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PREVALENCE & DETERMINANTS OF DOPING IN RECREATIVE TRIATHLON

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PRESENTED AT

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Summary

Although the use of doping substances and nutritional supplements by professional athletes and the determinants thereof have been investigated extensively, the information of recreational athletes' use of doping substances and nutritional supplements is limited. This study explored the prevalence of different doping substances and nutritional supplements as well as the power of determinants as background characteristics, training habits and variables originating from the Theory of planned behaviour to differ between groups of doping behaviour (user versus non-user) and the intention (positive versus negative) to use doping among German speaking recreative triathletes. An anonymous questionnaire was answered by 142 participants (105 men, 37 women), acquired via personal mailing (N=36) as well as via postings and invitation for participation in three Facebook-groups. The current use of doping was reported by 15% of the sample, all participants declared to use nutritional supplements. Asthma medication and cortisone for the doping substances and sport gels, drinks, minerals and magnesium for the nutritional supplements were found to be the most popular substances. Perceived advantages of doping ($F(13,128) = 2.083$; $p = 0.019 < 0.05$) differ significantly between persons who use doping substances and those do not use doping substances. Self-efficacy ($F(17,124) = 4.050$; $p < 0.001$) differ significantly between persons having a positive intention and persons having a negative intention towards doping. In conclusion, use of doping substances is prevalent in this sample of recreative triathletes and the use of nutritional supplements is common. According to the findings of this study health education programmes should incorporate the perception of advantages and disadvantages of doping as well as the self-efficacy. The primary objective of those intervention programs should be to enhance the skills of athletes to resist the temptation of doping.

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THE USE AND DETERMINANTS OF DOPING IN RECREATIVE TRIATHLON

1. Introduction

"Sport is universally promoted as the manifestation of excellence, hard work, health, fair play and equality" (Barkoukis, Lazarus, Tsorbatzoudis & Rodafinos, 2013). But "when human beings are placed in a competitive setting, particularly in the field of sport, they will attempt to gain an advantage over their opponent in order to achieve superiority and win the competition." (Holt, Erotokritou-Mulligan & Sönksen, 2009). This advantage is for example the use of forbidden methods and the intake of substances to become unnaturally stronger - that is what is known as doping.

As reported by Prokop (1970) the term "*doping*" became part of the English language in 1933, but was not yet explicitly defined. The definition of doping was adopted for the first time in 1963 by the Council of the Europe Committee for Out-of.School Education "Doping is the administration to or the use by a healthy individual … of any agent or substance not normally present in the body … and/or of any physiological agent or substance … when introduced in abnormal additional quantities and/or by an abnormal route and/or in an abnormal manner, … with the purpose and effect of increasing artificially and in an unfair manner the performance of that individual during the period of competition" (Council of Europe Committee for Out-of-School Education,1963).

Nowadays, the definition of the World Anti-Doping Agency (WADA) seems to be the most widespread. According to the WADA, doping summarizes every form and method of cheating behavior that can jeopardize an athlete's health, career and honor (WADA, 2011). Those methods and practices can be subdivided by the intake of

a) performance enhancing drugs,
b) substances to counter the effects of other doping substances,
c) substances to obtain a slim/or muscular physique and other substances (WADA, 2011).

Doping within the community of elite-level athletes attracts a high level of public attention. For example in the elite-level cycling a series of doping scandals and doping avowals have shown that doping is common practice among professional cyclists (Lentillon-Keaestner, Hagger & Hardcastle, 2012). One of the most stunning scandals in the history of doping was

the “Festina Scandal” in 1998. All members of the Festina team were accused of using doping substances or methods during the Tour de France 1998. In 2000 the suspicion that all nine Festina riders had been using EPO and other doping substances during the Tour was verified. Another example is the emotional avowal of Lance Armstrong in the popular talk-show of Oprah Winfrey in January of 2013. He confessed having taken different doping substances during his professional career (Macur, 2013).

The list of avowals or scandals in elite-level athletes in cycling as well as in other sports is long and much research is done to enlighten why elite-level athletes use doping substances. The investigation of doping in recreative sports is not as extensive as in the elite-level sports. In literature, recreational sport is defined as the “unity of different organized and unorganized sport facilities” (Müller-Platz, Boos & Müller, 2006). Whereas the high-performance level of sport applies only to the top athletes, recreational sport includes any person wanting to be physically active to participate in competition as well as people who train for health and condition. Consequently, recreational sport defines the broadest level of physically active people who should not be ignored by scientific investigation. However, only a few studies relating to doping and recreational sports were published. Within a study of Italian adolescents (Lucidi et. al, 2008), Danish non-competing athletes (Singhammer, 2013), Grecian leisure time exercisers (Tsochas, Lazarus & Barkoukis, 2013) and British highschool students (Bloodworth, Petroci, Bailey, Pearce & McNamee, 2012) a predominant positive attitude towards the use of doping substances was noticed. Certainly a positive attitude is not the same as the actual use of substances. But first ideas about the use of doping substances in recreative athletes evoked by the results of inquiries of high school students in the USA (Rogol & Yesalis, 1992) or Canada (Melia, Pipe & Greenberg, 1996). The abuse of anabolic substances among students was manifested. The substances, mostly anabolic steroids, were used to perform excellent in school sports, to shape the body athletically or to compensate psychological stress and physical overload.

Further research in different subgroups of recreative sports indicated the existence of doping in leisure-time gym users (Wiefferink et al., 2008). Singhammer (2013). This research attempted to investigate the attitude toward anabolic steroids among non-competitive athletes (athletic, ball, racket, aerobis, canoeing, martial arts, spinning, weight training, swimming and jogging). An outcome of that research was that a small proportion of the participants made experience with anabolic steroids.

The result of a Suisse study is that 81% of the interviewed recreational marathon runner (N=1201, 18-74 years) judge the prevalence of doping as a serious problem of

recreational sport (Kamber, 1995). In Germany a comparable study was administered to investigate the estimation of the prevalence of doping in recreational sports (Melchinger, Schwetje & Wiegmann, 1996). The results show that 68% of the 674 participants (18-25 years, from 15 different individual and group sports) estimate that doping is prevalent in recreational sport.

The actual prevalence of doping in recreational sport is hard to determine, because recreational sport is not bound by any form of doping control. Sometimes high performance sports and recreational sports overlap, e.g. during sport events such as marathons and triathlons in which recreational as well as professional athletes participate. On such occasions it is possible to test a broader population. Such tests have proven the presence of a great amount and variety of medicaments, but mostly included analgesics (painkiller), rheumatism plasters (plasters with heat developing ingredients) or asthma inhalers (Müller-Platz, Boos & Müller, 2006). A study of the prevalence within the fitness society of four EU-Countries (Germany, Belgium, Italy and Portugal) states that the consumption of doping substances is on the average 6% of the exercise population (Müller-Platz, Boos, Müller, 2006).

Additionally to doping, the massive use of nutritional supplements can result in health problems (Keun-Youl, 2005). According to the WADA, violations against the doping law are pursued with appropriate punishment. In contrast to the strict and world-wide valid doping legislature, the rules for the use of nutritional supplements are rather imprecise. Supplements were not officially defined until 1994, when Congress defined the term “dietary supplement” in the Dietary Supplement Health and Education Act (DSHEA). Within the Europe Union nutritional supplements are defined as “(…) any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans (…)” (European Council, 2002).

Within the EU, the allowed quantities of vitamins or minerals, is regulated by the European guidelines (What, 2009). The European Food Safety Authority (EFSA) has compiled risk assessments required for setting maximum levels. The EFSA has set "Tolerable Upper Intake Levels" (UL) for 16 vitamins and minerals. These UL-values are not to be mixed with maximum levels for foodstuffs in general. They describe safe levels for the daily intake of vitamins and minerals from all available sources such as conventional foodstuffs, enriched products and vitamin and mineral preparations. Whereas the maximum level indicates the amount of a vitamin or mineral which may be added to a food supplement. Other nutrients are not defined in detail within the EFSA, but examples like amino acids, essential fatty acids, roughage, or diverse plant- or herbal extracts are given. For foodstuffs with those

ingredients no UL's are given by the EFSA, although this does not mean that those foodstuffs are excluded from legislature. The novel-food enactment and food-concentration-enactment sum up a black list for substances which are forbidden in the food production (What, 2009).

According to § 1 of the Ordinance on Food Supplements (Verordnung über Nahrungsergänzungsmittel), food supplements are defined as foodstuffs

a) which are intended to supplement a normal diet,
b) which are concentrated sources of nutrients or other substances with a specific nutritional or physiological effect, alone or in combination, and
c) which are marketed in a dosage form, such as capsules, pastilles, tablets, pills and other similar forms, sachets of powder, ampoules of liquids, drop dispensing bottles and other similar forms of liquids and powders designated to be taken in measured small unit quantities (Kügel, Hahn & Delewski, 2007)

A study by Tsochas, Lazarus & Barkoukis (2013) investigated the prevalence of supplement use of leisure time gym-exercisers while asking potential participants face-to-face to fill in a questionnaire about social cognitions and their supplement use. The finding indicated that more than the half (65,1%) of the participants use supplements regularly. The motives to use nutritional supplements in recreative sports are different to those in the high-performance sport society. While athletes from the high-performance level are using nutritional supplements to maximize their athletic performance, recreative athletes use them for weight management, improvement of physical endurance and support of building muscle mass (McCreary, Hildebrandt, Heinberg, Boroughs & Thompson, 2007). Further, consumers frequently cite general health maintenance and the desire to decrease susceptibility to health problems such as stress, colds, heart attacks, and cancer as motivating reasons for nutritional supplement use (Ziegler, Nelson & Jonnalagadda, 2003). Other reasons are purely the taste, the attractive packaging or peer group pressure which is particular for adolescents (O'Dea, 2003). As well as doping research, the assessment of nutritional supplements in recreative sports is generally implemented in the group of leisure-time gym users and bodybuilders. Endurance sports seem to be excluded from doping and nutritional supplement research. Any doping substance or method included in the prohibition list has its own potential risks for the athlete's health. Some of the prohibited substances are intended for therapeutic purposes and require a physicians' prescription. The substances offered to athletes are often manufactured and sold illegally and are likely to contain impurities. Keun-Youl (2005) summarized the

expected benefit and potential negative consequences for health of various kinds of doping (table 1.).

