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The Role of Big Five Personality Traits, Basic Psychological Need Satisfaction, and Need Frustration in Predicting Athletes' Organic Self-Talk

Aristea Karamitrou [1,*], Nikos Comoutos [1], Evangelos Brisimis [1], Alexander T. Latinjak [2], Antonis Hatzigeorgiadis [1], Yannis Theodorakis [1], Georgios Loules [1], Yannis Tzioumakis [1] and Charalampos Krommidas [1]

[1] Department of Physical Education & Sport Sciences, University of Thessaly, 42100 Trikala, Greece; nzourba@pe.uth.gr (N.C.); vaggelismpr@yahoo.gr (E.B.); ahatzi@pe.uth.gr (A.H.); theodorakis@pe.uth.gr (Y.T.); geoloules@gmail.com (G.L.); tzioum3@yahoo.gr (Y.T.); hkrom@uth.gr (C.K.)
[2] School of Health and Sport Science, University of Suffolk, Ipswich IP4 1QJ, UK; a.latinjak@uos.ac.uk
* Correspondence: karamitrouaria@gmail.com

Abstract: Good health and the promotion of well-being for all is the third of the 17 Global Goals included in the 2030 Agenda for Sustainable Development. Contributing to this goal, the current study aimed to examine the relationships between one kind of athlete well-being, namely state organic self-talk, and personality traits and the basic psychological need satisfaction and frustration within their sport. Athletes ($n = 691$; mean age 21.65) from a variety of individual ($n = 270$) and team sports ($n = 421$) completed a multi-section questionnaire capturing the targeted variables. Three-step hierarchical regression analyses revealed the following: In step 1, all personality traits were to some extent a significant predictor of athletes' organic, spontaneous self-talk dimensions and goal-directed self-talk functions. In step 2, need satisfaction significantly contributed to all spontaneous self-talk dimensions and goal-directed self-talk functions (except for creating functional deactivated states) over and above personality. Finally, in step 3, need frustration significantly contributed to negative spontaneous self-talk dimensions and to all goal-directed self-talk functions (except for instruction) over and above personality and need satisfaction. Overall, our results indicate the importance of personality traits as personal antecedents, and perceptions of basic psychological need satisfaction and frustration as social–environmental antecedents in shaping athletes' state organic self-talk.

Keywords: inner speech; spontaneous self-talk; goal-directed self-talk; Big Five personality traits; self-determination theory; autonomy; competence; relatedness; sports

1. Introduction

1.1. Organic Self-Talk

According to Sustainable Development Goal 3 (SDG3) included in the 2030 Agenda for Sustainable Development, it is crucial to achieve by 2030 the promotion of physical and mental health and well-being for all people regardless of age. Self-talk is a kind of well-being and, especially, a form of cognition that is crucial in the formulation of our emotions, our behavior, and our performance as well as in our self-regulation and in almost all domains of life [1–4]. Thus, it is not surprising that the study of self-talk has attracted the interest within a broad range of disciplines, including philosophy, neuroscience, developmental, educational, clinical, social, and sport psychology [4]. In sport psychology, the systematic study of self-talk started between the 1980s and 1990s, while in recent years, the self-talk research literature in sport has expanded rapidly [1]. The major developments include the passage from purely data-driven approaches [2] to theory-driven approaches in the study and classification of self-talk in sport, which has resulted in the development of new, more theory-based conceptualizations of athletes' self-talk [1,3]. Particularly, these theory-driven approaches [1,3], based on dual-process theories, distinguish between an

uncontrolled type of self-talk, which is automatic and reflects underlying psychological processes, and a controlled type of self-talk, which is rational, effortful, and intentionally used for self-regulation [1,3].

According to contemporary self-talk conceptualizations, Van Raalte et al. [3] defined self-talk "as the syntactically recognizable articulation of an internal position that is expressed either internally or out loud where the message-sender is also the intended receiver" (p. 141). Regarding self-talk distinctions, Van Raalte et al. [3] in their sport-specific model of self-talk identified: (a) an intuitive/uncontrolled type of self-talk (called System 1 self-talk) that is fast, comes to mind spontaneously, and brings current experiences into awareness in a way that represents the immediate, emotionally charged reaction to a situation; and (b) a controlled/rational type of self-talk (called System 2 self-talk) that is slower, emotionally neutral, and is influenced by different perspectives and new information.

Three years later, Latinjak et al. [1] proposed a new integrative definition of self-talk that is able to accommodate the recent literature and also serve as a conceptual framework for the study of self-talk in the future. Specifically, the researchers conceptualized self-talk as "verbalizations addressed to the self, overtly or covertly, characterized by interpretative elements associated to their content; and it also either (a) reflects dynamic interplays between organic, spontaneous, and goal-directed cognitive processes or (b) conveys messages to activate responses through the use of predetermined cues developed strategically, to achieve performance-related outcomes" (p. 11). According to Latinjak et al.'s [1] aforementioned conceptualization, there are two distinct self-talk entities (i.e., organic self-talk and strategic self-talk), which were initially reflected in two different research perspectives [4] in the study of self-talk in sport. Organic self-talk, which was previously called automatic [2], refers to self-talk as inherent self-statements that athletes address to themselves, mostly during sport performance [1], and reflect various spontaneous and goal-directed psychological events [5]. Significantly, organic self-talk is not part of a psychological intervention, even though it may be indirectly influenced by interventions like cognitive–behavioral therapy or mindfulness–acceptance approaches [5]. On the other hand, strategic self-talk is described as the use of predetermined cue words and phrases, mostly developed through interventions, which athletes verbalize to themselves with the aim of enhancing performance or achieving other related goals [1].

With regard to organic self-talk, Latinjak et al.'s [1] conceptualization further distinguishes between spontaneous and goal-directed self-talk. Similar to Van Raalte et al.'s distinction of System 1 self-talk [3], spontaneous self-talk is a type of uncontrolled self-talk consisting of unintended, non-working, and non-instrumental statements that come to mind unbidden and effortlessly, and are linked to the task or activity at hand [5]. On the other hand, likewise with System 2 self-talk [3], goal-directed self-talk is a controlled type of self-talk that consists of statements that are intentionally used by athletes in order to self-regulate, enhance their performance, solve a problem, or make progress on a task [5].

Latinjak et al. [5–7] described several differences between spontaneous and goal-directed self-talk in terms of structure, content, and nature. In terms of structure, spontaneous self-talk varies in terms of two dimensions: valence (from positive to negative; e.g., "I performed well/I performed badly") and time perspective (from past-related to future-related; e.g., "I was lucky/I will win"), whereas goal-directed self-talk varies in terms of two dimensions: time orientation (from past-oriented to future-oriented; e.g., "Everybody makes mistakes/You will succeed") and activation (from low to high; e.g., "Relax/Give your best") [5–7]. With regard to the content, spontaneous self-talk mostly describes, evaluates, and explains past outcomes (e.g., "I played badly/I was unlucky") and makes predictions about future events (e.g., "I will succeed"). In contrast, goal-directed self-talk aims to control cognitive reactions (e.g., "Nothing happened"); and dysfunctional activated (e.g., "Do not be anxious") and deactivated affective states (e.g., "Do not be sad"); to create or maintain functional activated (e.g., "Give it all") and deactivated affective states (e.g., "Calm down"); to promote task instructions (e.g., "Pay attention/Pass the ball"); and to create facilitative attitudes for the future mainly by up-regulating self-confidence (e.g., "You

will achieve it"), by promoting mastery (e.g., "The goal is to perform according to your skills"), performance-approach (e.g., "Your goal is to win") and performance-avoidance goals (e.g., "You mustn't fail today"), and motivation (e.g., "Go and have fun") [5–9]. Finally, in terms of nature, spontaneous self-talk can be viewed as a window into the athlete's mind as it informs, among other things, about athletes' performance beliefs (e.g., "I can perform well"), goal orientations (e.g., "I want to be better than others"), irrational beliefs (e.g., "I have to win"), thoughts of disengagement (e.g., "I want to give up"), and causal attributions of success (e.g., "I won because I had played well") and of failure (e.g., "I was unlucky") [5]. Conversely, goal-directed self-talk is a rational process of thought that is deliberately employed for self-regulation (e.g., "Relax"; "Concentrate"; "Don't give in"; "Keep going") [5].

The two recently introduced theory-driven approaches to the study of self-talk [1,3,6] in sport, have been of particular importance in forwarding the self-talk literature and advancing our understanding regarding athletes' self-talk. However, their emerging concepts have not been operationalized yet to allow assessment suitable for quantitative research methodologies [10,11]. To date, in sport psychology, the research on strategic self-talk, and especially on its effects on sport performance, has dominated the self-talk literature [1,3,4]. Moreover, another research area that has attracted significant research attention in recent years is the study of the potential mechanisms/functions that may explain the facilitative effects of self-talk on sport performance [12]. On the contrary, the research on organic self-talk, and especially on the antecedents of athletes' organic self-talk is yet at a developmental stage [4,11]. Given the wide-reaching behavioral, motivational, affective, and cognitive consequences of self-talk [13], several researchers [4,14] have repeatedly suggested that determining the factors that shape athletes' organic self-talk should become a priority in self-talk research in sport psychology. The study of the factors that shape athletes' organic self-talk has been considered an important research direction, because it will help us to intervene and change these factors, thus regulating athletes' organic self-talk according to individual needs [4,11].

Hardy et al. [13] proposed a working framework for the study and application of self-talk within sport, and based on the existing research evidence, they suggested two general classes of self-talk antecedents: personal and situational; and four possible underpinning mechanisms that may explain the self-talk–performance relationship: cognitive, motivational, behavioral, and affective. Personal antecedents include factors such as individuals' cognitive processing preferences, belief in self-talk, global personality traits, and achievement goal orientations [13]. Situational antecedents involve factors such as task difficulty, match circumstances, the influence of significant others, and competitive setting [13]. Theodorakis et al. [4] supported the framework, but considering the research findings [15–18] outlining the influence of coaches' behavior on athletes' organic self-talk, they advocated that coaches' and significance others' behavior should be separated to form a third class of self-talk antecedents termed social–environmental factors. Although Hardy et al. [13] provided a strong theoretical framework for self-talk research in sports, they noticed that their proposed model was sequential in form, and that the relationships among self-talk and related variables could be more complex, possibly circular and reciprocal. Thus, Van Raalte et al. [3] built upon Hardy et al.'s [13] self-talk framework in sports, integrating discursive and dual-process theories, and created a sport-specific model of self-talk. In summary, Van Raalte et al. [3] in their sport-specific model of self-talk attempted to illustrate and explain the dynamic interrelationships that may exist among: personal factors, situational factors (referred to as contextual factors in this model), System 1 and System 2 processing (which have respectively, the same characteristics as System 1 and System 2 self-talk mentioned above), System 1 and System 2 self-talk, and behavior.

