentation and discussion of special options for EA to use social support in difficult situations	

class grades 10 and upward at four Germany elite sport schools. Elite sport schools are public schools with a special profile for facilitating dual careers in elite sports. Closely connected to Olympic training centres and other institutions of elite sports, they provide tailored timetables for education and training, training as part of physical education and short distances between school, training location and accommodation, as well as extended schooling in higher secondary education (Borggrefe & Cachay, 2012). Access to elite sport schools is offered to talented students showing high performance in Olympic sports. They are members of elite squads, participate regularly in competitions and often train daily, sometimes even several times a day.

The assignment to IG and CG was carried out according to the interest of the athletes as well as the willingness of support of their coaches and teachers. Additionally, it was important that participating schools, sports clubs, and training groups ensured continuous participation of their athletes in SRT-EA and the accompanying evaluation study during the school year 2012/2013.

The sample for the analyses of the main questionnaire consists of $N = 245$ athletes (53.5% male) between 13 and 20 years of age ($M_{age} = 16.38$, $SD_{age} = 1.26$). They represent various Olympic summer sports. Data from these athletes exist from all three points of measurement. Athletes who had already participated in a stress-related intervention programme before SRT-EA were not included in the sample. All selected participants in the IG were present for at least 75% of SRT-EA. IG consists of $n = 128$ athletes and CG $n = 117$ athletes. The number of participants in the IG who completed the additional questionnaires is $n = 166$ athletes (50.6% male, $M_{age} = 15.95$, $SD_{age} = 1.20$) at T2 and $n = 140$ athletes (56.4% male, $M_{age} = 16.61$, $SD_{age} = 1.22$) at T3.

Procedure of intervention and evaluation study

The intervention and evaluation took place in 2012 and 2013. The study was examined and approved by the regional school ministries and their data protection supervisors. All involved actors (school principal, teacher, coaches, parents, and athletes) were informed about the study. Participation was voluntary. Parents of participating EA provided their written consent for the participation of their children in SRT-EA and the accompanying evaluation study. For increasing the willingness of a continuous participation in the IG and CG, incentives were given at the first and second point of measurement (pencils and stress balls). The survey was conducted and logged by qualified researchers.

SRT-EA was taught by three qualified trainers based on an unpublished manual. Besides SRT-EA, the trainers were qualified to carry out other stress-management programmes for children, adolescents, and adults in the general population. The trainers were neither related to the participating schools nor the sport context of the participants. Thus, the participant–trainer relationship was free of pre-existing biases. Participants were distributed in intervention groups with an average size of approximately nine participants. Participants in each group were mostly of the same age and sport, mainly from their existing training groups. For most of the participants, SRT-EA was organised as part of their training sessions or PE lessons at school.

Table II. Components of the main questionnaire for measurement in intervention group and control group

Outcome variable	Instrument (Reference)	Item number	Description	Answer and value range	Cronbach's α at T1/T2/T3
General self-efficacy	General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995)	10	The general self-efficacy scale measures the optimistic self-beliefs a person has, by means of which they cope with different challenging demands in life. Typical item: *Thanks to my resourcefulness, I can handle unforeseen situations.*	Four-point Likert scale; possible responses are *strongly disagree* (1), *disagree* (2), *agree* (3), and *strongly agree* (4); mean score between 1 (*very low*) and 4 (*very high*)	.83/.84/.81
Chronic stress level	Screening Scale of Chronic Stress (SSCS; Schulz, Schlotz, & Becker, 2004)	12	SCSS measures psychosocial aspects of chronic stress. Chronic stress is characterized by a creeping onset, frequent recurring strains of low to high intensity as well as a long-lasting presence. Each item is rated in respect to how often EA have experienced a certain situation or have had a certain experience within the last three months. Typical items: (1) *I have too many tasks to perform.* (2) *Although I try, I do not fulfill my duties as I should.* (3) *Times when I worry a lot and cannot stop.*	Five-point Likert scale; possible responses are *never* (0), *seldom* (1), *sometimes* (2), *often* (3), and *very often* (4); mean score between 0 (*no stress*) and 4 (*very high stress*)	.86/.87/.88
Physical and psychological stress symptoms	Stress Symptoms Scale (SSKJ 3-8; Lohaus, Eschenbeck, Kohlmann, & Klein-Heßling, 2006)	6	The content of all items refers to the week before the assessment. Typical items: (1) *How often did you suffer from headaches last week?* (2) *How often did you have no appetite last week?*	Four-point Likert scale; possible responses are *never* (1), *once* (2), *several times* (3), and *almost daily* (4); mean score between 1 (*none*) and 4 (*high intense*)	.68/.67/.67
Stress reactivity	Stress Reactivity Scale (SRS; Schulz, Jansen, & Schlotz, 2005)	15	Stress reactivity describes the extent (endurance, speed, intensity) to which a person is likely to show emotional reactions to stress. Typical items: *When I'm faced with difficult tasks, […] (1) I'm usually very tense; (2) I'm often a bit restless; (3) I remain mostly calm.*	Three-point scale (1–3) with given item-specific responses; mean score between 1 (*low*) and 3 (*high*)	.80/.82/.83
Stress sensitivity	Stress Sensitivity Scale (FSS; Jansen, 2005)	6	Stress sensitivity describes how sensitive a person perceives stress and the reactions to it. Typical item: *With my typical reactions, I immediately perceive stress.*	Four-point Likert scale; possible responses are *strongly disagree* (1), *disagree* (2), *agree* (3), and *strongly agree* (4); mean score between 1 (*very low*) and 4 (*very high*)	.67/.65/.71
Stress-related knowledge	Own development (based on Lohaus, 2011)	4	Participants were asked about their knowledge of stress. They should write down as many examples as possible. Item 1 (focus on stressors): *What situations can cause stress for people?* Item 2 (focus on symptoms): *How can people perceive that they are in stress?* Item 3 (focus on coping strategies): *How do people try to cope with stressful situations?* Item 4 (focus on coping resources and stress genesis): *How would you explain that – in a certain situation – some people are really stressed whereas others are not?*	Questions with open answer-fields; answers were rated whether they were correct or not and a sum score (including all items) with a maximum of 37 points for correct answers was given (highest level of knowledge)	.62/.72/.74