Even though the use of nutritional supplements is not considered illegal, the threat towards health is distinctive for the following reasons. Athletes combining a plurality of supplements or using excessive amounts of them, risk an unbalanced diet (Chiou, Yang &Wan, 2011). Further, sportsmen reduce their training proportional to the consumption of supplements which is associated to health problems like ligament rupture or tearing of muscle fibre resulting from training overload per training unit (Chiou, Yang &Wan, 2011). As well as different doping substances conceal different health consequences, various nutritional supplements are also associated with a range of health consequences. Unfortunately, no unique concentration thresholds could be found in which a particular substance become harmful. Table 2 sums some famous agents in nutritional supplement products, their expected benefits for athletes as well as intake recommendations and potential health consequences if the agent is consumed excessively (Keun-Youl, 2005).

Table 1. Doping substances or methods and the related potential health consequences (Keun-Youl, 2005)

Substance	Typical user	Expected benefit	Potential Health consequence
Anabolic-Androgenic Steroids	- Professional and noncompetitive athletes from bodybuilding, weightlifting, track and field, cycling, baseball, wrestling, mixed martial arts, boxing, football and cricket (Cohen, Collins, Darkes & Gwartney, 2007)	- Fast improvement of athletic performance - Increasing muscle size - Reduction of body fat - Fast recovery from injury of muscle tissue	- *Cardiovascular effects* **(**arrhythmia, thrombosis, hypertension, sudden cardiac death) - *Hepatic effects* **(**hepatotoxicity (elevated liver function tests) jaundice, neoplasm) - *Reproductive- Endocrine effects* **(**libido changes, Subfertility In Males Only : Impotence, testicular shrinkage(atrophy), breast enlargement (gynecomastia), prostatic enlargement, reduction of sperm production In Female Only : Masculinization/Hirsutism, excessive hair growth on the face and body, deepening of the voice, enlargement of clitoris, abnormal menstrual cycles, reduced breast size Children: Premature epiphyseal closure of the growth center of long bones) - *Psychological effects / Behavioral effects* **(**mood swings, aggression, mania, depression, withdrawal, dependence) - *Dermatologic effects* **(**Acne, Striae, Alopecia, Collagen reducing skin elasticity) - *Musculo-skeletal system effects* **(**Muscle tightness and cramp, stiff tender, increased potential for muscle strains or rupture)
Stimulants	- College, professional and Olympic athletes from endurance sports as well as in group sports as baseball	- Improvement of physical strength and endurance exercises, improve reaction times, and reduce fatigue	- Increased heart rate, palpitation - Cardiac irregularities - Insomnia - Anxiety - Tremor - Aggressiveness - Inhibited judgement / decision making - Increased potential for dehydration

Table 1. Continued

Substance	Typical user	Expected benefit	Potential Health consequence
Erythropoietin (EPO)	- Used mainly by long distance-runners and cyclists	- Increased endurance - Delayed onset of fatigue	- Thickening of the blood clots (increases blood viscosity) - Increased risk of heart attacks, myocardial infarction and strokes - Pulmonary embolism
Growth Hormone (GH)	- Martial artists - Bodybuilders - Endurance athletes - Team player	- Reduction of body fat - Increased lean body mass - No increase in muscle strength	- Overgrowth of hand, feet and face (Acromegaly) - Heart diseases, myopathic muscle - Carpal tunnel syndrome - Increased oil gland production in the skin & increased sweating
Insulin-like Growth Factor (IGF-1)	- No specific group	- Increased muscle mass and strength - Reduced recovering times by inhabitation of cell death	- Hypoglycemia (low blood sugar) - Musculoskeletal changes such as enlargement of the heart, headaches and joint pains
Insulin	- No specific group	- Increased growth of lean muscle mass - Helps prevent muscle tissue breakdown	- Hypoglycemia - Nausea, weakness, shortness of breath - Drowsiness, coma, brain damages and death
Blood Doping	- Particularly long-distance athletes, runners and cyclists	- Improved endurance and performance by boosting the blood's ability to bring more oxygen to muscles	- Allergic reaction - Kidney damage - Fever and jaundice - Infectious diseases (viral hepatitis and AIDS) - Metabolic shock

Table 2. Nutritional supplements and the related potential health consequences (Keun-Youl, 2005)

Nutritional supplement	Recommendations	Expected benefit	Potential health consequence
Zinc	- There is no evidence found that intake of zinc via nutrition cause intoxication	- Boost the immune system - Speed recovery between workouts	- Nausea - Vomiting
Magnesium	- There is no evidence found that intake of magnesium via nutrition cause intoxication	- Faster muscle recovery - Reducing occurrence of muscle cramps	- Gastrointestinal upset - Nausea - Vomiting - Diarrhea - Interference with the absorption of calcium
Vitamin C	- 2,000mg per day before excessive effort is tolerated by healthy organisms	- Boost the immune system - Faster muscle recovery	- Diarrhea - Disturbance of the urine excretion
Calcium	- 1,000mg per day is healthy	- Helps prevent muscle cramps - Makes bones stronger	- Constipation - Bloating
Iron	- There is no clear threshold for the quantity of iron but healthy people got a hemoglobin value of 12-18g/dl	- Boost energy levels and endurance - Better oxygen supply	- Hepatic damage and cirrhosis - Hemochromatosis - Gastrointestinal upset - Constipation - Black stools which may be confused with gastrointestinal bleeding

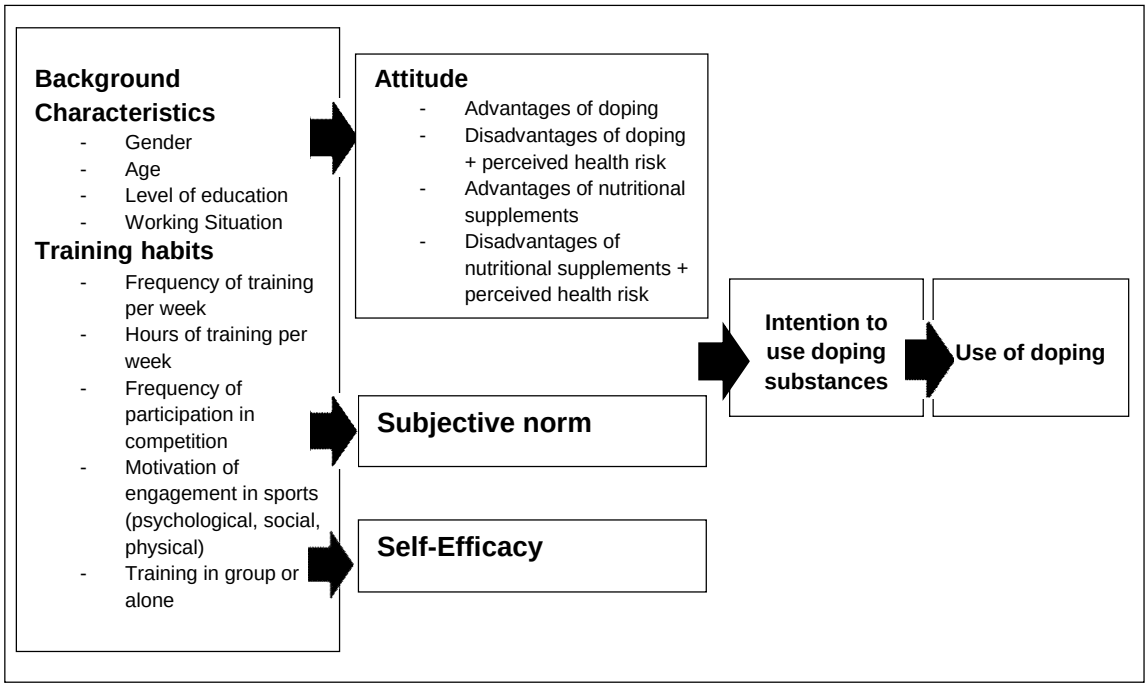
Table 2. Continued

Nutritional supplement	Recommendations	Expected benefit	Potential health consequence
Chromium	- 50–300 mcg per day is healthy - 600 mcg-2,400 mcg intake over more than 48h is asscociated with negative health consequences	- Stability of blood sugar - Decrease body fat - Increase muscles	- The concomitant addition of ephedrine to chromium preparations has been restricted because of significant complications, including hypertension, stroke, and death, even at lower doses
Selenium	- Supplementation greater than 100ug/day can cause health consequences	- Supplies the protein metabolism - Boost the immune system	- Nausea and vomiting, abdominal pain, and fatigue
Caffein	- Different organisms got different thresholds of tolerance - Supplementation between 5-300g is associated with death	- Enhance physical as well as mental performance during competition	- Flushing - Tachycardia - Anxiety - Trembling
Creatine	- 15 to 25 grams per day for five or six days (supply during competition) - 2 to 5 grams per day (long term supplementation)	- Build muscle mass - Improves performance - Delays muscle fatigue during short-duration and high-intensity exercise	- Water retention - Muscle cramping - Muscle (such as hamstring) tears - Electrolyte dilution - Gastrointestinal upset - Dehydration

1.1 Theory: Why athletes use doping substances?

Despite the associated negative consequences, use of doping and nutritional supplements in recreational sports is common. Insight into the determinants is necessary as, to date only little is known about the factors influencing the use of doping substances.

To elicit the reasons why people dope a theoretical framework containing constructs of the theory of planned behavior (Ajzen, 1991) as well as selected background characteristics will be used.