Sport-specific research on personal antecedents of organic self-talk has shown that achievement goal orientations [19–21], autonomous/controlled motivation [10], belief in self-talk [22], and global personality traits such as self-concept [23] and trait anxiety [14] are related to athletes' organic self-talk. Similarly, sport-specific research on situational

antecedents of organic self-talk has indicated that match circumstances [8,9,24], practice circumstances [9,25], goal–performance discrepancies [26], competitive setting [9,27,28], pre-competitive state anxiety [26,27], and emotion-eliciting sport situations [7,29] are linked to athletes' organic self-talk. Finally, sport-specific research on social–environmental antecedents of organic self-talk has revealed that supportive and unsupportive coaching behaviors [15–17], perceived coach's social support [18], perceptions of empowering and disempowering coach-created motivational climate [30], and athletes' perceived satisfaction of Basic Psychological Needs (BPNs; i.e., for autonomy, competence, and relatedness) within their sport environment [10] could shape athletes' organic self-talk. In this point, we should mention that almost all the aforementioned research into the antecedents of athletes' organic self-talk [10,14–24,26–28,30] had been conducted either before researchers distinguished between uncontrolled type (i.e., spontaneous and System 1 self-talk) and controlled type of self-talk (i.e., goal-directed and System 2 self-talk), or before operationalizing these constructs to allow assessment suitable for qualitative methodologies. The only exceptions are Latinjak et al.'s qualitative studies into the antecedents of athletes' organic, spontaneous [7,29], and goal-directed [7–9,25] self-talk, which were conducted after the classification of organic self-talk into these two major categories.

As a result, most of the quantitative research into the antecedents of athletes' organic self-talk had adopted the wider, traditional distinction between positive and negative organic self-talk, and their respective sub-dimensions [10,14–22,24,26–28,30], using for their assessment various measures, sport-specific or measures that were adapted from other contexts into sport. However, researchers [10,17,18,30] in recent years have mainly used for the measurement of athletes' organic self-talk the Automatic Self-Talk Questionnaire for Sports (ASTQS), a comprehensive, sport-specific instrument developed by Zourbanos et al. [2], for the assessment of the content and structure of athletes' organic self-talk. Particularly, ASTQS is a psychometrically sound, self-reported trait questionnaire assessing four positive (psych up, anxiety control, confidence, and instruction) and four negative (worry, disengagement, somatic fatigue, and irrelevant thoughts) self-talk dimensions. Even though ASTQS contains statements and therefore factors that can be described as spontaneous or System 1 self-talk (e.g., worry and disengagement) and goal-directed or System 2 self-talk (e.g., instruction and confidence), these distinctions had not been included in the development of ASTQS, as they were introduced some years later.

Thus, in an attempt to develop a measure that will also take into account the contemporary theory-driven classifications of athletes' organic self-talk, Karamitrou et al. [31] developed the Organic Self-Talk Questionnaire for Sport (OSTQS). The OSTQS is a theory-based, multidimensional, state measure of athletes' organic self-talk, that assesses according to Latinjak et al.'s contemporary conceptual framework of organic self-talk in sport [1,6], the two major types of athletes' organic self-talk on a state level: spontaneous (uncontrolled) and goal-directed (controlled) self-talk. Spontaneous (uncontrolled) organic self-talk consists of four spontaneous self-talk dimensions, namely: retrospective-positive, anticipatory-positive, retrospective-negative, and anticipatory-negative self-talk. On the other hand, goal-directed (controlled) organic self-talk consists of seven goal-directed functions, namely: controlling cognitive reactions, controlling dysfunctional activated/deactivated states, creating functional activated states, creating functional deactivated states, up-regulating self-confidence, instruction, and promoting goals. Karamitrou et al. [31] provided support for the psychometric properties of the OSTQS through evidence of construct validity (i.e., factorial, convergent, and discriminant validity) and internal consistency of the scale in athletes from a variety of team and individual sports and age groups. However, to the best of the authors' knowledge, there are to date no quantitative studies into the antecedents of athletes' spontaneous and goal-directed self-talk. Thus, contributing to the achievement of SDG3, and using a quantitative research design and OSTQS for the assessment of athletes' spontaneous and goal-directed self-talk, the purpose of this study was twofold:

1. To examine whether (a) the Big Five personality traits as personal antecedents and (b) athletes' BPNs satisfaction and frustration within their sport environment as social–

environmental antecedents would predict athletes' spontaneous and goal-directed self-talk. More specifically, we are interested in analyzing the incremental contribution of BPNs satisfaction and frustration to the prediction of athletes' spontaneous and goal-directed self-talk over and above athletes' Big Five personality traits and BPNs satisfaction, respectively.

2. To provide evidence regarding the nomological validity of OSTQS (i.e., the extent to which the construct assessed by the scale relates to other concepts such as antecedents or consequences, based on existing theory or a theoretical model [32]) by a detailed examination of the relationships between athletes' spontaneous and goal-directed self-talk and their antecedents, that is, the variables of the Big Five personality traits, BPNs satisfaction, and BPNs frustration.

1.2. Personality and Athletes' Organic Self-Talk

Similarly to all people, athletes' personality inevitably contribute to how they think, talk to themselves, feel, and behave when they participate in their sport as well as in other domains of their life. Cervone and Pervin [33] defined personality as "psychological qualities that contribute to an individual's enduring and distinctive patterns of feeling, thinking and behaving" (p. 8). Trait theorists have achieved a consensus by which we are able to understand personality via five major personality traits or, in other words, a five-factor model, typically termed the Big Five Model (BFM) of personality traits [34,35]. The BFM constitutes a widely accepted, robust, and comprehensive broad-based taxonomy of individual differences in personality [34,35]. It is a hierarchical model that suggests that the five major personality trait dimensions, named emotional stability, extraversion, openness/intellect, agreeableness, and conscientiousness, each enclose a number of more specific traits (termed facets) [34,35]. Emotional stability (also often referred to by its inverse—neuroticism) includes traits like experiencing stable and positive emotional states (e.g., calm, secure, controlled, and even-tempered); the generation of rational and positive thoughts; and holding rational beliefs [34,35]. Extraversion refers to an individual's tendency to experience positive emotions and to be sociable, outgoing, talkative, energetic, enthusiastic, cheerful, and assertive [34,35]. Openness/intellect (also often referred to as openness to new experiences or imagination) reflects the extent to which an individual is intellectually curious, creative, imaginative, and open to new experiences, ideas, and change [34,35]. Agreeableness contrasts with antagonism and refers to the extent to which an individual is trusting, compassionate (i.e., warm-hearted, unselfish, and forgiving), modest, cooperative, altruistic, and compliant [34,35]. Finally, conscientiousness refers to an individual's tendency toward organization, punctuality, hardworkingness, reliability, self-control, self-discipline, and being persistent, goal-directed, and purposeful in cognition and behavior [34,35].

As already mentioned above, previous research on athletes' organic self-talk antecedents has indicated that global personality traits such as self-concept [23], trait anxiety [14], and achievement goal orientations [19–21] are related to athletes' organic self-talk. Thus, it is reasonable to expect that the Big Five personality traits will also be a kind of personal antecedent of athletes' organic self-talk, both spontaneous and goal-directed self-talk. Moreover, previous research in sport has shown that the Big Five personality traits influence athletes' sport-related cognitive appraisals, emotional regulation, and coping behaviors. Athletes' both spontaneous and goal-directed self-talk constitute an integral part and play an essential role in all these processes. For instance, Lazarus and Folkman [36] defined cognitive appraisal as the process of a cognitive evaluation of an environmental stimulus, that is internal or external to the individual, with regard to its significance for individual well-being, and/or the attainment of personal goals. Lazarus [37] differentiated between two important and equal types of appraisal: primary appraisal and secondary appraisal. Primary appraisal refers to the individual evaluation of a situation in relation to a person's goals and values, and may happen consciously and/or unconsciously. Lazarus and Folkman [36] identified three types of primary appraisal: Emotional-irrelevant ap-

praisals refer to those situations that are appraised as neither threatening nor harmful, nor of potential benefit to the individual. Benign-positive appraisals refer to the evaluations of situations with a potential to enhance an individual's well-being. Stressful appraisals refer to evaluations that indicate a substantial threat to individual well-being. The situations appraised as stressful can include perceptions of harm/loss (the situation has already left damage to one's goal, values, or beliefs), threat (the damage to one's goal, values, or beliefs is possible), or challenge (the person positively perceives an obstacle towards their goal, values, or beliefs). The secondary appraisal refers to the conscious and/or unconscious evaluation of one's coping resources for dealing with the situation, and the level of control over it that one possesses [36]. As is evident from the above description of cognitive appraisal processes, spontaneous and goal-directed self-talk play a key role in cognitive appraisals, both primary and secondary. The same also occurs with the coping process. According to a recent coping conceptualization [38], coping refers to both intentional/volitional and automatized/unintentional cognitive, emotional, and behavioral responses to stress. As this definition implies, both spontaneous and goal-directed organic self-talk play a key role in the coping process, as intentional (i.e., goal-directed self-talk) and unintentional (i.e., spontaneous self-talk) cognitive responses to stress.

With respect to the research findings on the relationships between the Big Five personality traits and cognitive appraisals, in a study in sports settings, Kaiseler et al. [39] examined the relationships between athletes' Big Five personality traits with their appraisals (intensity, control) of a sport-specific, self-selected stressor. The authors found that neuroticism (low emotional stability) significantly predicted higher levels of stress intensity and lower levels of perceived stressor control. Conversely, agreeableness significantly predicted lower levels of stress intensity, whereas conscientiousness significantly predicted higher levels of perceived stressor control. Similar research findings were also found in studies conducted in non-sports settings. For instance, Eysenck [40] reported that individuals high in neuroticism, particularly in trait anxiety, tended to appraise events as more harmful (i.e., damage that has already occurred) or threatening (i.e., anticipation of harms and losses that may occur). Similarly, Gunthert et al. [41] found that college students high in neuroticism, compared with students low in neuroticism had more negative primary and secondary appraisals of their stressful daily events, and they also reacted with more distress in response to those appraisals. In contrast, Semmer [42] reported that extraversion was positively related to a positive appraisal of coping resources.