Statistical analysis

Analyses were performed using SPSS® Statistics version 23. Missing values were calculated as the mean score of the available items if at least 75% of the items from each scale were answered. The answers from the IG resulting from the two additional questionnaires were only analysed descriptively. Independent *t*-tests were used to analyse baseline differences in age and outcomes between IG and CG and to examine differences in outcomes at T2 and T3 between dropouts and adherers. The analysis of differences in the distribution of gender between IG and CG at T1 was performed using the χchi-square test. To estimate short-term effects (T1–T2) and mid-term effects (T1–T3) of the intervention, group differences were calculated by ANCOVA using the baseline values (T1) of the dependent variables and age as covariates. For all outcome variables, an approximate normal distribution can be assumed since the distribution values are within the tolerance ranges for skewness ($\pm$ 0.5) and kurtosis ($\pm$ 1.0) recommended by Lienert and Raatz (1998). If there was no homogeneity of variance or sphericity, degrees of freedom were corrected.

Results

Pre-test analysis

The analysis of the data at T1 revealed no *baseline differences* between IG and CG in terms of stress perception, stress sensitivity, stress reactivity, and general self-efficacy. However, the stress-related knowledge reported by the athletes at T1 differed between IG and CG ($t_W(1, 224) = -2.85$, $p = .005$, $d = 0.37$): The CG had a slightly better knowledge about stress (Table III). No differences were found regarding the gender distribution at T1 between IG and CG, but there was a significant age difference ($t(1, 243) = -5.01$, $p < .001$, $d = 0.64$). Athletes in the IG were significantly younger ($M_{age} = 16.02$, $SD_{age} = 1.19$) than those in the CG ($M_{age} = 16.79$, $SD_{age} = 1.22$).

Lost to follow-up analysis shows differences between the number of dropouts in the CG and IG. The dropout rate in the IG seems to be relatively low, with 9% at T2 and 25% at T3. In the CG, the dropout rate is higher, with 27% at T2 and 58% at T3. Dropouts in both groups occurred almost exclusively due to the absence of athletes from school at the time of the surveys. The main reasons for absence were competitions, training camps, medical treatments and sport performance diagnostics, as well as class trips and group excursions. Systematic dropouts due to the lack of willingness to participate could largely be excluded. There were no significant differences between dropouts and adherers at T2 and T3 in the baseline values of outcomes. It can be assumed that there is no substantial attrition bias.