Graphic 1. Theoretical framework of the study

One of the common theories to investigate behaviour is the Theory of Planned Behaviour (TPB) (Ajzen, 1991). This theory forms also the base frame for this research study. According to the TPB the key element to predict behaviour is the intention which, according to the TPB, is determined by three variables:

1. Attitude
2. Subjective norm
3. Perceived behavioral control

The *attitude* toward a specific behavior is defined as "the individual's positive or negative evaluation of performing the particular behavior of interest" (Ajzen, 1991, p.117). The attitude towards doping is not only affected by the positive or negative evaluation of the use

of doping and nutritional supplements in general, but especially the perception of advantages of doping as well as disadvantages including potential health risks. The second construct is called the *subjective norm*, which describes the perceived social expectations and beliefs hold by social referents (Partner, peers, parents) about the individual's behavior and how important these opinions are to the individual (Ajzen, 1991). The *perceived behavioral control* is defined as the assessment of the necessary skills to overcome barriers to perform a certain behavior or not to do so (Ajzen, 1991). Additionally, the social-cognitive construct of *self-efficacy* is defined as one's internal opinion to achieve personal goals and to control behavior (Bandura, 1997). Bandura stated that high levels of self-efficacy predict a proportionally high capacity to resist deviant or dishonorable behaviors. Within this study the constructs of perceived behavioral control and self-efficacy are merged due to the length of the questionnaire. Questions relating to both constructs were asked within the subscale of self-efficacy.

The TPB is applied in research of doping behavior and results assuming that the constructs of the theory of planned behavior correlate with the intention to dope. For instance, the study of Italian students by Lucidi et al. (2008) suggests that a positive attitude towards doping combined with a stronger belief that significant others tolerate their use of doping substances (subjective norm) is contributing to a more pronounced intention to consume these substances. On the opposite, a higher self-efficacy is associated with a greater confidence in one's ability to resist social pressure to (perceived behavioral control) and consequently a weaker intention to use doping substances in the future (Lucidi et al., 2008). Another study of Gucciardi et al. (2010) emphasizes the importance of the attitude in context of doping intentions. Within the sample of (224) Australian athletes, favorable attitudes towards doping were associated with a greater predisposition to use doping (Gucciardi et al., 2010).

Some obvious results were found concerning the association between an individual's background characteristics and the use of doping. Various studies show that gender correlates with the use of doping. Males have a more positive attitude towards doping than females (Lucidi, Zelli, Mallia, Grano, Russo & Violani, 2008, Tsochas, Lazarus & Barkoukis, 2013; Whitaker, Long, Petroczi & Backhouse, 2013). Within a sample consisting of 1232 Italian students (49,31% female, 50,69% male) significantly different responses between male and female subgroups were given. Males expressed a more positive attitude towards the use of doping substances, anticipated more appreciation by peers and significant others if they use doping substances, were more willing to indicate the use of doping substances, and indicated stronger intentions to use doping substances than the female students. The females within this

sample were less suggestible for significant others and scored higher on self-determination with regard to the use of doping (Lucidi, Zelli, Mallia, Grano, Russo & Violani, 2008). The intention to use nutritional supplements instead of doping substances was investigated in another study. Within the sample of 196 Greek gym users (72,3% males) the male gender correlate significantly with more positive attitudes towards the use of supplements, weaker feelings of guilt through the use of nutritional supplements (personal norms) and also weaker scores on questions assessing their self-determination related to the use of nutritional supplements (subjective norm) (Tsochas, Lazarus & Barkoukis, 2013). Additionally, in a study of 729 American competitive athletes (cycling, athletics, badminton, football and hockey), 63% being male, the male cohort held significantly more positive attitudes towards doping than the female athletes. Also, significantly more male than female athletes held the believe that fellow athletes of their sport use doping substances (Whitaker, Long, Petroczi & Backhouse, 2013).

Furthermore, the level of education correlates with doping behavior. Within groups of non-competitive athletes from various sports, lower levels of education come along with more experiences in doping (Singhammer, 2013). Another indicator for doping behavior are experiences formerly made with doping. Doping experienced athletes are statistically significantly more open minded towards doping compared to non-experienced athletes (Singhammer, 2013; Tsochas, Lazarus & Barkoukis, 2013; Whitaker, Long, Petroczi & Backhouse, 2013).

According to Opaschowski (2008), the motivation for engagement in sports can be split into *psychological, physical* and *social motives* to engage in sport. Psychological motivation is characterized by the central goal to achieve well-being of body and soul as well as the strive to achieve the personal goals related to sport. Secondly, the physical motivation includes motives regarding the physical condition, outer appearance and health. Thirdly, the social motivation to engage in sport is to be amongst friends, to get to know other people with the same interests or to compare the own performance to others (Opaschowski, 2008).

The result of the literature review is that plenty studies have been executed to explore the reasons and determinants of doping use. But those studies were predominantly conducted among high-level athletes. Nevertheless sport is not only performed by professional, but by recreational athletes as well. The review of literature has shown the use of doping and nutritional supplements is prevalent among both groups of athletes. However, participants of research studies concerning are mostly recreative gym users or leisure-time bodybuilders and the substance of interest was almost always anabolic steroids. Studies including endurance

athletes and other substances are rare. When found those studies are often outdated and restricted to dietary patterns or training schedules (Worme, Doubt, Singh, Ryan, Moses & Deuster, 1990).

To fill this gap the primary objective of this research study is the exploration of the prevalence of doping substances and nutritional supplements as well as the determinants to use doping substances in the community of recreative triathlon athletes. The following research questions were elicited.

1. What is the **prevalence** of doping and nutritional supplements among German triathletes and which **substances and supplements** are used?
2. To what extend persons who use doping and persons who do not can be differentiated by…
    a) …their background characteristics **(gender, age, level of education, working status)**?
    b) …their training habits **(frequency of training per week, hours of training per week, frequency of participation in competition in the last 12 month, motivation of engagement in sports)**?
    c) …and their social cognitions **(attitude, subjective norm, and self-efficacy)**?

2. Method

2.1 Design and procedure

A cross-sectional study design was chosen to measure behavior (doping and consume of nutritional supplements) and associated assumptions (attitude, subjective norm, perceived severity etc.). The data was collected by an internet online questionnaire which was accessible from 26th May 2014 up to 23th June 2014. The questionnaire was split in seven subscales. To ensure completeness, the participants had to finish each subpart before being allowed to progress to the next question.

2.2 Recruitment and Participants

In order to achieve recreative triathletes in Germany to participate voluntary in this study, an invitation was placed via three social network groups of Facebook ("Triathleten in Deutschland", "Du bist ein richtiger Triathlet, wenn…" and "Triathlon-Planung und Training"), as well as via a mailing list of a regional sport association (Lippstädter Turn Verein) (N=36). Through Facebook as well as e-mail, a link to the questionnaire was accessible, so any reader willing to participate could access the study. The beginning of the questionnaire consist of a letter explaining the study's objective. Furthermore it is stated that anonymity is guaranteed. The participants need to meet certain requirements to enroll: they have to be at least 18 years of age, must be capable of reading and writing the German language and need access to the internet.

2.3 Instrument

An instrument with in total seven subscales was developed in cooperation with a regional triathlon trainer and athlete. Participants provided personal and sociodemografic information, as well as answers to questions regarding their training habits and motivation of engagement in sports. The survey was completed answering questions reflecting constructs of the theories of planned behavior. The questionnaire is written in German, because the potential participants were recruited from a target group of German triathletes. In table 3 the number of items per subscale as well as their minimum and maximum values and their reliability coefficients were summed.

Table 3. Number of items, minimum, maximum and reliability of the subscales

Scale	# items	Min	Max	α
Psychological Motivation	3	3	15	.49
Social Motivation	4	4	20	.45
Physiological Motivation	4	4	20	.76
Attitude Doping				
• Advantages	5	5	25	.67
• Disadvantages	5	5	25	.66
Attitude Nutritional Supplements				
• Advantages	7	7	35	.79
• Disadvantages	5	5	25	.80
Subjective norm	4	4	20	.56
Self-Efficacy	7	7	35	.72

Use of doping substances and supplements. The participants were given a list of doping substances and nutritional supplements and were asked to indicate for every doping substance and nutritional supplement, whether they had "consciously" used them "in the last three month". Options to answer for each product are "No, never", "No, but earlier", "Yes, unregularly", "Yes, for competition", and "Yes regularly, also beyond the competitions". The list of doping substances summarized compounds like anabolic steroids, stimulants or asthma medication and one category named "other performance enhancing medication". The list of supplements included established compounds like creatine, carnitine and calcium. In accordance to the regional triathlon trainer i.a. the category "Sportgels" and "Proteinshakes" have been added.

Motivation for engagement in sports. Because no instrument to measure this motivation exist, eleven items displaying the different motives for doing sports were formulated with an regional triathlete and his trainer. One item out of three of psychological motivation is „I do my workout, because it is a pleasure to do". Physical motives are represented by four items in form of, "I workout, because I want to get slim". Social motivation is detected with four items such as "I workout, because I want to get to know other athletes". Answers can be given with a 5-point Likert-scale ranging from 1 (I totally disagree) to 5 (I totally agree). The scores were summed up respectively for each type of motivation. Higher values symbolize a stronger agreement with the particular motive.

Attitude. The Attitude scale is divided in four subscales, measuring the perceived advantages and disadvantages and health risks of doping substances and nutritional supplements respectively. The participant's attitude towards doping and nutritional supplements was measured by expressing on a 5-point Likert scale to what extend "the use/intake of doping substances or nutritional supplements is…justified, unfair, helpful". The Likert ranges from (I totally disagree) to 5 (I totally agree). The scores of the items concerning the doping substances as well as the scores concerning the supplements were respectively summed up in a single score. A higher value indicated a more positive attitude towards doping or supplements.