With regard to the research findings on the relationships between the Big Five personality traits and coping, in two sports studies, Allen et al. [43,44] examined the relationships between athletes' Big Five personality traits with their sport-related, dispositional coping. The researchers found that extraversion [43] and conscientiousness [44] significantly and positively predicted athletes' problem-focused coping in their sport (i.e., strategies aimed to actively change and remain in the sport-related stressful situation; e.g., "I look for ways to solve the problem or change the situation."). Conscientiousness was also found [43] to be a significant (positive) predictor of athletes' emotion-focused coping in their sport (i.e., strategies used to change the meaning of the stressful situation and regulate emotional arousal and distress that arise, while remaining in this; e.g., "I try to view the situation in a way that makes it seem less stressful."). In contrast, the researchers reported that athletes' avoidance coping in their sport (i.e., strategies aimed to remove oneself mentally or physically from the sport-related stressor; e.g., "I try to get away from the situation to reduce the stress.") was significantly predicted by neuroticism (positively) [43,44], agreeableness (negatively) [44], and openness (negatively) [43,44].

Similarly, in their study in the sports context reported above, Kaiseler et al. [39] also examined the relationships between athletes' Big Five personality traits with their coping strategies during a specific stressful event in their sport (a situational measure of coping). The authors found that neuroticism significantly and positively predicted the avoidance coping strategy of behavioral disengagement (e.g., "I decreased the amount of time and effort I put into my performance.") and the emotion-focused coping strategies of venting

emotions (e.g., "I felt a lot of upset feelings, and I showed those feelings a lot.") and wishful thinking (e.g., "I wished the situation would go away or somehow be over."). Conversely, the researchers found that neuroticism significantly and negatively predicted the problem-focused coping strategies of planning (e.g., "I thought hard about what steps to take to manage this situation."), suppression of competing activities (e.g., "I stopped doing other things in order to concentrate on my performance."), and increasing effort (e.g., "I worked harder."). On the other hand, conscientiousness was found to significantly and positively predict the problem-focused coping strategies of planning and suppression of competing activities as well as the emotion-focused coping strategy of seeking emotional social support (e.g., "I talked about my feelings with someone."), whereas it was found to significantly and negatively predict the emotion-focused coping strategies of humor (e.g., "I made jokes about my performance") and wishful thinking. Likewise, extraversion significantly and positively predicted the emotion-focused coping strategy of seeking emotional social support as well as the problem-focused coping strategies of increasing effort and seeking informational social support (e.g., "I talked to someone who could do something about my performance."). Agreeableness was a significant and positive predictor only of the problem-focused coping strategy of active coping (e.g., "I did what had to be done, one step at a time."), whereas it emerged as a significant and negative predictor of the problem-focused coping strategy of planning and the emotion-focused coping strategies of venting emotions and self-blame (e.g., "I blamed myself for the situation."). Finally, openness was found to be a significant and positive predictor of the problem-focused coping strategy of planning and the emotion-focused coping strategy of wishful thinking.

Finally, in another relevant study in a sports setting, Kaiseler et al. [45] examined the relationships between athletes' Big Five personality traits with dispositional coping during sport competitions. The results showed that extraversion, agreeableness, and openness significantly and positively predicted task-oriented coping, that is, strategies used by athletes to manage the internal and external demands of sport competitions, such as thought control (e.g., "I replace my negative thoughts with positive ones."), logical analysis (e.g., "I think about the possible solutions in order to manage the situation."), effort expenditure (e.g., "I give my best effort."), mental imagery (e.g., "I visualize myself doing a good performance."), relaxation (e.g., "I try to relax my body."), and seeking support (e.g., "I talk to someone who is able to motivate me."). Agreeableness, conscientiousness, and extraversion significantly and negatively predicted distraction-oriented coping, which refers to strategies used by athletes to temporarily direct their attention to factors that are unrelated to a sport competition, such as distancing from social interactions (e.g., "I keep all people at a distance.") and mental distraction (e.g., "I entertain myself in order not to think about the competition."). Moreover, agreeableness and conscientiousness significantly and negatively predicted disengagement-oriented coping, which refers to strategies used by athletes to disengage from the processes that could lead to their goal attainment, such as disengagement/resignation (e.g., "I doubt my ability to attain my goal.") and venting of unpleasant emotions (e.g., "I use swear words loudly or in my head in order to expel my anger."). In contrast, neuroticism and extraversion significantly and positively predicted disengagement-oriented coping. Finally, neuroticism emerged as a significant and positive predictor of distraction-oriented coping and was the only significant and negative predictor of coping effectiveness.

1.3. BPNs Satisfaction, Frustration, and Athletes' Organic Self-Talk

Self-determination theory (SDT; [46,47]) is a meta-theory of human motivation and personality that has been applied in a variety of life domains (e.g., sport and exercise, education, workplace, health care, personal relationships, psychotherapy) and cultures, receiving a plethora of empirical support. Besides these, SDT has also provided a framework that could help us to enhance our understanding regarding the antecedents [10,48,49] and the interpretation of self-talk [50]. More particularly, Basic Psychological Needs Theory (BPNT; [47]), one of the six mini-theories within the SDT, proposes that people have three

BPNs for autonomy, competence, and relatedness, the satisfaction of which is essential for optimal functioning, growth, and well-being [47,51]. BPNT postulates a dual-process model in explaining human functioning with two parallel pathways, a bright and a dark pathway, based on the distinction between the satisfaction and the frustration of the three BPNs. BPNs satisfaction constitutes the bright pathway of human functioning, as it contributes to proactivity, integration, and well-being, whereas BPNs frustration represents the dark pathway of human functioning, as it makes one vulnerable to passivity, fragmentation, and illness [52,53]. Autonomy satisfaction refers to the experience of volition, the self-endorsement of one's actions, and psychological freedom. On the other hand, autonomy frustration refers to the experience of a sense of pressure and often internal conflict, such as feeling pushed in an unwanted direction [53]. Competence need refers to the experience of effectiveness and mastery, and is satisfied by capably engaging in activities and also by experiencing opportunities for using and extending skills and expertness. In contrast, competence frustration refers to the experience of a sense of inefficacy or even failure and helplessness [53]. Finally, the relatedness need concerns the experience of warmth, bonding, and care in interpersonal relationships, and is satisfied by genuinely connecting to and feeling significant to others. Conversely, relatedness frustration refers to the experience of a sense of social alienation, exclusion, and loneliness [53].

Decades of SDT-based research has broadly shown in different life domains the benefits of need satisfaction for the quality of motivation, growth, human functioning, and physical and psychological well-being [52,53]. Moreover, over the past few years, the concept of need frustration has received increased research attention, where studies have shown the detrimental consequences of need frustration [52–56]. SDT-based research has also broadly indicated in different life domains that need satisfaction and need frustration may co-occur to different degrees within the same context rather than being two opposite poles along a need-satisfaction continuum. Need satisfaction and need frustration constitute distinct psychological experiences and are related to different antecedents and consequences [52,53,57]. Particularly, need frustration is experienced when the three BPNs are actively undermined within social contexts and is a different, stronger, and more harmful experience than the mere lack of need satisfaction, which represents a more passive obstruction of the three BPNs [52,53]. For instance, an athlete may feel low relatedness to teammates in his/her team, and thus, he/she may have less vitality and excitement for sport participation. However, an athlete may also be actively rejected or excluded by his/her teammates, and in this case, he/she may suffer from depression or severe symptoms of stress. Thus, the relationship between need satisfaction and need frustration is considered to be asymmetrical [52,53]. That is, low levels of need satisfaction do not necessarily imply the presence of need frustration, whereas need frustration by definition involves low need satisfaction [52]. Supporting the presumed asymmetrical relationship between need satisfaction and need frustration, a moderate negative relationship between both was found in previous research [52].

SDT-based research in sport settings has repeatedly focused on both need satisfaction and need frustration, and explored their differential associations with motivation and psychological functioning [52,54,55]. It was found that measures of athletes' perceived need satisfaction were positively related to adaptive responses, including higher levels of autonomous motivation and flow, a higher frequency of positive self-talk, better sport performance, greater persistence in sport, more adaptive developmental experiences, and increased well-being as measured by indicators such as self-esteem, positive affect, enjoyment, and subjective vitality [58–65]. Conversely, athletes' low scores on measures of perceived need satisfaction were found to be related to maladaptive consequences such as negative affect, negative self-talk, physical symptoms, burnout, and drop out from sport [59,60,63,66]. Specifically, with regard to the study of athletes' organic self-talk antecedents, Karamitrou et al. [10], using the ASTQS for the assessment of athletes' organic self-talk, examined the relationships among basic need satisfaction, behavioral regulations, and athletes' organic self-talk among a sample of 381 athletes. They found that satisfaction

of the need for competence positively predicted positive self-talk and negatively predicted negative self-talk, both directly and indirectly via autonomous motivation. Satisfaction of the need for autonomy positively predicted positive self-talk both directly and indirectly via autonomous motivation, whereas negatively predicted negative self-talk in an indirect way via both autonomous and controlled motivation (inversely). Lastly, satisfaction of the need for relatedness indirectly predicted athletes' positive self-talk (positively) and negative self-talk (negatively) through autonomous motivation.

Although previous SDT-based research in sport has indicated that low need satisfaction is associated with ill-being, this finding has not always been replicated in the literature, and some studies showed that low scores on need satisfaction were unrelated to ill-being [58,67]. Bartholomew et al. [54] suggested that this may be the result of the fact that previous SDT-based research has not explicitly assessed need frustration in relation to negative outcomes but inadvertently equated it with low need satisfaction. Specifically, Bartholomew et al. [54] posited that low scores on measures of need satisfaction may simply reflect need dissatisfaction and not adequately tap the active nature and intensity of need frustration that Deci and Ryan [47] described as states of need thwarting (e.g., "I do not feel related" vs. "I feel I am rejected"). Indeed, subsequent studies [55,68] have also included assessments of need frustration and showed that athletes' need frustration, in relation to low need satisfaction, was consistently a better predictor of maladaptive outcomes (disordered eating, burnout, depression, negative affect, and physical symptoms).