Outcome analysis

Level 1: reactions of program participants programme. The overall reactions to SRT-EA appeared to be very positive. To the question "How did you like SRT-EA overall?" 74% of the participants stated "good" or "very good", 21% stated "okay", and

Table III. Short- and mid-term intervention effects, controlled for baseline values of age and outcomes

| Outcome variable | Time | IG ($n = 128$) | | CG ($n = 117$) | | Intervention effects | | | |
		M	SD	M	SD	F	p	η_p^2	d
Stress-related knowledge	T1	11.46	3.19	12.77	3.92				
	T2	15.37	5.45	12.01	3.64	63.70	<.001	.21	0.73
	T3	14.43	5.01	12.13	3.66	48.35	<.001	.17	0.52
Chronic stress level	T1	1.72	0.60	1.70	0.67				
	T2	1.66	0.56	1.68	0.65	0.44	.522	.00	0.03
	T3	1.47	0.53	1.58	0.68	5.56	.019	.02	0.18
Psychosomatic stress symptoms	T1	2.12	0.52	2.07	0.55				
	T2	2.04	0.52	2.13	0.54	5.10	.025	.02	0.17
	T3	1.98	0.42	2.07	0.57	6.41	.026	.03	0.18
Stress reactivity	T1	2.09	0.33	2.11	0.34				
	T2	1.95	0.32	2.08	0.38	18.65	<.001	.07	0.37
	T3	1.94	0.31	2.06	0.38	15.62	<.001	.06	0.35
Stress sensitivity	T1	2.92	0.44	2.88	0.48				
	T2	2.93	0.42	2.91	0.44	0.38	.538	.00	0.05
	T3	3.03	0.40	2.89	0.47	7.02	.009	.03	0.32
General self-efficacy	T1	2.77	0.43	2.77	0.42				
	T2	2.85	0.40	2.77	0.48	3.99	.047	.02	0.18
	T3	2.81	0.35	2.78	0.42	3.13	.011	.03	0.08

about 5% were rather unsatisfied ("not so good"). No one was highly unsatisfied ("not good at all"). Also, their personal gain was rated positively by the participants. More than 68% of the participants (strongly) agreed with the item "I learned something meaningful and important to me." This positive evaluation was also reflected in the high agreement of 92% of the participants with the statement "I would recommend SRT-EA to other athletes."

Level 2: stress-related knowledge. The results displayed in Table III reveal that stress-related knowledge has a tendency to drop in the CG from T1 to T3 ($t(116) = 2.23$, $p = .027$), whereas in the IG there is a significant rise in knowledge from T1 to T2 ($t(127) = -8.89$, $p < .001$). The level of knowledge declines slightly afterwards, while still remaining significantly above the baseline level at T3 ($t(127) = -7.47$, $p < .001$). The means of IG and CG differ significantly at all points of measurement. Short- and mid-term intervention effects of medium size are shown. Participation in SRT-EA leads to an increase in stress-related knowledge, which occurs promptly and remains sustainable.

Level 3: transfer to daily life. Participants had somewhat more positive than negative experiences with transferring the learned content to their daily lives. In Table IV, this can be seen by the added mean scores of the relevant items which are above the average of the scale (3.00). Hence, most of the participants managed to apply the learned content at least somewhat successfully. The results also indicate that this applies equally to the content of almost all SRT-EA components.

Level 4: indicators for changes in stress-resistance. The results in Table III). illustrate the effects of SRT-

EA on different indicators for stress-resistance. Levels of stress perception, stress symptoms, and stress reactivity could be reduced by participating in SRT-EA. The results reveal small short- and mid-term effects. Whereas stress perception reached a significantly lower level for the IG than the CG only at T3. SRT-EA further led to a mid-term increase in stress sensitivity and promoted the positive development of general self-efficacy in the short- and mid-term. These effects were also small.

Discussion

The aim of the subsequent examination was to evaluate SRT-EA using four distinct levels of criteria. On the first level, athletes' reactions to SRT-EA were considered. The results show significantly positive reactions. One thing that stands out is that 92% of participants rated the programme as highly recommendable. This is notable because adolescents are particularly difficult to motivate for interventions to improve health and to prevent diseases (Hurrelmann & Settertobulte, 2002). Even though SRT-EA did not exclusively elicit positive participant reactions, the reactions were slightly more positive than those to similar intervention programmes (e.g. Dallmann, Bach, Zipser, Thomann, & Herpertz, 2016).

The second level addressed the question of how the stress-related knowledge of the participants has developed in the given timeframe. The results show a significant intervention effect in favour of the IG. This effect is also the strongest of all effects identified for SRT-EA. Looking at the results of other stress interventions in- and outside of sports, the transfer of declarative knowledge appears to be the most successful of all intervention aims (Lohaus, 2011; Manz et al., 2001; Preis, 2015).