Subjective norm. Four items measured the participant's subjective norms by asking, for example, „Do you believe, that recreational athletes consume doping substances? "or „Do you believe, that trainers support the intake?". Answers were given on a 5-point Likert scale ranging from 1 (I totally disagree) to 5 (I totally agree). The scores were summed up in a single score. A higher value indicated more positive norms toward doping substances or nutritional supplements within the triathlon society.

Self-efficacy. The development of the seven items measuring the self-regulatory efficacy regarding the doping and nutritional supplement was based on the interview of 3 regional triathletes who train regularly. They discussed the influences and reasons why they can imagine to use doping substances or (additional) nutritional supplements and selected certain parameters, such as the influence of their sport partners and trainers as well as the probability that the intake of substances and supplements lead to greater success. The questions are formulated like „How probable it is to you to resist the use of doping even if they were offered to you by your trainer? Again, answers can be given on a 5-point Likert scale ranging from 1 (very unlikely) to 5 (very probable). The Scores were summed up in a single score. After recoding all variables a higher value indicated a higher self-regulatory efficacy to resist the use of doping substances or nutritional supplements in the future**.**

Intention. One item measures the construct of behavioural intention of using doping substances:

(1) I would never take doping substances, even if the intake would be associated with a higher promise of success.

The item was rated on a 5-point Likert scale in which "1" indicates that participants "totally agree" whereas a "5" represents "total disagreement". A higher score represents a more positive intention to the use of doping substances as well as to nutritional supplements.

2.4 Data preparation and statistical analysis

Because participants could choose between a variety of answers regarding their level of education, working status and training habits, these variables were recoded. Education levels were categorized as “low”, representing participants having lower secondary education or a middle school degree, “medium” symbolizing high-school diplomas and apprenticeship diplomas and “high” summarizing certified technicians and participants with an academic degree. The working status was categorized in “unemployed” and “employed/in education” whereas employed means that participants are students, employees, freelancers or self-employees.

The quantitative data of this study was acquired via Qualtrics, a software enabling users to do many kinds of online data collection via self-established questionnaires. Following the closing of the questionnaire the collected data was exported to SPSS.22. The rough data file was saved, and the introduction text, IP-addresses of participants as well as start-and-end dates of questionnaire completion were deleted. In the next step all incomplete cases were excluded. The total number of participants and those who were excluded are listed in the description of the sample (3.1).

The categories of training were artificially recoded in continuous variables. The original items were categorical variables asking for frequency and duration of training for each sports (swim, bike, run, triathlon, other sports), but we wanted to know how often participants train per week and how many hours of workout they do per week. For the frequency of training per week the scale runs from “0” representing “never” up to “4” representing “4 times per week (or more)” the original category “unregularly” is coded as “missing”, because this category gives unspecific information. The scale of the duration per unit of training runs from “0” (never) up to “3” (2h per training or more)”. Frequency of competitions in the last 12 month runs also from “0” (never) to “3” (5 times or more). For each of these training habits a single score is calculated, whereas a higher score represents a higher frequency of training per week, a longer duration per unit of training and more competitions in the last year (Table 4.). Within the description of the sample the mean and the standard deviation of the training habits are listed in table 4.

To detect the prevalence doping, persons who dope were separated from those persons who do not dope. To be placed in the first group participants have to positively reply to have one or more out of six different doping substances with “yes, irregularly, only in competition or also beyond competitions”. Participants who do not use doping substances responded to all six substances with “No, never” “No, but in the past”. To be placed in the group of persons

having a “positive intention to dope”, participants had to answer the intention question by choosing a “4” or “5”, participants answering the intention question with “1”, “2” or “3” were placed in the group having a “negative intention to dope”. To describe the sample the percentages of distribution of gender, age, education level, working status and nationality were examined (table.4).

To compare the differences in categorical variables between groups of participants, data is analysed using the Chi^2 test. To test the significance of differences in the continuous variables between the two groups regarding doping behaviour as well as the intention to dope *p* was calculated by a univariate analysis of variance. The level of significance was set at .05.

3. Results

3.1 Description of the sample

In total 190 participants responded to the questionnaire, of which 45 were excluded from further analysis due to incomplete answers. This indicates that 24% of the initial participants did not finish the questionnaire. An additional three cases were excluded because the participants reported to be younger than 18 years of age. The final sample size was 142 participants. Table 4 summarizes the characteristics of all respondents.

The sample contains more males than females, 74% (N=105) versus 26% (N=37). Further 61% (N=87) of the participants are between 26 and 45 years of age. With regard to the level of education 64% (N=91) of people within this sample are certified technicians or hold an academic degree, and were grouped as “high” level of education. 92% (N=131) of the participants are employed or students in education, whereas 8% (N=11) are unemployed. Concerning the training habits, 85% (N=121) of the participants prefer to train in groups. The participants train an average of 8.9 times per week, with 7.4 hours of total training per week. They have participated in competitions on averagely 4.2 times in the last 12 month.

Table 4. Characteristics of all respondents in this study (N=142)

Variable	N (%)	Mean (SD)
Background Characteristic		
Gender		
• male	105 (74)	-
• female	37 (26)	-
Age		
• 18-25	19 (13)	-
• 26-35	46 (32)	-
• 36-45	41 (29)	-
• >45	36 (26)	-
Level of education		
• low	12 (9)	-
• middle	39 (27)	-
• high	91 (64)	-
Work status		
• unemployed	11 (8)	-
• employed/in education	131 (92)	-
Training habits		
Training		
• in group	121 (85)	-
• alone	21 (15)	-
Frequency of training per week	-	8.9 (2.8)
Hours of training per week	-	7.4 (2.2)
Frequency of competition within the last 12 months	-	4.5 (2.6)
Motivation of engagement in sports		
• psychological	-	12.0 (1.9)
• social	-	11.2 (2.8)
• physical	-	14.3 (3.2)

3.2 Prevalence of doping and nutritional supplements

The prevalence of doping within this research sample is 19 persons out of 142, representing 15% of the sample. Anabolic steroids and EPO were not used, but there were eight cases of current usage of asthma medication, eight cases of current usage of cortisone, four cases of current use of stimulants and one person declared the current use of undefined performance enhancing drugs. Concluding, it must be assumed that at least one participant reported to have used more than one doping substance. The use of nutritional supplements is more popular - all participants declared to use at least one supplement. Most favored supplements are sport gels, sport drinks, minerals and magnesium. Carnitine and Creatine were used least of all.

Table 5. Prevalence of doping substances and nutritional supplements in the sample (N=142)

Compound	**Prevalence** N=142 N (%)
Doping substances	
• Anabolic steroids	0 (0)
• EPO	0 (0)
• Asthma medication	8 (6)
• Cortisone	8 (6)
• Stimulants	4 (3)
• Other substances	1 (1)
Nutritional supplements	
• Minerals	85 (60)
• Vitamin C	48 (34)
• Vitamin E	29 (20)
• Carbohydrates	69 (48)
• Sportdrinks	126 (89)
• Sportgels	114 (80)
• Proteinshakes	77 (54)
• Carnitin	13 (9)
• Creatine	12 (8)
• Iron	36 (25)
• Cinc	42 (29)
• Calcium	44 (31)
• Magnesium	81 (57)

3.3 Predictors of doping behavior and the intention to use doping

No significant differences in gender, age, level of education or status of work existed in the use of doping or the intention to use doping.

Table 6. Differences in the background characteristics between users and non-users of doping substances and those having a positive or negative intention towards doping (N=142)

Background Characteristics	Doping bevaviour			Intention to dope		
	User N=19	Non-User N=123	p	Postitive N=8	Negative N=134	p
	N (%)	**N (%)**		**N (%)**	**N (%)**	
Gender			n.s.			n.s.
• male	15 (79)	90 (73)		7(87)	98(73)	
• female	4 (21)	33 (27)		1(13)	36(27)	
Age			n.s.			n.s.
• 18-25	3 (16)	16 (13)		0	19(14)	
• 26-35	9 (48)	37 (30)		2(25)	44(33)	
• 36-45	5 (26)	36 (29)		4(50)	37(28)	
• > 45	2 (10)	34 (28)		2(25)	34(25)	
Level of education			n.s.			n.s.
• low	0 (0)	12 (10)		0	12(9)	
• middle	9 (48)	30 (24)		2(25)	37(28)	
• high	10 (52)	81 (66)		6(75)	85(63)	
Status of work			n.s.			n.s.
• unemployed	2 (11)	9 (7)		0	11(8)	
• employed	17 (89)	114 (93)		8(100)	123(92)	

Table 7 shows the mean scores of the training habits in the group of persons using and those not using doping as well as for persons with either a positive or negative intention towards doping. None of the training habits differ statistically significant between persons who use doping and those who do not use doping.

	Doping bevaviour	Intention to dope

Training habits	User N=19	Non-User N=123	p	Postitive N=8	Negative N=134	p
	N(%)	**N(%)**		**N(%)**	**N(%)**	
Training			n.s.			n.s.
• in group	17 (90)	104 (85)		8(100)	113(84)	
• alone	2 (10)	19 (15)		0	21(16)	
	Mean (SD)	**Mean (SD)**		**Mean (SD)**	**Mean (SD)**	
Frequency of training per week	10.3(1.9)	8.7(2.9)	n.s.	9.5(5.1)	8.9(2.1)	n.s.
Hours of training per week	7.8(1.8)	7.4(2.2)	n.s.	7.8(2.9)	7.4(2.1)	n.s.
Frequency of competition	4.8(2.3)	4.4(2.7)	n.s.	7.0(3.5)	4.33(2.52)	n.s.
Type of athlete						
• Psychological	11.5(2.6)	12.1(1.7)	n.s.	12.6(2.1)	11.9(1.8)	n.s.
• Social	11.3(2.4)	11.2(2.8)	n.s.	11.9(2.8)	11.2(2.8)	n.s.
• Physiological	14.7(3.6)	14.3(3.2)	n.s.	14.9(3.5)	14.3(3.2)	n.s.