With regard to the study of organic self-talk antecedents, in a study conducted in the context of physical education, Brisimis [48] examined among primary and secondary education students the relationships between need satisfaction, need frustration, and organic self-talk. The researchers used the ASTQS for the assessment of organic self-talk, as it was adapted for the context of physical education. They found that only competence need frustration significantly predicted (negatively) students' positive self-talk. Conversely, relatedness and autonomy needs satisfaction emerged as the two negative and significant predictors of students' negative self-talk, whereas competence and relatedness needs frustration emerged as the two positive and significant predictors of students' negative self-talk. Nevertheless, to date, as far as we know, no studies in the sport context have examined athletes' BPNs frustration as an antecedent of athletes' organic self-talk. Additionally, to the best of our knowledge, to date, there are no quantitative studies in the sport context that have examined athletes' BPNs satisfaction and frustration as antecedents of the two contemporary classifications of athletes' organic self-talk, that is, spontaneous and goal-directed self-talk, and their subclassifications.

Therefore, based on SDG3, BFM of personality traits, and SDT; and using a quantitative research design and the OSTQS for the assessment of athletes' spontaneous and goal-directed self-talk, the purpose of this study was twofold:

1. To examine whether (a) the Big Five personality traits as personal antecedents and (b) athletes' BPNs satisfaction and frustration within their sport environment as social–environmental antecedents would predict athletes' spontaneous and goal-directed self-talk. More specifically, we are interested in analyzing the incremental contribution of BPNs satisfaction and frustration to the prediction of athletes' spontaneous and goal-directed self-talk, over and above athletes' Big Five personality traits and BPNs satisfaction, respectively.
2. To provide evidence regarding the nomological validity of OSTQS (i.e., the degree to which the construct assessed by the scale relates to other concepts such as its antecedents or its consequences, according to an existing theory or a theoretical model [32]) by a detailed examination of the relationships between athletes' spontaneous and goal-directed self-talk with their antecedents, and particularly the variables of the Big Five personality traits, BPNs satisfaction, and BPNs frustration.

The research into the factors that shape athletes' organic self-talk is important because it will help us to intervene and modify these factors so as to regulate athletes' organic self-talk according to their personal needs [4,11], and also to promote athletes' physical and

mental health and well-being, in line with SDG3. Although athletes' Big Five personality traits are considered relatively stable and consequently more difficult to change through interventions, athletes' BPNs satisfaction and frustration within their sport environment could be easily changed through the appropriate interventions [11]. Finally, interventions that aim to change the social–environmental antecedents of athletes' organic self-talk (such as motivational climate and coaching behavior) also have the potential to change the personal antecedents of athletes' organic self-talk (e.g., goal orientation, behavioral regulations, self-concept, trait anxiety, etc.) as well athletes' situational perceptions [11].

2. Materials and Methods

2.1. Research Design

Since this was the first exploratory study, we used a cross-sectional research design to identify the potential links among athletes' organic, spontaneous self-talk and goal-directed self-talk; the Big Five personality traits; and BPNs satisfaction and frustration within their sport. In order to guarantee that our sample of Greek athletes represented both genders and team and individual sports, we employed the stratified sampling method in this study.

2.2. Participants

The participants were 691 athletes (363 males and 328 females) with a mean age of 21.65 ($\pm$8.06) years. The inclusion criteria were being 14 years and older and practicing their sport at least twice a week. Any athletes who left many unanswered questions, were younger than 14 years, or practiced their sport less than twice a week were excluded. The athletes represented a variety of team (e.g., football, basketball, volleyball, water polo, and handball: $n = 421$) and individual (e.g., athletics, swimming, finswimming, rhythmic gymnastics, tennis, taekwondo, karate, boxing, kickboxing, wrestling weight lifting, fencing, windsurfing, etc.: $n = 270$) sports. With regard to competitive level, 12.7% of them had competed at the international level, 39.5% at the national level, and 47.8% at the regional or county level. Finally, the mean competitive experience of the participants was 7.58 ($\pm$5.44) years.

2.3. Measures

The Big-Five Personality Traits. The Greek version of the 50-item International Personality Item Pool (IPIP) Big Five factor markers [69] was used to assess athletes' Big Five personality traits. The instrument is a self-report personality scale consisting of 50 items and five factors (10 items per factor) designed to assess the Big Five personality traits (i.e., extraversion, agreeableness, conscientiousness, emotional stability, and intellect/openness) as expressed in Costa and McCrae's [34] revised NEO personality inventory (NEO-PI-R). Example items for each personality trait include: "I make friends easily" for extraversion; "I sympathize with others' feelings" for agreeableness; "I follow a schedule" for conscientiousness; "I get stressed out easily" (reversed item) for emotional stability; and "I am quick to understand things" for intellect/openness. As in the original measure, participants were instructed to respond regarding how accurately they believed each statement described themselves on a 5-point Likert-type scale ranging from 1 (very inaccurate) to 5 (very accurate). Ypofanti [70] reported satisfactory evidence for the validity and reliability of the translated scale on the general population in Greece.

Athletes' Organic Self-Talk. Athletes' organic self-talk was measured using the OSTQS. The OSTQS is a theory-grounded, multidimensional, state measure of athletes' organic self-talk that assesses, according to Latinjak et al.'s contemporary conceptual framework of organic self-talk in sport [1,6], the two major types of athletes' organic self-talk: spontaneous and goal-directed self-talk. The instrument consists of 45 items, 17 assessing four dimensions of athletes' state spontaneous self-talk and 28 assessing seven functions of athletes' state goal-directed self-talk. Particularly, athletes' state spontaneous self-talk consists of the dimensions of retrospective-positive (five items; e.g., "I have performed well"), anticipatory-positive (four items; e.g., "I will succeed"), retrospective-negative

(five items; e.g., "I have failed"), and anticipatory-negative (three items; e.g., "I want to give up") self-talk. On the other hand, athletes' state goal-directed self-talk consists of the functions of controlling cognitive reactions (four items; e.g., "It does not matter. No one is perfect"), controlling dysfunctional activated/deactivated states (four items; e.g., "Do not worry"/"Do not be disappointed"), creating functional deactivated states (four items; e.g., "Calm down"), creating functional activated states (four items; e.g., "Give it all"), instruction (four items; e.g., "Focus on your technique/tactic"), up-regulating self-confidence (four items; e.g., "You can do it"), and promoting goals (four items; e.g., "The goal is to perform well"). The participants were asked to read each statement and to indicate how frequently they had told it to themselves during the competition or training in which they just had participated on a 5-point Likert-type scale ranging from 0 (*never*) to 4 (*very often*). Karamitrou et al. [31] have supported the validity and reliability of the OSTQS in athletes from a variety of team and individual sports and age groups.

Athletes' BPNs Satisfaction. Items from three previous validated questionnaires were used to assess athletes' perceptions of the degree to which they experienced satisfaction of the three BPNs. Particularly, to assess satisfaction of the need for autonomy, we used the five items (e.g., "I have some choice in what I want to do in my sport") collated by Standage et al. [71]. Satisfaction of the need for competence was assessed using the five items (e.g., "I think I am pretty good at my sport") from the competence subscale of the Intrinsic Motivation Inventory (IMI; [72]). Lastly, satisfaction of the need for relatedness was assessed using the five items (e.g., "When participating in my sport I feel supported") from the acceptance subscale of the Need for Relatedness Scale (NRS-10; [73]). Responses for all three questionnaires were provided on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The psychometric properties of the three aforementioned questionnaires were previously examined in Greek athletes with satisfactory results [74].

Athletes' BPNs frustration. The Greek version of the 12-item Psychological Need-Thwarting Scale (PNTS; [54]) was administered to assess athletes' perceptions of the degree to which they experienced frustration of the three BPNs of autonomy (four items; e.g., "I feel forced to follow training decisions made for me"), competence (four items; e.g., "There are times when I am told things that make me feel incompetent"), and relatedness (four items; e.g., "I feel I am rejected by those around me") within their sport environment. Athletes were instructed to consider their general experiences in the sport context during the last four weeks, and indicate how much they agreed or disagreed with each statement on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Previous research has also used the Greek version of PNTS with good psychometric properties [74].

2.4. Procedure

The research was conducted following international ethical guidelines that are consistent with the guidelines of the American Psychological Association and with the Declaration of Helsinki. Prior to the beginning of data collection, ethical approval was sought and received from the first author's university Ethics Committee (approval number: 1219, 5/4/2017). Subsequently, sports clubs, administrators, and club coaches were contacted to explain the purpose and nature of the study, and to invite their athletes to participate. Similarly, all participants were informed regarding the purpose and nature of our research, their voluntary participation, their right to withdraw from the study at any time they wished, and the anonymity and confidentiality of their responses. Coach and athlete consent were provided prior to participation, while parental consent was obtained for every athlete under the age of 16. The primary researcher and a trained research assistant administered the questionnaires described above immediately after the end of a competition or a regular practice, and supervised their completion in all cases without the presence of a coach. Instructions about how to complete the questionnaire were provided orally and in written format, while participants were repeatedly reminded that there were no right or wrong answers. Athletes needed approximately 20–25 min to complete the questionnaires.

2.5. Data Analysis

IBM SPSS Statistics 24 (IBM Corp., Armonk, NY, USA) was used for all analyses conducted in this study. After screening for outliers and normality, descriptive statistics, internal consistency coefficients (Cronbach's alphas), and Pearson's correlations for all study variables were calculated. The nomological validity of the OSTQS was examined through Pearson's correlations between the OSTQS subscales and the subscales of the Big Five personality traits, BPNs satisfaction, and BPNs frustration. Finally, a three-step hierarchical multiple regression analysis was conducted for each OSTQS subscale to examine whether the Big Five personality traits, and athletes' BPNs satisfaction and frustration within their sport environment, could predict the four dimensions of athletes' spontaneous self-talk as well as the seven functions of athletes' goal-directed self-talk. We used hierarchical multiple regression analyses instead of *structural equation modeling* (SEM) because, in this first exploratory study, we are particularly interested in analyzing the incremental contribution of BPNs satisfaction and frustration to the prediction of athletes' spontaneous and goal-directed self-talk, over and above athletes' Big Five personality traits and BPNs satisfaction, respectively. Therefore, in each of the analyses conducted, the Big Five personality traits subscales were entered in step 1, the three BPNs satisfaction subscales were entered in step 2, and the three BPNs frustration subscales were entered in step 3. We entered first the Big Five personality traits, as they are relatively stable; are considered to have a more general influence on thoughts and behavior; and we want to control for their effects in the two consecutive steps. In the second step, we entered the three BPNs satisfaction subscales, as we wanted to examine whether they could add to the prediction of the dependent variables after controlling for the Big Five personality traits. Finally, in the third and final step, we entered the three BPNs frustration subscales, as we wanted to examine whether they could add to the prediction of the dependent variables after controlling for the satisfaction of three basic psychological needs and the Big Five personality traits.