Table IV. Experience with transfer of intervention content into daily life ($N = 140$)

Transfer-items	M	SD
Contents based on Units 1–2		
1. The acquired knowledge about my typical reactions to stress helps me to perceive stress sooner.	3.24	0.94
2. The acquired knowledge about my typical stressors helps me to react better to stress in everyday life.	3.16	0.88
Contents based on Units 3–5		
3. Now, I consciously use the familiar strategies for coping with stress.	2.95	0.86
4. With the acquired knowledge about my usual coping strategies, it is easier for me to tackle stress.	3.04	0.84
5. The acquired knowledge of the targeted selection of coping strategies makes it easier for me to deal with stress.	3.15	0.86
Contents based on Unit 6		
6. SRT-EA has encouraged me to use stress-reducing thoughts more often.	3.16	0.93
7. Because of SRT-EA, I am more sensitive to my stress-amplifying thoughts and beliefs.	3.15	0.92
Contents based on Units 7–9		
8. SRT-EA has encouraged me to rethink my personal demands and goals more often, and to adapt them so that I get less stressed.	3.17	1.07
9. The acquired knowledge about my personal resources helps me to address demands and problems more calmly.	3.37	0.88

The third level explored the success of independent application of the learned material in everyday situations, questioning whether the participants would be able to transfer the contents of the programme to their daily lives. The transfer can be seen as a huge challenge in the area of health promotion because the chance of success is more than marginally attributed to factors that lay outside the sphere of influence of individual-centred intervention programmes. Subjective assessments by programme participants have shown that the transfer to everyday life is not at all an unrestricted process. This should not be a surprise since such a result would more closely approach the unattainable ideal goal than realistic expectations. At the same time, SRT-EA is expected to enable participants to actively, independently, and effectively deal with negatively perceived stress in their everyday lives. This has been partially achieved, as the programme graduates have shown a tendency to perceive more positive than negative experiences in their daily lives. Nevertheless, the results indicate that the transfer to everyday life needs to be prepared and supported more effectively.

In accordance with the state of research, the effectiveness of stress interventions can mostly be attributed to significantly positive changes in the experience of stress, psychosomatic stress symptoms, and coping resources. These criteria for intervention success are contained within the fourth level. There was evidence that SRT-EA created significant changes in both the short- and mid-term in the intended direction for almost all of the selected outcome measures. These intended outcomes are of low to medium effect size. Due to its broad spectrum and size of intervention effects, the SRT-EA seems at least as effective as other stress-management programmes for EA (Sallen, 2017). The results are similar to those of common primary preventative stress interventions for youth in the general population (Lohaus, 2011; Manz et al., 2001). Meta-analyses show that larger effect sizes can hardly be expected in the area of primary prevention (Kaluza, 1997; Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006). It must be noted that the effects of primary preventative interventions can, in most cases, only be observed with significant delay.

In summary, SRT-EA seems to be a suitable tool for broad and sustainable facilitation of individual resistance to chronic stress. It can be seen as an alternative to universal life-skills programmes for EA and a complement to interventions with a focus on acute stress and/or psychological skills in sports. Person-centred interventions like SRT-EA should be embedded in larger, more complex programmes for the facilitation of dual careers and health promotion in elite sports. Sustainable effects on stress-resistance need to be supported by programmes that (1) create an organisational-structural coupling of academics and sports, and (2) include parents, teachers, and coaches of EA (Fletcher, Hanton, & Mellalieu, 2006; Lohaus, 2011).

Some methodological limitations, which are symptomatic for programme evaluations in the field of educational-psychological health promotion (Kaluza & Schulze, 2000), could not be avoided under the given study conditions. When interpreting the results, it should be noted that some bias effects cannot be excluded in the selection of participants for the IG and CG. Furthermore, self-evaluations can lead to exaggerated positive results, so that a careful interpretation is recommended. The results are related to the impact of the programme in its entirety. The design of the study and the selected outcomes do not allow conclusions on single effects of each component and on the achievement of sub-objectives. Future studies should focus on this deficiency and, additionally, consider potential effects of SRT-EA on parameters, which are relevant for successful dual careers (e.g. performance in school and sports). In this regard, it may be helpful to consider motivations (Lupo et al., 2015) and identities (Lupo et al., 2017) of EA.

Finally, a note about implementing the SRT-EA in elite sport structures: standardised group intervention programmes are not rigid concepts, but suggest a guideline-oriented, proven approach. They can and should be flexibly adjusted with regard to time, content, and the needs of the target group. Nonetheless, this flexibility does have its limits. It is not comparable to a loose assortment of tools for psychological training. Standardisation can thus potentially make programme implementation more difficult.

Note

1. In German-speaking areas, the acronym SRT-L is used for this intervention programme.

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