Table 7. Differences in the training habits between users and non-users of doping substances and those having a positive or negative intention towards doping (N=142)

Table 8 contains the samples means and standard deviations of the social cognitions and the differences in mean scores between persons who do and those who do not use doping as well as for persons with a positive intention and negative intention to dope regarding their social cognitions. Regarding the range of the scales of advantages and disadvantages of doping running from 5 to 25 it is obvious that the within the sample advantages of doping are valuated low with 7.4. The mean of 23.2 for the disadvantages reflects that the sample perceive the use of doping as dangerous for health. A reverse impression is woken for the advantages and disadvantages of nutritional supplements. The score range for the advantages runs from 7 to 35 and the samples mean is 20.3 opposed to 13.4 for disadvantages and potential negative health consequences of nutritional supplements, which scale runs from 5 to 25.

Table 8. Differences in the social cognitions between users and non-users of doping substances and those having a positive or negative intention towards doping (N=142)

Social Cognitions		Doping bevaviour			Intention to dope		
		User	Non-User	p	Postitive	Negative	p
	N=142	N=19	N=123		N=8	N=134	
	Mean (SD)	**Mean (SD)**	**Mean (SD)**		**Mean (SD)**	**Mean (SD)**	
Attitude							
Advantages of doping	7.4 (3.2)	8.7(3.3)	7.2(3.1)	<0.05	8.0(4.9)	7.4(3.1)	n.s.
Disadvantages of doping	23.2 (2.2)	23.2(1.8)	23.2 (2.3)	n.s.	23.9(1.8)	23.2(2.2)	n.s.
Advantages of nutritional supplements	20.3 (5.3)	22.6(4.5)	21.6(5.4)	n.s.	25.9(3.4)	21.5(5.3)	n.s.
Disadvantages of nutritional supplements	13.4 (4.2)	13.0(2.8)	13.5(4.4)	n.s.	11.6(4.2)	13.5(4.2)	n.s.
Subjective norm	15.6 (2.2)	15.6(2.2)	15.5(2.2)	n.s.	16.4(2.3)	15.5(2.2)	n.s.
Self-efficacy	28.5 (4.4)	26.6(4.3)	28.8(4.3)	n.s.	23.1(4.5)	28.80(4.2)	<0.05

Differences between persons who use doping and those who do not use doping were significant in the means of perceived advantages of doping ($F(13,128) = 2.083$; $p = 0.019 < 0.05$). Obviously, persons who do not use doping perceive doping as less beneficial in opposite to those persons who use doping. Additionally and in line with expectations, the self-efficacy differs between persons having a positive or negative intention towards doping ($F(17,124) = 4.050$; $p < 0.001$). Persons with higher self-efficacy have more power and strategies to resist the use of doping and a more negative intention to use doping substances.

Differences in the means per item are listed in table 9. It is obvious that persons who do not use doping score lower on all items of the doping advantage scale, but the greatest difference is found in item three. According to this finding it seems that persons who dope perceive doping on average for 0.4 points more helpful for the athletes performance than persons who do not use doping substances. Differences in items of the self-efficacy scale seem to be greatest in items 2, 3, 4 and 5. Persons with a positive intention to doping score 1.1 points lower on the item of estimation of further training without intake of nutritional supplements (Item 2). Further those persons with a negative intention valuate it for 1.1 points more probable to train without doping substances if their trainer will offer them. Item 4 of the self-efficacy scale represents the readiness to use doping substances ever if they were offered by the trainer. Those having a positive intention valuate the intake of supplement if offered by their trainer for 0.9 points more probable than those having a negative intention.

The mean scores of all items representing the self-efficacy to resist doping substances (Items 1, 3, 6, 7) are without exceptions higher in compared to the means of items representing the self-efficacy to resist the intake of nutritional supplements (2, 4, 5). This indicates that all

participants are more willing to avoid the intake of doping substances in comparison to the intake of nutritional supplements.

Table 9. Differences between the groups in the descriptive statistics per item of the advantages of doping and the self-efficacy scale

Advantages of Doping		**Doping behavior**	
		User N=19	Non-User N=123
Item		**Mean (SD)**	**Mean (SD)**
1	Doping is justified	1.6 (0.8)	1.3 (0.7)
2	Doping is fair	1.9 (1.3)	1.4 (1.0)
3	Doping is helpful	1.8 (1.0)	1.4 (0.8)
4	Doping should be legalized	1.5 (0.7)	1.4 (0.9)
5	Doping should not be punished more strict	2.0 (1.1)	1.8 (1.3)
Self-efficacy		**Intention to dope**	
		Positive N= 8	**Negative N= 134**
Item		**Mean (SD)**	**Mean (SD)**
1	I will train without d.s.	4.5 (1.1)	5.0 (0.2)
2	I will train without n.s.	2.1 (1.0)	3.2 (1.4)
3	I will train without d.s., also if they were offered by my trainer	3.8 (1.3)	4.9 (0.4)
4	I will train without n.s., also if they were offered by the trainer	2.1 (1.0)	3.0 (1.4)
5	I will train without n.s., also if they were offered by friends/sport partner	2.1 (1.1)	3.2 (1.4)
6	I will train without d.s, also if they were offered by friends/sport partner	4.4 (0.7)	4.8 (6.0)
7	I will train without d.s., also if the probability of better performance will increase	4.1 (1.1)	4.7 (0.7)

Note. d.s. = doping Substances; n.s. = nutritional supplements

4. Discussion

The purpose of this study was to explore the prevalence of doping among recreative triathletes. It is shown that the use of doping substances is prevalent in recreative triathlon.

Further, the perceived advantages of doping differ between groups of persons who use doping substances and those who do not. The investigation of differences in determinants of the intention to use illustrates that the self-efficacy varies significantly between persons having a negative or positive intention towards doping.

In the study of Müller-Platz, Boos & Müller (2006) the prevalence of doping in the fitness society of four European countries measured on average 6% of athletes. Remarkably, within the sample of this study the prevalence of doping is 13%. This is more than twice as high as expected. One explanation of this high prevalence might be the method of sampling. As it is used a convenience sampling, inviting respondents through selected Facebook groups and mailing lists, the sample may not be representative for all recreative triathletes in Germany. This anonymous method offers the advantage to recruit a large number of athletes who use doping substances, but it is therefore likely that users of doping are overrepresented. Therefore the prevalence reported in this study overestimates the actual prevalence of doping substances among all recreative triathletes.

On the other hand the used substances themselves must not be disregarded. In contrast to samples of athletic high school students reporting mainly the use of anabolic steroids (Melia, Pipe & Greenberg, 1996) the prevalence of anabolic steroids is not evident in this sample of recreative triathletes. An explanation might be that athletes of different sports "prefer" different substances. This conclusion is supported by Müller-Platz, Boos & Müller (2006) investigating another sort of endurance sport, namely marathon. Whereas anabolic steroids were not found, the use of asthma inhalers was common. But why do different sports prefer different substances? The explanation is given by their motivation to dope. Leisure time gym exercisers want to achieve fast changes in body shape (Cohen, Collins, Darkes & Gwartney, 2007), so they use substances as anabolic steroids associated with the expected benefit of fast increasing muscle size (Keun-Youl, 2005). Athletes of endurance sports want to finish a competition, without losses of their power, so they chose stimulants expecting to reduce the emerging fatigue (Cohen, Collins, Darkes & Gwartney, 2007). Other substances used in this sample were cortisone as well as asthma medication. Unfortunately, in this study the reasons why athletes use the substances were left out of investigation, so it is possible that some participants have got a medical indication requiring administration of cortisone or asthma medication. Consequently the prevalence of doping is overrepresented.

As anticipated, the use of supplements is more prevalent than that of doping. However, the consumption of supplements is also higher in this research sample than in other studies, with an average prevalence of supplements intake of 65% in leisure time exercisers (Tsochas,

Lazarus & Barkoukis, 2013). The method of data collection differ in both studies, might be responsible for this finding. While participants in Tsochas' study have had personal contact with the researcher, in this study the data collection is absolutely anonymous and without any contact between participants and researcher. The personal contact can lead to an underrepresentation of the prevalence of use of nutritional supplements in Tsochas' study because participants had contact with the researcher are more willing to answer questionnaires in a social desirable way. Another explanation of the higher refers to the physical requirements of triathlon. Triathletes train for multievent competitions and often work out several times a day or on consecutive days. Such extensive training schedules impose additional demands on the body's resources. To compensate this expenditure nutritional supplements are popular among triathletes (Worme, Doubt, Singh, Ryan, Moses & Deuster, 1990).

The most used supplements within this sample of recreative triathletes are sportgels and drinks. They represent a mixture of different supplements, promoted as healthy and beneficial aids to physical activity and healthy dieting. They are often used to compensate deficits caused by the outstanding training (Worme, Doubt, Singh, Ryan, Moses & Deuster, 1990). Further, Protein is used by more than half of the sample. It is one of the most popular supplements used by the athletes in an attempt to increase body mass and strength (Tsitsimpikou et al., 2011). Additional, the use of mineral and vitamin supplements is common in this sample. In another study analysing the motivation to use different types of supplements most popular reasons for the intake of minerals and vitamins were to promote better health, to prevent illness and the perception of doing something positive for themselves (O'Dea, 2003). Creatine is the least used supplement and this finding is in line with a literature review study by Quirk (2009). People using creatine expect enhanced performance and improved appearance, on the other hand they avoid creatine out of safety, reasons, as creatine seems to have uninvestigated side effects (Quirk, 2009).

All in all, triathletes within this study seem to use supplements to do something good for themselves. They wanted to accomplish their physical requirements and are interested in their nutrition.