3. Results

3.1. Descriptive Statistics, Reliabilities, and Correlations

Descriptive statistics (means and standard deviations), Cronbach's alpha reliability coefficients, and correlations for all subscales are presented in Table 1. Examination of Cronbach's alpha coefficients (ranging from 0.68 to 0.88) revealed adequate internal consistency ($a > 0.70$) for almost all subscales, except for the competence need satisfaction subscale ($a = 0.68$) and agreeableness subscale ($a = 0.69$), whose reliability coefficients were marginally acceptable.

The mean scores indicated that the athletes in this study scored moderately to highly on the Big Five personality traits subscales; on the retrospective-positive and anticipatory-positive spontaneous self-talk subscales; on all goal-directed self-talk subscales with the exception of controlling cognitive reactions; as well as on the three BPNs satisfaction subscales. In contrast, the participants scored low to moderately in the retrospective-negative and anticipatory-negative spontaneous self-talk subscales; on the controlling cognitive reactions subscale of goal-directed self-talk; and on the three BPNs frustration subscales.

Table 1. Pearson's Correlations, Descriptive Statistics, and Cronbach's Alpha Coefficients for All Subscales.

Subscale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. E	-																					
2. A	0.18 **	-																				
3. CO	0.11 **	0.20 **	-																			
4. ES	0.15 **	−0.05	0.16 **	-																		
5. IN	0.39 **	0.24 **	0.15 **	0.04	-																	
6. RP	0.32 **	0.16 **	0.16 **	0.08 *	0.25 **	-																
7. AP	0.32 **	0.18 **	0.21 **	0.17 **	0.25 **	0.58 **	-															
8. RN	−0.22 **	−0.01	−0.14 **	−0.40 **	−0.09 *	−0.30 **	−0.33 **	-														
9. AN	−0.14 **	−0.01	−0.13 **	−0.32 **	−0.06	−0.23 **	−0.25 **	0.45 **	-													
10. CCR	0.03	0.19 **	0.05	−0.13 **	0.08 *	0.26 **	0.08	0.13 **	0.14 **	-												
11. CDS	0.11 **	0.25 **	0.14 **	−0.15 **	0.21 **	0.31 **	0.29 **	0.09 *	0.08 *	0.48 **	-											
12. CFDS	0.05	0.24 **	0.12 **	−0.25 **	0.17 **	0.21 **	0.26 **	0.14 **	0.11 **	0.40 **	0.67 **	-										
13. CFAS	0.23 **	0.19 **	0.20 **	−0.01	0.17 **	0.41 **	0.50 **	−0.04	−0.06	0.24 **	0.53 **	0.48 **	-									
14. I	0.17 **	0.19 **	0.23 **	−0.10 *	0.18 **	0.34 **	0.37 **	0.02	−0.08 *	0.34 **	0.56 **	0.52 **	0.66 **	-								
15. C	0.27 **	0.20 **	0.25 **	−0.01	0.25 **	0.50 **	0.62 **	−0.14 **	−0.11 **	0.33 **	0.60 **	0.46 **	0.72 **	0.62 **	-							
16. PG	0.24 **	0.13 **	0.26 **	−0.01	0.18 **	0.42 **	0.45 **	−0.02	−0.17 **	0.32 **	0.46 **	0.38 **	0.60 **	0.61 **	0.64 **	-						
17. AS	0.12 **	0.13 **	0.10 **	0.01	0.17 **	0.20 **	0.13 **	−0.14 **	−0.01	0.13 **	0.14 **	0.10 **	0.13 **	0.13 **	0.18 **	0.10 **	-					

Table 1. *Cont.*

Subscale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
18. CS.	0.29 **	0.19 **	0.15 **	0.03	0.30 **	0.50 **	0.35 **	−0.24 **	−0.24 **	0.13 **	0.24 **	0.16 **	0.29 **	0.25 **	0.37 **	0.34 **	0.37 **	-				
19. RS	0.23 **	0.23 **	0.15 **	0.13 **	0.16 **	0.31 **	0.24 **	−0.18 **	−0.18 **	0.09 *	0.14 **	0.08 *	0.20 **	0.18 **	0.23 **	0.22 **	0.42 **	0.49 **	-			
20. AF	−0.07	−0.14 **	−0.15 **	−0.24 **	−0.03	−0.08 *	−0.10 *	0.25 **	0.18 **	0.08 *	0.02	0.03	−0.02	−0.04	−0.05	−0.01	−0.23 **	−0.18 **	−0.49 **	-		
21. CF	−0.03	−0.01	−0.10 **	−0.28 **	0.01	−0.08 *	−0.07	0.32 **	0.20 **	0.15 **	0.06	0.13 **	0.02	0.04	0.01	0.04	−0.10 **	−0.05	−0.46 **	0.62 **	-	
22. RF	−0.03	−0.03	−0.07	−0.32 **	0.07	−0.06	−0.08 *	0.28 **	0.21 **	0.14 **	0.16 **	0.18 **	0.06	0.07	0.06	0.07	−0.08 *	−0.05	−0.47 **	0.60 **	0.69 **	-
Mean	3.63	4.26	4.00	3.11	4.08	2.52	3.03	1.49	0.88	1.78	2.12	2.52	3.04	2.81	2.88	2.66	4.72	5.18	5.34	2.82	3.58	2.79
SD	0.77	0.49	0.79	0.83	0.55	0.75	0.76	0.75	0.89	0.97	1.03	0.93	0.86	0.86	0.92	0.93	1.12	0.95	1.12	1.34	1.10	1.41
a	0.83	0.69	0.87	0.85	0.75	0.77	0.79	0.75	0.82	0.79	0.79	0.74	0.81	0.80	0.82	0.76	0.74	0.68	0.88	0.83	0.82	0.81

Note. E = Extraversion; A = Agreeableness; CO = Conscientiousness; ES = Emotional stability; IN = Intellect/openness; RP = Retrospective-positive self-talk; AP = Anticipatory-positive self-talk; RN = Retrospective-negative self-talk; AN = Anticipatory-negative self-talk; CCR = Controlling cognitive reactions self-talk; CDS = Controlling dysfunctional activated/deactivated states self-talk; CFDS = Creating functional deactivated states self-talk; CFAS = Creating functional activated states self-talk; I = Instruction self-talk; C = Up-regulating self-confidence self-talk; PG = Promoting goals self-talk; AS = Autonomy satisfaction; CS = Competence satisfaction; RS = Relatedness satisfaction; AF = Autonomy frustration; CF, competence frustration; RF = Relatedness frustration. Correlations were considered small (0.10), medium (0.30), or large (0.50) based on the criteria suggested by Cohen [75]. * $p < 0.05$ (two-tailed). ** $p < 0.01$ (two-tailed).

3.2. Nomological Validity of OSTQS

The nomological validity of the OSTQS was tested via examination of Pearson's correlations between the OSTQS subscales and the subscales of the Big Five personality traits, BPNs satisfaction, and BPNs frustration. The two positive dimensions of spontaneous self-talk, retrospective-positive and anticipatory-positive self-talk, showed low to moderate positive significant correlations with the Big Five personality traits, and low to large positive significant correlations with the three forms of BPNs satisfaction. In contrast, low negative significant correlations were found among the dimensions of retrospective-positive and anticipatory-positive self-talk with the three forms of BPNs frustration (with the exception of the correlations between competence need frustration and anticipatory-positive self-talk, and between relatedness need frustration and retrospective-positive self-talk, which although negative, were not significant). On the other hand, low to moderate negative significant correlations were found among retrospective-negative and anticipatory-negative self-talk with the Big Five personality traits (with the exception of the correlations among agreeableness with retrospective-negative and anticipatory-negative self-talk, and among intellect/openness with anticipatory-negative self-talk, which were negative but not significant). Similarly, low negative significant correlations were found among retrospective-negative and anticipatory-negative self-talk with the three forms of BPNs satisfaction, apart from the correlation between anticipatory-negative self-talk and autonomy need satisfaction, which was negative and non-statistically significant. In contrast, low to moderate positive significant correlations were found among retrospective-negative and anticipatory-negative self-talk with the three forms of BPNs frustration.

With regard to the goal-directed self-talk subscales, extraversion, agreeableness, conscientiousness, and intellect/openness had low positive significant correlations with all goal-directed self-talk functions, with the exception of the correlations among extraversion with controlling cognitive reactions and creating functional deactivated states functions of goal-directed self-talk, and also the correlation between conscientiousness and controlling cognitive reactions function of goal-directed self-talk, all of which were positive and non-significant. In contrast, emotional stability had low negative significant correlations with controlling cognitive reactions, controlling dysfunctional activated/deactivated states, creating functional deactivated states, and instruction functions of goal-directed self-talk, and negative non-significant correlations with creating functional activated states, up-regulating self-confidence, and promoting goals functions of goal-directed self-talk. All goal-directed self-talk functions had low to moderate positive significant correlations with the three forms of BPNs satisfaction. Low positive significant correlations were also found among the controlling cognitive reactions function with the three forms of BPNs frustration, between the controlling dysfunctional activated/deactivated states function with relatedness need frustration, and among creating functional deactivated states function with competence and relatedness needs frustration. Finally, low non-significant correlations were found among the three forms of BPNs frustration with creating functional deactivated states, instruction, up-regulating self-confidence, and promoting goals functions of goal-directed self-talk.

Overall, the above results provide support for the nomological validity of the OSTQS by showing the relationships among spontaneous self-talk dimensions and goal-directed self-talk functions with their personal and social–environmental antecedents, based on the existing theoretical models of self-talk in sport [1,3,6,13], the BFM of personality traits [34,35], and SDT [46,47].

3.3. Hierarchical Regression Analyses for Predicting Athletes' Spontaneous Self-Talk Dimensions

Four three-step hierarchical regression analyses were conducted to examine whether the Big Five personality traits and athletes' BPNs satisfaction and frustration within their sport environment could predict the four dimensions of athletes' spontaneous self-talk. The results of the four hierarchical multiple regression analyses are displayed in Table 2.

Table 2. Hierarchical Regression Analyses Summary for Predicting Athletes' Organic, Spontaneous Self-Talk Dimensions.

Dependent Variable	Step	Predictor(s) Entered	B	$SE\ B$	β	t	R^2	R^2 Change	F Change	F
Retrospective-positive	**Step 1**	Extraversion	0.23	0.04	0.24	6.09 ***				
		Agreeableness	0.11	0.06	0.07	1.85				
		Conscientiousness	0.09	0.04	0.10	2.66 **				
		Emotional stability	0.02	0.03	0.02	0.60				
		Intellect/Openness	0.17	0.05	0.12	3.14 **				
		All Predictors					0.14			21.38 ***
	Step 2	Extraversion	0.15	0.04	0.15	4.16 ***				
		Agreeableness	0.04	0.05	0.03	0.72				
		Conscientiousness	0.06	0.03	0.06	1.84				
		Emotional stability	0.02	0.03	0.03	0.74			-	
		Intellect/Openness	0.06	0.05	0.05	1.26				
		Autonomy satisfaction	−0.01	0.02	−0.01	−0.29				
		Competence satisfaction	0.32	0.03	0.41	10.42 ***				
		Relatedness satisfaction	0.03	0.03	0.05	1.19				
		All Predictors					0.29	0.16	50.98 ***	35.40 ***
	Step 3	Extraversion	0.15	0.04	0.15	4.15 ***				
		Agreeableness	0.05	0.05	0.04	1.01				
		Conscientiousness	0.06	0.03	0.07	1.94				
		Emotional stability	0.02	0.03	0.02	0.70				
		Intellect/Openness	0.06	0.05	0.04	1.18				
		Autonomy satisfaction	0.00	0.03	0.00	0.00				
		Competence satisfaction	0.33	0.03	0.42	10.45 ***				
		Relatedness satisfaction	0.03	0.03	0.05	1.00				
		Autonomy frustration	0.06	0.03	0.10	2.30 *				
		Competence frustration	−0.06	0.03	−0.09	−1.83				
		Relatedness frustration	0.00	0.03	0.00	0.06				
		All Predictors					0.30	0.01	2.22	26.49 ***
Anticipatory-positive	**Step 1**	Extraversion	0.23	0.04	0.23	5.99 ***				
		Agreeableness	0.15	0.06	0.09	2.56 *				
		Conscientiousness	0.13	0.04	0.13	3.70 ***				
		Emotional stability	0.11	0.03	0.12	3.25 **				
		Intellect/Openness	0.15	0.05	0.11	2.82 **				
		All Predictors					0.17			27.61 ***
	Step 2	Extraversion	0.18	0.04	0.18	4.70 ***				
		Agreeableness	0.11	0.06	0.07	1.90				
		Conscientiousness	0.11	0.03	0.11	3.22 **				
		Emotional stability	0.11	0.03	0.12	3.34 **				
		Intellect/Openness	0.09	0.05	0.07	1.72				

Table 2. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	B	SE B	β	t	R²	R² Change	F Change	F
		Autonomy satisfaction	−0.02	0.03	−0.03	−0.73				
		Competence satisfaction	0.19	0.03	0.24	5.78 ***				
		Relatedness satisfaction	0.02	0.03	0.03	0.82				
		All Predictors					0.22	0.05	15.30 ***	24.07 ***
	Step 3	Extraversion	0.18	0.04	0.18	4.65 ***				
		Agreeableness	0.11	0.06	0.07	1.95				
		Conscientiousness	0.11	0.03	0.12	3.29 **				
		Emotional stability	0.11	0.03	0.12	3.22 **				
		Intellect/Openness	0.09	0.05	0.07	1.72				
		Autonomy satisfaction	−0.02	0.03	−0.02	−0.61				
		Competence satisfaction	0.19	0.03	0.24	5.65 ***				
		Relatedness satisfaction	0.03	0.03	0.04	0.88				
		Autonomy frustration	0.03	0.03	0.05	0.96				
		Competence frustration	0.00	0.04	0.01	0.11				
		Relatedness frustration	−0.02	0.03	−0.03	−0.52				
		All Predictors					0.22	0.00	0.37	17.56 ***
Retrospective-negative	**Step 1**	Extraversion	−0.16	0.04	−0.16	−4.22 ***				
		Agreeableness	0.02	0.06	0.01	0.36				
		Conscientiousness	−0.06	0.03	−0.06	−1.78				
		Emotional stability	−0.33	0.03	−0.36	−10.31 ***				
		Intellect/Openness	−0.01	0.05	−0.01	−0.27				
		All Predictors					0.19			32.43 ***
	Step 2	Extraversion	−0.12	0.04	−0.12	−3.21 **				
		Agreeableness	0.05	0.06	0.03	0.94				
		Conscientiousness	−0.04	0.03	−0.05	−1.29				
		Emotional stability	−0.33	0.03	−0.37	−10.53 ***				
		Intellect/Openness	0.04	0.05	0.03	0.78				
		Autonomy satisfaction	−0.04	0.03	−0.06	−1.45				
		Competence satisfaction	−0.14	0.03	−0.18	−4.34 ***				
		Relatedness satisfaction	0.00	0.03	0.00	−0.06				
		All Predictors					0.23	0.04	10.78 ***	25.18 ***
	Step 3	Extraversion	−0.14	0.04	−0.14	−3.79 ***				
		Agreeableness	0.03	0.05	0.02	0.55				
		Conscientiousness	−0.04	0.03	−0.04	−1.11				
		Emotional stability	−0.27	0.03	−0.30	−8.35 ***				
		Intellect/Openness	0.03	0.05	0.02	0.51				
		Autonomy satisfaction	−0.05	0.03	−0.08	−2.01 *				
		Competence satisfaction	−0.19	0.03	−0.24	−5.81 ***				

Table 2. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	*B*	*SE B*	*β*	*t*	*R²*	*R²* Change	*F* Change	*F*
		Relatedness satisfaction	0.12	0.03	0.18	3.73 ***				
		Autonomy frustration	0.00	0.03	0.01	0.15				
		Competence frustration	0.16	0.03	0.23	4.76 ***				
		Relatedness frustration	0.04	0.03	0.08	1.54				
		All Predictors					0.28	0.06	17.59 ***	24.45 ***
Anticipatory-negative	**Step 1**	Extraversion	−0.10	0.05	−0.09	−2.15 *				
		Agreeableness	0.03	0.07	0.02	0.49				
		Conscientiousness	−0.09	0.04	−0.08	−2.08 *				
		Emotional stability	−0.32	0.04	−0.30	−8.06 ***				
		Intellect/Openness	−0.02	0.07	−0.01	−0.27				
		All Predictors					0.12			18.55 ***
	Step 2	Extraversion	−0.04	0.05	−0.03	−0.84				
		Agreeableness	0.08	0.07	0.04	1.15				
		Conscientiousness	−0.07	0.04	−0.06	−1.67				
		Emotional stability	−0.31	0.04	−0.29	−8.13 ***				
		Intellect/Openness	0.04	0.06	0.02	0.56				
		Autonomy satisfaction	0.10	0.03	0.12	3.07 **				
		Competence satisfaction	−0.22	0.04	−0.23	−5.49 ***				
		Relatedness satisfaction	−0.06	0.03	−0.07	−1.73				
		All Predictors					0.18	0.06	15.31 ***	18.06 ***
	Step 3	Extraversion	−0.05	0.05	−0.04	−1.05				
		Agreeableness	0.07	0.07	0.04	1.06				
		Conscientiousness	−0.07	0.04	−0.06	−1.59				
		Emotional stability	−0.28	0.04	−0.26	−6.85 ***				
		Intellect/Openness	0.02	0.06	0.02	0.37				
		Autonomy satisfaction	0.09	0.03	0.11	2.85 **				
		Competence satisfaction	−0.24	0.04	−0.26	−5.96 ***				
		Relatedness satisfaction	0.01	0.04	0.01	0.18				
		Autonomy frustration	0.01	0.03	0.02	0.42				
		Competence frustration	0.05	0.04	0.06	1.15				
		Relatedness frustration	0.04	0.03	0.07	1.28				
		All Predictors					0.19 ***	0.01	2.90 *	14.04 ***

Note. *B* = unstandardized regression coefficient; *SE* = standard error; *β* = standardized regression coefficient. *df* for step 1 = (5, 685); *df* for step 2 = (3, 682); *df* for step 3 = (3, 679).* *p* < 0.05. ** *p* < 0.01. *** *p* < 0.001.

For the retrospective-positive dimension of spontaneous self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance (R^2 = 0.14). Examination of the beta coefficients in step 1 indicated that extraversion

(β = 0.24, p < 0.001), intellect/openness (β = 0.12, p = 0.002), and conscientiousness (β = 0.10, p = 0.008) were the three significant (positive) predictors of athletes' retrospective-positive self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of athletes' retrospective-positive self-talk (R^2 = 0.29, R^2 change = 0.16) over and above that explained by the five personality traits alone (R^2 = 0.14). Examination of the beta coefficients in step 2 revealed that only competence need satisfaction (β = 0.41, p < 0.001) and extraversion (β = 0.15, p < 0.001) were the two significant (positive) predictors of athletes' retrospective-positive self-talk. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they did not significantly contribute to the prediction of athletes' retrospective-positive self-talk (R^2 = 0.30, R^2 change = 0.01; F change = 2.22, p = 0.085). Examination of the beta coefficients from the entire model revealed that the only significant (positive) predictors of athletes' retrospective-positive self-talk were competence need satisfaction (β = 0.42, p < 0.001), extraversion (β = 0.15, p < 0.001), and, unexpectedly, autonomy need frustration (β = 0.10, p = 0.022).

For the anticipatory-positive dimension of spontaneous self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance (R^2 = 0.17). Examination of the beta coefficients in step 1 revealed that each of the five personality traits significantly and positively predicted athletes' anticipatory-positive self-talk. Particularly, extraversion (β = 0.23, p < 0.001) was the strongest significant predictor of athletes' anticipatory-positive self-talk, followed by conscientiousness (β = 0.13, p < 0.001), emotional stability (β = 0.12, p = 0.001), intellect/openness (β = 0.11, p = 0.005), and agreeableness (β = 0.09, p = 0.011). In step 2, when the three BPNs satisfaction subscales were added as predictors, they significantly improved the prediction of athletes' anticipatory-positive self-talk (R^2 = 0.22, R^2 change = 0.05) over and above that explained by the five personality traits alone. However, examination of the beta coefficients in step 2 revealed that only competence need satisfaction (β = 0.24, p < 0.001), extraversion (β = 0.18, p < 0.001), emotional stability (β = 0.12, p = 0.001), and conscientiousness (β = 0.11, p = 0.001) were significant (positive) predictors of athletes' anticipatory-positive self-talk. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they did not significantly contribute to the prediction of athletes' anticipatory-positive self-talk (R^2 = 0.22, R^2 change = 0.00, F change = 0.3, p = 0.773). Examination of the beta coefficients from the full model revealed that, similarly to step 2, competence need satisfaction (β = 0.24, p < 0.001), extraversion (β = 0.18, p < 0.001), emotional stability (β = 0.12, p = 0.001), and conscientiousness (β = 0.12, p = 0.001) were the only significant (positive) predictors of athletes' anticipatory-positive self-talk.