As expected, athletes who use doping substances perceive more advantages of doping, and have a more positive attitude towards the use of doping use substances. This result is congruent with the finding of Gucciardi et al. (2010), suggesting a positive attitude is associated with a higher probability to use doping. One explanation of this finding is that users of doping substances are likely to self-justify for their actions and adjust their attitudes

towards the use of doping (Petrozci & Aidman, 2009). This is compliant with the association between attitude and behaviour described by Aijzen (1991); a certain behaviour is evaluated as beneficial the probability of performing the behaviour is higher. Regarding the differences in the beliefs about doping it seems that users having a higher belief that doping is justified, helpful and fair. In former research it is also noted that those beliefs influence an athlete's decision to engage in doping (Strelan & Boeckmann, 2006). An explanation of this result is that athletes with doping experiences tend to engage in self-justification, unconsciously adopted doping-related beliefs and values, in order to be congruent with their behavioural choices and practices. This requires behavioural reflection of persons who dope over their practices and self-justification of their behaviour. In contrast, person who do not use doping seem to adopt a more negative attitude towards doping.

Another finding of the current study is that persons with a negative intention towards doping are more confident about their capacities to avoid doping in the future. This is also consistent with former research. Bandura stated that high levels of self-efficacy predict a proportionally high capacity to resist deviant or dishonorable behaviors (Bandura, 1997). Doubtless, doping is defined as such dishonorable behavior (Lucidi et. al., 2008). Results of a comparable study prove that high self-efficacy is related to greater self-reliance in one's capacity to resist the use of doping substances in the future (Lucidi et al., 2008). Except the finding, that the self-efficacy to resist doping is in general high in this sample, the participants with a positive intention seem not to be sure to avoid the intake of doping substances if they were offered by their trainer. Doping research has highlighted the role of normative pressure, such as the influence of the trainer, on attitude and intention to doping (Petroczi, Taylor & Naughton, 2011). The finding of this study hints to an association between intention to dope and the influence of significant others but needs to be investigated in further research.

The null finding regarding the subjective norm needs closer scrutiny. One reason of this null finding might be the poor reliability of the measure of subjective norm. This may have hindered discovering differences in the intention to use doping substances as well as of the actual use of doping substances. However, it is important to note that other doping studies using the TPB also failed to find evidence for an effect of the subjective norm on intention to use or actual use of doping (Barkoukis, 2013). One reason might be that the majority of recreative athletes train and compete without doping substances. Therefore it is likely that athletes find it difficult to evaluate the dissemination and valuation of doping substances under the whole triathlete population. One solution of this difficulty might be to combine the questions about the subjective norm with explicit situational cues like usage and valuation of

doping during competition or after illness. Those cues do not trigger multiple measurements interpretation, which hinder the detection of systematic differences between users and nonusers of doping substances.

As mentioned above a shortcoming of the method of sampling was the possible overrepresentation of prevalence of doping caused by the method of sampling. Considering the triathletes enrolled in this study, a serious commitment to the sport is reflected by the extent the participants work out. Thus, the sampling method seemed adequate to recruit the requested participants. Moreover the high volume of participants as well as the participant's written feedback via e-mail indicated that the topic of this study is relevant. Participants remarked, that the length of the questionnaire was quite short for this delicate topic and they expressed their readiness to complete a much longer survey if this leads to a clarification about motives, prevalence and determinants of doping.

Regarding design and instrument of this study some limitations have to be brought up. As mentioned the design was cross-sectional. Data was gathered at a certain point of time in the beginning of the triathlon competition season with the use of doping substances being asked for about the past three months. Prevalence rates might change over the stretch of a year as result of seasonal consumption during competition period. Longitudinal research is advisable to get a higher reliability of the results. Further, the results and the interpretation refer only to a small group of recreative triathletes representing the whole triathlete population. Results must be interpreted with caution. To get a higher generalizability the study must be conducted in more than one sample.

Additionally, the instrument of a questionnaire hides problems when evaluating the doping prevalence. Using a list of substances in a questionnaire can result in under-estimating doping because some athletes might use other substances not suggested. Prevalence rates depend on the definition of doping applied by the researcher including the frequency of consumption and the reference period. Regarding the great variety of individual definitions of doping, questionnaires should include a variety of different questions. Combining close-ended questions, questions with a list of proposed substances proposed and open questions. Open questions enhance the likeliness to gather reliable results. Particularly amateur athletes might not know precisely which substances are prohibited. Next to a questionnaire, interviews are supplementary possibilities to investigate the prevalence of doping in recreative athletes. That is because non-professional athletes used not fear being convicted and therefore might render honest answers (Lentillon-Kaestner & Ohl, 2011). But it is important to consider that responses given in accordance to social desirability always pose a possible bias when

gathering self-reported data (Wiefferink et al., 2008). On the other hand the use of a questionnaire is a chance to measure the prevalence and determinants of doping because it enables contact with a lot of persons, in a standardized and systematic way, with low costs and data analysis can be automated.

To overcome the problem of the low α of the subscales it must be considered to use existing scales with appropriate α to achieve more reliable results. But it must be mentioned that this study was the first attempt to develop an instrument to measure the different motives of engagement in sport and the alpha could not be increased by deleting items. Regarding the low reliability, the interpretation of the results must be regarded with caution.

The developed theoretical framework was inspired by review of the literature and individual interviews of recreative triathletes and their trainer. An addition to the used TPB is the person's moral reasoning. Moral reasoning is a process in which individuals compare options of behavior with their internal moral standards. In context of doping this will be the planning to whether use doping and perform better, called positive self-reactions, or not to use and be free of sanctions or negative health consequences, which are possible negative self-reactions towards doping behavior. This self-monitoring and internal judgment process influences the doping behavior (Lucidi et. al., 2008). Additional to their moral standards athletes are driven by their goals. Elliot and Mc Gregor developed the achievement goal theory (2001). Evidence is found, that persons who use doping substances differ in their goals from those persons who do not use doping substances (Barkoukis et al., 2011). To gain a better insight in doping behavior within recreative athletes, further research should investigate if persons who use doping differ in their moral reasoning and their goals from persons who do not use doping.

Findings of this study can help to develop interventions for doping prevention. According to the results the role of self-efficacy should be an essential one, and efforts ought to be directed toward enhancing the resistance skills of athletes. One way to achieve this objective is the formation of implementation intention plans. According to Gollwitzer & Sheeran (2006), implementation intentions are applied to supply people with specific if-then plans. These plans contain descriptions of people's reactions to specific stimuli (e.g., social pressure), and direct self-control toward the situational stimuli. This means that instead of applying conscious control over regulating the target behavior, the person may achieve the desirable outcome by associating control with specific risk-conductive situations (e.g., "Next time I prepare for an important contest I will not engage in doping"). This approach will help athletes formulate specific plans to resist doping, but may also help them adopt appropriate

behavioral responses in line with the concept of fair play (e.g., “Next time I prepare for an important contest I will train harder, and follow a strict diet program”).

Further psychological research has shown that aroused fear influences attitude and behavior change (Rogers, 1985). Knowing this association should influence the preparation of preventive messages concerning the use of doping substances. If this source is very credible, the message is more likely to be heard. Athletes who confessed to their previous doping practices could become involved in preventive actions concerning doping use.

There is more than one possibility to design and implement such prevention programs. The least expensive might be an online prevention program, combining

1. information about doping and nutritional supplements adopted for recreative triathletes,
2. persuasive messages about potential negative health consequences of doping and nutritional supplements through personalized stories, and
3. examples of alternative reactions (implementation plans) to tempting situations by videotaped models.

Comparable prevention programs have already been developed for smoking behaviour and it is proven that those self-help programmes have a positive effect (Lancaster, Stead, Sowden, 2000). As mentioned recreative triathletes are concerned about the topic of doping and are very conscious about their nutrition. This awareness makes it likely that such prevention programmes could successfully reduce the prevalence of doping and sensitise athletes for the subject of doping and nutrition.

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6. Attachement

Sehr geehrte Damen und Herren,
liebe Sportlerinnen und Sportler,

mein Name ist Friederike Lollies, ich bin 26 Jahre alt und studiere den Masterstudiengang Gesundheitspsychologie an der Universität Twente im niederländischen Enschede. Im Rahmen meiner Masterarbeit führe ich eine Studie zum Thema Doping- und Nahrungsergänzungsmittel durch. Ich bin selber seit geraumer Zeit begeisterte „Hobby Triathletin“, daher bin ich besonders gespannt was die Ergebnisse meines Fragebogens zeigen werden.

Konsum bis hin zum Missbrauch von Nahrungsergänzungsmitteln und Medikamenten ist leider nicht nur im Hochleistungssport weit verbreitet, sondern hat mittlerweile auch den Breitensportler erreicht. In den letzten Jahren wurde dem Sportler der Zugang zu Nahrungsergänzungsmitteln, legalen Medikamenten (z.B. Schmerzmittel) bis hin zu unerlaubten leistungssteigernden Medikamenten (Doping), z.B. durch Internet, Auslandsapotheken, Schwarzmarkt etc. ermöglicht bzw. stark erleichtert. Leider werden beim Konsum mögliche gesundheitliche Risiken vollständig außer Acht gelassen.

Meine Überzeugung ist es, dass durch eine rechtzeitige und gezielte Aufklärung und Hinweis auf die Gefahren der Anwendung eine Sensibilisierung der Sporttreibenden erzielt werden kann und so auch ein Missbrauch verringert wird.
Für eine effektive Prävention sind weitere Informationen für mich von Bedeutung. Aus diesem Grund möchte ich Sie um Ihre Mitarbeit bitten, indem Sie den Fragebogen sorgfältig lesen und ausfüllen.

Es werden keine Daten erhoben, die eine Identifizierung Ihrer Person ermöglichen. Die Befragung ist also streng anonym.
Wir hoffen auf eine zahlreiche Teilnahme und möchten uns bereits im Voraus für Ihre Mitarbeit herzlich bedanken.
Sie benötigen für das Ausfüllen ungefähr 8-10 Minuten.

Indem Sie den folgenden Link in Ihr Browser-Fenster kopieren gelangen Sie direkt zu meinem Online-Fragebogen.

https://utwentebs.eu.qualtrics.com/SE/?SID=SV_8oVhwHj0cZW8ukB

Rückfragen bzw. Anregungen können Sie mir jederzeit unter

f.lollies@student.utwente.nl zusenden.

Mit freundlichem Gruß,

Friederike Lollies

Doping und Nahrungsergänzungsmittel im Triathlon

Sehr geehrte Damen und Herren, liebe Sportlerinnen und Sportler, ich freue mich sehr, dass Sie mir durch Ihre Teilnahme helfen eine Einsicht in das Konsumverhalten in unseren Sport zu bekommen.Um ein verwertbares Ergebnis der Studie zu ermöglichen bin ich auf Ihre Hilfe angewiesen, nur komplett ausgefüllte Fragebögen können mit in die Analyse einbezogen werden, darum ist ein Weitergang zwischen den Fragen nur möglich wenn auch die vorangegangene Frage beantwortet ist. Zu Ihrer Information:Es werden keine Daten erhoben, die eine Identifizierung Ihrer Person ermöglichen. Die Befragung ist also streng anonym.Ich hoffe auf eine zahlreiche Teilnahme und möchte mich bereits im Voraus für Ihre Mitarbeit herzlich bedanken. Es liegen nun 23 Fragen vor Ihnen und Sie benötigen für das Ausfüllen ungefähr 8-10 Minuten. Wenn Sie zwischendurch eine Pause machen wollen, ist dies kein Problem. Das System speichert sich nach der Beantwortung eines Blocks automatisch ab und Sie können jederzeit innerhalb einer Woche mit dem Einfüllen fortfahren. Rückfragen bzw. Anregungen können Sie mir unter f.lollies@student.utwente.nl zusenden. Vielen Dank für Ihre Unterstützungmit sportlichem Gruß,Friederike Lollies Ab jetzt beginnt der Fragbogen.

1 Ich bin...
- ❍ ...ein Mann (1)
- ❍ ...eine Frau (2)

2 Wie alt sind Sie?
- ❍ unter 18 (1)
- ❍ 18-25 (2)
- ❍ 26-35 (3)
- ❍ 36-45 (4)
- ❍ 46-55 (5)
- ❍ 56-65 (6)
- ❍ über 65 (7) _____

3 Besuchen Sie im Moment die Schule bzw. gehen Sie einer anderen Ausbildung nach?
- ❍ Ja (1)
- ❍ Nein (2)

4 Welche Form von Ausbildung ist dies?
- ❍ Hauptschule (1)
- ❍ Real- oder Gesamtschule (2)
- ❍ Gymnasium (3)
- ❍ Ausbildungsberuf (4)
- ❍ Universitäres oder Fachhochschulstudium (5)
- ❍ Ich gehe nicht zur Schule/mache keine Ausbildung (6)

5 Gehen Sie derzeit einer beruflichen Tätigkeit nach?
- ❍ Nein, ich bin arbeitslos (1)
- ❍ Ja, ich habe einen Arbeitsplatz (2)
- ❍ Ja, ich bin selbstständig (3)
- ❍ Ja, ich bin Freelancer (4)

6 Welches ist der höchste Abschluss den Sie absolviert haben?
- ❍ Hauptschule (1)
- ❍ Real- oder Gesamtschule (2)
- ❍ Gymnasium (3)
- ❍ Gesellenbrief (4)
- ❍ Meisterbrief/Techniker (5)
- ❍ Akademischer Abschluss (6)

7 Welche ist Ihre Staatsangehörigkeit?

8 Wie ist Ihre derzeitige Wohnsituation?
- ❍ Zu Hause bei meinen Eltern (1)
- ❍ Zusammen mit festem Partner/Ehepartner (2)
- ❍ In einer Wohngemeinschaft (3)
- ❍ Allein (4)
- ❍ Anders (5)

B2 Mehr als das erste Drittel ist geschafft!Durch das Beantworten der folgenden vier Fragen geben Sie einen Einblick in Ihre Sportgewohnheiten.

9 Klicken Sie pro Zeile das jeweils Zutreffende an.Wie oft gehen/absolvieren Sie...

	Nie (1)	1 mal pro Woche (2)	2 mal pro Woche (3)	3 mal pro Woche (4)	öfter als 3 mal pro Woche (5)	unregelmäßig (6)
...schwimmen? (1)	❍	❍	❍	❍	❍	❍
...laufen? (2)	❍	❍	❍	❍	❍	❍
...(Renn)Rad fahren? (3)	❍	❍	❍	❍	❍	❍
...eine kombinierte Einheit (mehr als eine Disziplin)? (4)	❍	❍	❍	❍	❍	❍
...anderen/weiteren Sport? (5)	❍	❍	❍	❍	❍	❍

10 Wie lange gehen/absolvieren Sie... (pro Einheit)

	Nie (1)	Weniger als 1 Stunde (2)	Ca. 1 Stunde (3)	Ca. 2 Stunden (4)	Mehr als 2 Stunden (5)
...schwimmen? (1)	❍	❍	❍	❍	❍
...laufen? (2)	❍	❍	❍	❍	❍
...(Renn)Rad fahren? (3)	❍	❍	❍	❍	❍
...eine kombinierte Einheit (mehr als eine Disziplin)? (4)	❍	❍	❍	❍	❍
...anderen/weiteren Sport? (5)	❍	❍	❍	❍	❍

11 Trainieren Sie in einer Gruppe/zu zweit?

❍ Ja, immer (1)
❍ Ja, regelmäßig (2)
❍ Ja, selten (3)
❍ Nein, immer allein (4)

12 Haben Sie in den letzten 12 Monaten an Wettkämpfen teilgenommen?

	Nie (1)	1 mal (2)	Mehr als 2 mal (3)	Mehr als 5 mal (4)	Mehr als 10 mal (5)
Schwimmen (1)	❍	❍	❍	❍	❍
Laufen (2)	❍	❍	❍	❍	❍
(Renn)Rad (3)	❍	❍	❍	❍	❍
Kombinierte Disziplin (4)	❍	❍	❍	❍	❍
anderer Sport (5)	❍	❍	❍	❍	❍

B3 Nur noch 10 Fragen bis zum Ziel!In dem Frageblock 3 geht es darum, warum Sie überhaupt ein Sportler sind - verraten Sie es mir?!

13 Warum machen Sie Sport?

	Trifft absolut zu (1)	Trifft zu (2)	Neutral (3)	Trifft begrenzt zu (4)	Trifft überhaupt nicht zu (5)
Weil ich gut darin bin (1)	❍	❍	❍	❍	❍
Weil es mir Spaß macht (2)	❍	❍	❍	❍	❍
Weil ich so in Kontakt mit anderen Sportlern komme (3)	❍	❍	❍	❍	❍
Für meine Kondition und Gesundheit (4)	❍	❍	❍	❍	❍
Weil meine Freunde es auch tun (5)	❍	❍	❍	❍	❍
Weil es mir Spaß macht an Wettkämpfen teilzunehmen (6)	❍	❍	❍	❍	❍
Um abzunehmen (7)	❍	❍	❍	❍	❍
Um mehr Muskeln zu bekommen (8)	❍	❍	❍	❍	❍
Für eine gute Figur (9)	❍	❍	❍	❍	❍
Um zu gewinnen (10)	❍	❍	❍	❍	❍
Weil ich es gut finde, wenn andere sehen wie gut ich bin (11)	❍	❍	❍	❍	❍

B4 Im Sport, sei es Breiten- oder Leistungssport werden Substanzen zur Leistungsförderung eingenommen. Hier geht es darum einen Einblick zu bekommen inwieweit verschiedene Mittel verbreitet sind.

14 Nehmen Sie, oder haben sie in den letzten 3 Monaten bewusst folgende Mittel eingenommen?

	Nein, noch nie (1)	Nein, aber früher mal (2)	Ja, unregelmäßig (3)	Ja, aber nur zu Wettkämpfen (4)	Ja, regelmäßig auch außerhalb von Wettkämpfen (5)
leistungssteigernde Medikamente (1)	❍	❍	❍	❍	❍
Anabolika (2)	❍	❍	❍	❍	❍
Epo (3)	❍	❍	❍	❍	❍
Asthmamittel (4)	❍	❍	❍	❍	❍
Kortison (5)	❍	❍	❍	❍	❍
Stimulanzien (6)	❍	❍	❍	❍	❍
Nahrungsergänzungsmittel (7)	❍	❍	❍	❍	❍
Mineralstoffe (8)	❍	❍	❍	❍	❍
Vitamin C Präparate (9)	❍	❍	❍	❍	❍
Vitamin E Präparate (10)	❍	❍	❍	❍	❍
Kohlenhydrat-Zusatzpräparate (11)	❍	❍	❍	❍	❍
Sportgetränke/Powerriegel (12)	❍	❍	❍	❍	❍
Sportgels (13)	❍	❍	❍	❍	❍
Proteinshakes (14)	❍	❍	❍	❍	❍
Carnitin (15)	❍	❍	❍	❍	❍
Creatin (16)	❍	❍	❍	❍	❍
Eisen (17)	❍	❍	❍	❍	❍
Zink (18)	❍	❍	❍	❍	❍
Kalzium (19)	❍	❍	❍	❍	❍
Magnesium (20)	❍	❍	❍	❍	❍
Andere Mittel (21)	❍	❍	❍	❍	❍

B5 Die Frage 16 mit ihren 8 Unterfragen erfragt inwiefern Sie mit einigen Aussagen im Bezug auf Doping und Nahrungsergänzungsmitteln übereinstimmen um ihre Haltung gegenüber dem Einen und dem Anderen erfassen.