For the retrospective-negative dimension of spontaneous self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance (R^2 = 0.19). Examination of the beta coefficients at step 1 indicated that only emotional stability (β = −0.36, p < 0.001) and extraversion (β = −0.16, p < 0.001) were significant (negative) predictors of athletes' retrospective-negative self-talk. At step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of athletes' retrospective-negative self-talk (R^2 = 0.23, R^2 change = 0.04) over and above that explained by the Big Five personality traits alone. Examination of the beta coefficients in step 2 showed that emotional stability (β = −0.37, p < 0.001), competence need satisfaction (β = −0.18, p < 0.001), and extraversion (β = −0.12, p = 0.001) were the three significant (negative) predictors of athletes' retrospective-negative self-talk. In the final and third step, when the three BPNs frustration subscales were added as predictors, they significantly contributed to the prediction of athletes' retrospective-negative self-talk (R^2 = 0.28, R^2 change = 0.06). Examination of the beta coefficients from the entire model revealed that emotional stability (β = −0.30, p < 0.001), extraversion (β = −0.14, p < 0.001), competence need satisfaction (β = −0.24, p < 0.001), and autonomy need satisfaction (β = −0.08, p = 0.045) were significant and negative predictors of athletes' retrospective-negative self-talk. Relatedness need satisfaction (β = 0.18, p < 0.001) emerged as a significant

but, in contrast to our expectations, positive predictor of athletes' retrospective-negative self-talk. Finally, competence need frustration ($\beta = 0.23$, $p < 0.001$) was a significant and positive predictor of athletes' retrospective-negative self-talk.

For the anticipatory-negative dimension of spontaneous self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance ($R^2 = 0.12$). Examination of the beta coefficients in step 1 indicated that emotional stability ($\beta = -0.30$, $p < 0.001$), extraversion ($\beta = -0.09$, $p = 0.032$), and conscientiousness ($\beta = -0.08$, $p = 0.038$) were the three significant and negative predictors of athletes' anticipatory-negative self-talk. At step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of athletes' anticipatory-negative self-talk ($R^2 = 0.18$, R^2 change $= 0.06$) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 showed that emotional stability ($\beta = -0.29$, $p < 0.001$) and competence need satisfaction ($\beta = -0.23$, $p < 0.001$) were significant and negative predictors of athletes' anticipatory-negative self-talk. However, and in contrast to our expectations, autonomy need satisfaction ($\beta = 0.12$, $p = 0.002$) emerged as a significant and positive predictor of athletes' anticipatory-negative self-talk. In the final and third step, when the three BPNs frustration subscales were added as predictors, they significantly contributed to the prediction of athletes' anticipatory-negative self-talk ($R^2 = 0.19$, R^2 change $= 0.01$). Likewise, in step 2, examination of the beta coefficients from the entire model revealed that emotional stability ($\beta = -0.26$, $p < 0.001$) and competence need satisfaction ($\beta = -0.26$, $p < 0.001$) emerged as significant and negative predictors of athletes' anticipatory-negative self-talk, whereas autonomy need satisfaction ($\beta = 0.11$, $p = 0.004$) emerged in contrast to our expectations as a significant and positive predictor of athletes' anticipatory-negative self-talk.

3.4. Hierarchical Regression Analyses for Predicting Athletes' Goal-Directed Self-Talk Functions

Seven three-step hierarchical regression analyses were conducted to examine whether the Big Five personality traits, and athletes' BPNs satisfaction and frustration within their sport environment could predict the seven functions of athletes' goal-directed self-talk. The results of the seven hierarchical multiple regression analyses are displayed in Table 3.

Table 3. Hierarchical Regression Analyses Summary for Predicting Athletes' Organic Goal-Directed Self-Talk Functions.

Dependent Variable	Step	Predictor(s) Entered	B	SE B	β	t	R^2	R^2 Change	F Change	F
Controlling Cognitive Reactions	**Step 1**	Extraversion	−0.01	0.05	0.00	−0.10				
		Agreeableness	0.33	0.08	0.17	4.24 ***				
		Conscientiousness	0.04	0.05	0.03	0.83				
		Emotional stability	−0.15	0.04	−0.13	−3.44 **				
		Intellect/Openness	0.07	0.07	0.04	0.91				
		All Predictors					0.05			7.67 ***
	Step 2	Extraversion	−0.03	0.05	−0.02	−0.54				
		Agreeableness	0.30	0.08	0.15	3.84 ***				
		Conscientiousness	0.03	0.05	0.02	0.53				
		Emotional stability	−0.15	0.04	−0.13	−3.39 **				
		Intellect/Openness	0.03	0.07	0.01	0.34				
		Autonomy satisfaction	0.07	0.04	0.09	2.04 *				
		Competence satisfaction	0.07	0.05	0.07	1.57				

Table 3. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	B	SE B	β	t	R^2	R^2 Change	F Change	F
		Relatedness satisfaction	0.00	0.04	0.00	0.08				
		All Predictors					0.07	0.02	3.73 *	6.25 ***
	Step 3	Extraversion	−0.05	0.05	−0.04	−0.89				
		Agreeableness	0.29	0.08	0.15	3.76 ***				
		Conscientiousness	0.03	0.05	0.03	0.72				
		Emotional stability	−0.08	0.05	−0.07	−1.83				
		Intellect/Openness	0.00	0.07	0.00	0.06				
		Autonomy satisfaction	0.07	0.04	0.08	1.81				
		Competence satisfaction	0.03	0.05	0.03	0.70				
		Relatedness satisfaction	0.13	0.05	0.15	2.72 **				
		Autonomy frustration	0.05	0.04	0.07	1.28				
		Competence frustration	0.10	0.05	0.11	1.98 *				
		Relatedness frustration	0.06	0.04	0.09	1.54				
		All Predictors					0.10	0.03	7.77 ***	6.80 ***
Controlling Dysfunctional Activated/ Deactivated States	**Step 1**	Extraversion	0.04	0.05	0.03	0.83				
		Agreeableness	0.37	0.08	0.18	4.62 ***				
		Conscientiousness	0.14	0.05	0.11	2.96 **				
		Emotional stability	−0.21	0.05	−0.17	4.60 ***				
		Intellect/Openness	0.26	0.08	0.14	3.54 ***				
		All Predictors					0.12			18.08 ***
	Step 2	Extraversion	0.00	0.05	0.00	−0.01				
		Agreeableness	0.33	0.08	0.16	4.13 ***				
		Conscientiousness	0.12	0.05	0.10	2.56 *				
		Emotional stability	−0.21	0.05	−0.17	−4.55 ***				
		Intellect/Openness	0.20	0.08	0.11	2.68 **				
		Autonomy satisfaction	0.03	0.04	0.03	0.86				
		Competence satisfaction	0.17	0.05	0.16	3.58 ***				
		Relatedness satisfaction	0.01	0.04	0.01	0.17				
		All Predictors					0.14	0.03 ***	6.93 ***	14.19 ***
	Step 3	Extraversion	−0.01	0.05	−0.01	−0.24				
		Agreeableness	0.33	0.08	0.16	4.20 ***				
		Conscientiousness	0.12	0.05	0.09	2.51 *				
		Emotional stability	−0.15	0.05	−0.12	−3.18 **				
		Intellect/Openness	0.17	0.08	0.09	2.26 *				
		Autonomy satisfaction	0.02	0.04	0.02	0.57				

<div align="center">Table 3. <i>Cont.</i></div>

Dependent Variable	Step	Predictor(s) Entered	*B*	*SE B*	*β*	*t*	*R²*	*R² Change*	*F Change*	*F*
		Competence satisfaction	0.14	0.05	0.13	3.03 **				
		Relatedness satisfaction	0.09	0.05	0.10	1.96				
		Autonomy frustration	0.02	0.04	0.03	0.53				
		Competence frustration	−0.06	0.05	−0.07	−1.26				
		Relatedness frustration	0.15	0.04	0.21	3.93 ***				
		All Predictors					0.17	0.02 ***	6.61 ***	12.38 ***
Creating Functional Deactivated States	**Step 1**	Extraversion	−0.01	0.05	−0.01	−0.16				
		Agreeableness	0.33	0.07	0.17	4.67 ***				
		Conscientiousness	0.13	0.04	0.11	3.01 **				
		Emotional stability	−0.30	0.04	−0.26	−7.23 ***				
		Intellect/Openness	0.21	0.07	0.13	3.21 **				
		All Predictors					0.14			22.67 ***
	Step 2	Extraversion	−0.03	0.05	−0.02	−0.61				
		Agreeableness	0.32	0.07	0.17	4.36 ***				
		Conscientiousness	0.12	0.04	0.10	2.77 **				
		Emotional stability	−0.29	0.04	−0.26	−7.12 ***				
		Intellect/Openness	0.18	0.07	0.11	2.66 **				
		Autonomy satisfaction	0.02	0.03	0.03	0.70				
		Competence satisfaction	0.09	0.04	0.09	2.08 *				
		Relatedness satisfaction	−0.01	0.04	−0.01	−0.16				
		All Predictors					0.15	0.01	2.31	15.12 ***
	Step 3	Extraversion	−0.04	0.05	−0.03	−0.82				
		Agreeableness	0.30	0.07	0.16	4.18 ***				
		Conscientiousness	0.12	0.04	0.10	2.70 **				
		Emotional stability	−0.25	0.04	−0.22	−5.72 ***				
		Intellect/Openness	0.16	0.07	0.09	2.36 *				
		Autonomy satisfaction	0.01	0.03	0.01	0.25				
		Competence satisfaction	0.06	0.04	0.06	1.40				
		Relatedness satisfaction	0.07	0.04	0.08	1.58				
		Autonomy frustration	−0.04	0.03	−0.05	−1.08				
		Competence frustration	0.03	0.05	0.03	0.61				
		Relatedness frustration	0.11	0.04	0.17	3.14 **				
		All Predictors					0.17	0.02	4.99 **	12.55 ***