15 Inwiefern stimmen Sie mit folgenden Aussagen überein?Nahrungsergänzungsmittel...

	Stimme ich absolut mit überein (1)	Stimme ich mit überein (2)	Neutral (3)	Stimme ich nicht mit überein (4)	Stimme ich absolut nicht mit überein (5)
...dienen dem Gesundheitserhalt. (1)	❍	❍	❍	❍	❍
...helfen einem Ernährungsmangel vorzubeugen. (2)	❍	❍	❍	❍	❍
...helfen die Leistungsfähigkeit in Wettkämpfen zu erhalten. (3)	❍	❍	❍	❍	❍
...steigern die Leistungsfähigkeit. (4)	❍	❍	❍	❍	❍
...sind im Wettkampf notwendig. (5)	❍	❍	❍	❍	❍

16 Inwiefern Stimmen Sie mit folgenden Aussagen überein?Klicken Sie an

	Stimme ich absolut mit überein (1)	Stimme ich mit überein (2)	Neutral (3)	Stimme ich nicht mit überein (4)	Stimme ich absolut nicht mit überein (5)
Den Gebrauch von leistungssteigernden Medikamenten im Sport finde ich gerechtfertigt. (1)	❍	❍	❍	❍	❍
Den Gebrauch von leistungssteigernden Medikamenten im Sport finde ich fair. (2)	❍	❍	❍	❍	❍
Den Gebrauch von leistungssteigernden Medikamenten im Sport finde ich hilfreich. (3)	❍	❍	❍	❍	❍
Ich finde es gut, wenn der Gebrauch von leistungssteigernden Medikamenten im Sport legalisiert wird. (4)	❍	❍	❍	❍	❍
Die Bestrafung von Sportlern, die leistungssteigernde Medikamente im Sport benutzen, sollte nicht verschärft werden. (5)	❍	❍	❍	❍	❍
Den Gebrauch von Nahrungsergänzungsmitteln im Sport finde ich hilfreich. (6)	❍	❍	❍	❍	❍
Den Gebrauch von Nahrungsergänzungsmitteln im Sport finde ich unfair. (7)	❍	❍	❍	❍	❍
Ich würde nie Nahrungsergänzungsmittel einnehmen, auch wenn ich durch die Einnahme eine höhere Chance auf Erfolg hätte. (8)	❍	❍	❍	❍	❍

B6 Was glauben Sie wie verbreitet der Konsum ist?Noch maximal 5 Minuten bis zum Ziel!

17 Glauben Sie, dass...

	Nein, überhaupt nicht (1)	Wenn ja, dann aber nur im Einzelfall (2)	Weiß ich nicht (3)	Ja, einige (4)	Ja, die meisten (5)
... Sportler im Freizeit- und Breitensport bewusst leistungssteigernde Medikamente einnehmen? (1)	❍	❍	❍	❍	❍
...Sportler im Freizeit- und Breitensport bewusst Nahrungsergänzungsmittel einnehmen? (2)	❍	❍	❍	❍	❍
... ein Trainer es befürworten würde, wenn Sie Nahrungsergänzungsmittel einnehmen wollen? (3)	❍	❍	❍	❍	❍
... mehr Sportler im Freizeit- und Breitensport leistungssteigernde Mittel einnehmen würden, wenn dies legal wäre? (4)	❍	❍	❍	❍	❍

B7 Die Theorie besagt, dass die Eigeneffektivität, die Risikoeinschätzung und das wahrgenommene persönliche Risiko wichtige Faktoren für den Konsum sein können. Im Frageblock 18, 19 und 20 wird genau danach gefragt.

18 Für wie wahrscheinlich halten Sie es, dass...

	Sehr wahrscheinlich (1)	Wahrscheinlich (2)	Kann ich nicht einschätzen (3)	unwahrscheinlich (4)	Sehr unwahrscheinlich (5)
... Sie weiterhin ohne die Einnahme von leistungssteigernden Medikamenten trainieren werden? (1)	❍	❍	❍	❍	❍
... Sie weiterhin ohne die Einnahme von Nahrungsergänzungsmitteln trainieren werden? (2)	❍	❍	❍	❍	❍
... Sie auf leistungssteigernde Medikamente verzichten werden, selbst wenn diese ihnen von Ihrem Trainer angeboten werden? (3)	❍	❍	❍	❍	❍
... Sie auf Nahrungsergänzungsmittel verzichten werden, selbst wenn diese von Ihrem Trainer angeboten werden? (4)	❍	❍	❍	❍	❍
... Sie auf Nahrungsergänzungsmittel verzichten werden, selbst wenn diese von Freunden/Sportpartnern angeboten werden? (5)	❍	❍	❍	❍	❍
... Sie auf leistungssteigernde Medikamente verzichten werden, selbst wenn diese von Freunden/Sportpartnern angeboten werden? (6)	❍	❍	❍	❍	❍
... es Ihnen leicht fällt, auf die Einnahme von leistungssteigernde Medikamente zu verzichten, auch	❍	❍	❍	❍	❍

wenn mit der Einnahme die Wahrscheinlichkeit von sportlichem Erfolg zunehmen würde? (7)					

19 Inwiefern stimmen Sie mit folgenden Aussagen überein?

	Stimme ich absolut mit überein (1)	Stimme ich mit überein (2)	Neutral (3)	Stimme ich nicht mit überein (4)	Stimme ich absolut nicht mit überein (5)
Sportler im Freizeit- und Breitensport würden leistungssteigernde Medikamente einnehmen, wenn dies keine Gesundheitsrisiken mit sich bringen würde. (1)	❍	❍	❍	❍	❍
Die Einnahme von leistungssteigernden Medikamenten ist ein Risiko für die Gesundheit. (2)	❍	❍	❍	❍	❍
Die Einnahme von Nahrungsergänzungsmitteln ist ein Risiko für die Gesundheit. (3)	❍	❍	❍	❍	❍
Die gesundheitlichen Schäden, die durch die Einnahme von leistungssteigernden Medikamenten hervorgerufen werden können, sind schwerwiegend. (4)	❍	❍	❍	❍	❍
Die gesundheitlichen Schäden, die von Nahrungsergänzungsmitteln hervorgerufen werden können, sind schwerwiegend. (5)	❍	❍	❍	❍	❍
Sportler, die zu leistungsteigernden Medikamenten greifen, haben durch die Einnahme ein größeres Risiko gesundheitlichen Schaden zu erleiden als "saubere" Sportler. (6)	❍	❍	❍	❍	❍
Leistungssteigernde Medikamente haben gesundheitliche Nebenwirkungen. (7)	❍	❍	❍	❍	❍
Nahrungsergänzungsmittel haben gesundheitliche Nebenwirkungen. (8)	❍	❍	❍	❍	❍

20 Inwiefern treffen folgende Aussagen auf Sie zu?

	Trifft absolut zu (1)	Trifft zu (2)	Neutral (3)	Trifft begrenzt zu (4)	Trifft überhaupt nicht zu (5)
Ich würde nie leistungssteigernde Medikamente einnehmen, auch wenn ich durch die Einnahme eine höhere Chance auf Erfolg hätte. (1)	❍	❍	❍	❍	❍
Ich würde um als Sportler erfolgreich zu sein, dopen, wenn ich nicht erwischt werden könnte. (2)	❍	❍	❍	❍	❍
Ich würde um als Sportler erfolgreich zu sein, Nahrungsergänzungsmittel verwenden, wenn durch die Einnahme keine gesundheitlichen Risiken bestünden. (3)	❍	❍	❍	❍	❍
Die Wahrscheinlichkeit, dass die Einnahme von leistungssteigernden Medikamente ernste Folgen für meine Gesundheit hat, schätze ich sehr niedrig ein. (4)	❍	❍	❍	❍	❍
Die Wahrscheinlichkeit, dass die Einnahme von Nahrungsergänzungsmitteln ernste Folgen für meine Gesundheit hat, schätze ich sehr hoch ein. (5)	❍	❍	❍	❍	❍
Ich bin mir bewusst darüber, dass die Einnahme von leistungssteigernden Medikamenten für mich ein gesundheitliches Risiko birgt. (6)	❍	❍	❍	❍	❍
Ich mache mir Gedanken über gesundheitliche Folgen durch den Konsum von leistungssteigernden Medikamenten. (7)	❍	❍	❍	❍	❍
Ich habe mir noch nie Gedanken über die gesundheitlichen Folgen durch den Konsum von Nahrungsergänzungsmitteln gemacht. (8)	❍	❍	❍	❍	❍

B8 Die letzten beiden Fragen sollen nur noch einen kurzen Einblick in das allgemeine Konsumverhalten unserer Teilnehmer geben.

22 Beantworten Sie bitte die folgenden Fragen.

	Ja, immer (1)	Gelegentlich (2)	Selten (3)	Nein, aber habe ich mal (4)	Nein, noch nie (5)
Nehmen Sie vor dem Training/Wettkämpfen koffeinhaltige Präparate zu sich? (1)	❍	❍	❍	❍	❍
Trinken sie regelmäßig Kaffee? (2)	❍	❍	❍	❍	❍
Rauchen Sie? (3)	❍	❍	❍	❍	❍
Trinken Sie Alkohol? (4)	❍	❍	❍	❍	❍
Nehmen Sie Schmerzmittel? (5)	❍	❍	❍	❍	❍

23 Wann nehmen Sie Schmerzmittel ein?

	Ja, immer (1)	Gelegentlich (2)	Selten (3)	Nein, aber habe ich mal (4)	Nein, noch nie (5)
Weil ich chronische Schmerzen habe (z.B. bei Rheuma oder Arthrose) (1)	❍	❍	❍	❍	❍
Prophylaktisch bei körperlicher Belastung (2)	❍	❍	❍	❍	❍
Prophylaktisch vor der Trainings-/Wettkampfbelastung (3)	❍	❍	❍	❍	❍
Nach der Belastung (Training/Wettkampf) (4)	❍	❍	❍	❍	❍
Zur schnellen Regeneration (5)	❍	❍	❍	❍	❍

Danke Geschafft! Vielen Dank für Ihre Teilnahme! Wenn Sie an dem Ergebnis meiner Studie interessiert sind, können Sie mir einfach eine Mail zukommen lassen.F.lollies@student.utwente.nlEine gute Saison bei Ihrem Sport wünscht IhnenFriederike Lollies