Table 3. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	B	SE B	β	t	R²	R² Change	F Change	F
Creating Functional Activated States	**Step 1**	Extraversion	0.20	0.05	0.18	4.44 ***				
		Agreeableness	0.19	0.07	0.11	2.80 **				
		Conscientiousness	0.18	0.04	0.16	4.32 ***				
		Emotional stability	−0.06	0.04	−0.06	−1.55				
		Intellect/Openness	0.09	0.06	0.05	1.35				
		All Predictors					0.10			15.77 ***
	Step 2	Extraversion	0.15	0.05	0.13	3.32 **				
		Agreeableness	0.14	0.07	0.08	2.15 *				
		Conscientiousness	0.16	0.04	0.14	3.89 ***				
		Emotional stability	−0.06	0.04	−0.06	−1.60				
		Intellect/Openness	0.03	0.06	0.02	0.44				
		Autonomy satisfaction	0.00	0.03	−0.01	−0.13				
		Competence satisfaction	0.17	0.04	0.19	4.35 ***				
		Relatedness satisfaction	0.04	0.03	0.05	1.06				
		All Predictors					0.14	0.04	10.16 ***	14.06 ***
	Step 3	Extraversion	0.14	0.05	0.13	3.13 **				
		Agreeableness	0.15	0.07	0.08	2.19 *				
		Conscientiousness	0.16	0.04	0.15	3.94 ***				
		Emotional stability	−0.02	0.04	−0.02	−0.61				
		Intellect/Openness	0.01	0.06	0.01	0.17				
		Autonomy satisfaction	−0.01	0.03	−0.01	−0.26				
		Competence satisfaction	0.15	0.04	0.17	3.85 ***				
		Relatedness satisfaction	0.10	0.04	0.13	2.42 *				
		Autonomy frustration	0.03	0.03	0.05	1.09				
		Competence frustration	−0.01	0.04	−0.01	−0.25				
		Relatedness frustration	0.07	0.03	0.11	2.02 *				
		All Predictors					0.15	0.01	3.20 *	11.20 ***
Instruction	**Step 1**	Extraversion	0.13	0.05	0.12	2.90 **				
		Agreeableness	0.18	0.07	0.10	2.68 **				
		Conscientiousness	0.22	0.04	0.21	5.49 ***				
		Emotional stability	−0.15	0.04	−0.15	−3.96 ***				
		Intellect/Openness	0.14	0.06	0.09	2.16 *				
		All Predictors					0.12			17.87 ***
	Step 2	Extraversion	0.09	0.05	0.08	1.95				
		Agreeableness	0.14	0.07	0.08	2.06 *				
		Conscientiousness	0.21	0.04	0.19	5.11 ***				
		Emotional stability	−0.15	0.04	−0.15	−4.06 ***				

Table 3. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	B	$SE\ B$	β	t	R^2	R^2 Change	F Change	F
		Intellect/Openness	0.09	0.06	0.06	1.41				
		Autonomy satisfaction	0.00	0.03	0.00	0.07				
		Competence satisfaction	0.13	0.04	0.14	3.32 **				
		Relatedness satisfaction	0.04	0.03	0.05	1.25				
		All Predictors					0.14	0.03	7.09 ***	14.13 ***
	Step 3	Extraversion	0.08	0.05	0.07	1.80				
		Agreeableness	0.13	0.07	0.08	1.96				
		Conscientiousness	0.21	0.04	0.19	5.06 ***				
		Emotional stability	−0.12	0.04	−0.12	−3.10 **				
		Intellect/Openness	0.08	0.06	0.05	1.19				
		Autonomy satisfaction	−0.01	0.03	−0.01	−0.18				
		Competence satisfaction	0.11	0.04	0.13	2.83 **				
		Relatedness satisfaction	0.09	0.04	0.12	2.26 *				
		Autonomy frustration	−0.01	0.03	−0.01	−0.28				
		Competence frustration	0.01	0.04	0.02	0.35				
		Relatedness frustration	0.06	0.03	0.10	1.94				
		All Predictors					0.15	0.01	2.11	10.90 ***
Up-Regulating Self-Confidence	**Step 1**	Extraversion	0.24	0.05	0.20	5.08 ***				
		Agreeableness	0.17	0.07	0.09	2.51 *				
		Conscientiousness	0.24	0.04	0.20	5.52 ***				
		Emotional stability	−0.08	0.04	−0.07	−2.01 *				
		Intellect/Openness	0.21	0.07	0.12	3.16 **				
		All Predictors					0.16			25.10 ***
	Step 2	Extraversion	0.17	0.05	0.14	3.74 ***				
		Agreeableness	0.12	0.07	0.07	1.79				
		Conscientiousness	0.21	0.04	0.18	5.04 ***				
		Emotional stability	−0.08	0.04	−0.07	−1.98 *				
		Intellect/Openness	0.12	0.06	0.07	1.88				
		Autonomy satisfaction	0.02	0.03	0.03	0.65				
		Competence satisfaction	0.25	0.04	0.25	6.14 ***				
		Relatedness satisfaction	0.01	0.03	0.02	0.43				
		All Predictors					0.22	0.06	18.58 ***	23.86 ***
	Step 3	Extraversion	0.16	0.05	0.14	3.58 ***				
		Agreeableness	0.12	0.07	0.06	1.75				
		Conscientiousness	0.21	0.04	0.18	5.00 ***				
		Emotional stability	−0.04	0.04	−0.04	−1.05				

Table 3. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	B	SE B	β	t	R^2	R^2 Change	F Change	F
		Intellect/Openness	0.10	0.06	0.06	1.61				
		Autonomy satisfaction	0.01	0.03	0.02	0.42				
		Competence satisfaction	0.23	0.04	0.24	5.61 ***				
		Relatedness satisfaction	0.07	0.04	0.08	1.69				
		Autonomy frustration	0.00	0.03	0.01	0.14				
		Competence frustration	−0.01	0.04	−0.01	−0.18				
		Relatedness frustration	0.08	0.03	0.12	2.34 *				
		All Predictors					0.23	0.01	2.69 *	18.21 ***
Promoting Goals	**Step 1**	Extraversion	0.24	0.05	0.20	4.93 ***				
		Agreeableness	0.05	0.07	0.03	0.65				
		Conscientiousness	0.28	0.04	0.24	6.46 ***				
		Emotional stability	−0.08	0.04	−0.07	−2.01 *				
		Intellect/Openness	0.11	0.07	0.07	1.68				
		All Predictors					0.13			19.73 ***
	Step 2	Extraversion	0.17	0.05	0.14	3.53 ***				
		Agreeableness	−0.01	0.07	−0.01	−.14				
		Conscientiousness	0.26	0.04	0.22	6.06 ***				
		Emotional stability	−0.09	0.04	−0.08	−2.13 *				
		Intellect/Openness	0.04	0.07	0.02	0.61				
		Autonomy satisfaction	−0.05	0.03	−0.06	−1.59				
		Competence satisfaction	0.25	0.04	0.25	5.93 ***				
		Relatedness satisfaction	0.06	0.04	0.07	1.57				
		All Predictors					0.19	0.06	17.34 ***	19.72 ***
	Step 3	Extraversion	0.15	0.05	0.13	3.28 **				
		Agreeableness	−0.01	0.07	−0.01	−0.15				
		Conscientiousness	0.26	0.04	0.22	6.20 ***				
		Emotional stability	−0.04	0.04	−0.03	−0.85				
		Intellect/Openness	0.02	0.07	0.01	0.32				
		Autonomy satisfaction	−0.06	0.03	−0.07	−1.75				
		Competence satisfaction	0.22	0.04	0.22	5.23 ***				
		Relatedness satisfaction	0.14	0.04	0.17	3.43 **				
		Autonomy frustration	0.04	0.03	0.06	1.33				
		Competence frustration	0.03	0.04	0.04	0.69				

Table 3. *Cont.*

Dependent Variable	Step	Predictor(s) Entered	*B*	*SE B*	*β*	*t*	*R²*	*R²* Change	*F* Change	*F*
		Relatedness frustration	0.06	0.03	0.10	1.87				
		All Predictors					0.21	0.02	5.09 ***	15.99 ***

Note. B = unstandardized regression coefficient; *SE* = standard error; *β* = standardized regression coefficient. *df* for step 1 = (5, 685); *df* for step 2 = (3, 682); *df* for step 3 = (3, 679).* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

For the controlling cognitive reactions function of goal-directed self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance ($R^2 = 0.05$). Examination of the beta coefficients in step 1 indicated that agreeableness ($\beta = 0.17$, $p < 0.001$) significantly and positively predicted the cognitive reactions function of goal-directed self-talk, whereas emotional stability ($\beta = -0.13$, $p = 0.001$) significantly and negatively predicted the cognitive reactions function of goal-directed self-talk. The other personality traits were not significant predictors of cognitive reactions function of goal-directed self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of the cognitive reactions function of goal-directed self-talk ($R^2 = 0.07$, R^2 change = 0.02) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 revealed that agreeableness ($\beta = 0.15$, $p < 0.001$) and autonomy need satisfaction ($\beta = 0.09$, $p = 0.042$) were the two positive significant predictors of the cognitive reactions function of goal-directed self-talk, whereas emotional stability ($\beta = -0.13$, $p = 0.001$) emerged again as a significant and negative predictor of this goal-directed self-talk function. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they significantly improved the prediction of the cognitive reactions function of goal-directed self-talk ($R^2 = 0.10$, R^2 change = 0.03). Examination of the beta coefficients from the entire model revealed that agreeableness ($\beta = 0.15$, $p < 0.001$), relatedness need satisfaction ($\beta = 0.15$, $p = 0.007$), and competence need frustration ($\beta = 0.11$, $p = 0.048$) were the only significant (positive) predictors of the cognitive reactions function of goal-directed self-talk.

For the controlling dysfunctional activated/deactivated states function of goal-directed self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance ($R^2 = 0.12$). Examination of the beta coefficients in step 1 indicated that agreeableness ($\beta = 0.18$, $p < 0.001$), conscientiousness ($\beta = 0.11$, $p = 0.003$), and intellect/openness ($\beta = 0.14$, $p < 0.001$) significantly and positively predicted the controlling dysfunctional activated/deactivated states function of goal-directed self-talk, whereas emotional stability ($\beta = -0.17$, $p < 0.001$) significantly and negatively predicted this function of goal-directed self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of the controlling dysfunctional activated/deactivated states function of goal-directed self-talk ($R^2 = 0.14$, R^2 change = 0.03) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 revealed that agreeableness ($\beta = 0.16$, $p < 0.001$), conscientiousness ($\beta = 0.10$, $p = 0.011$), intellect/openness ($\beta = 0.11$, $p = 0.008$), and competence need satisfaction ($\beta = 0.16$, $p < 0.001$) were the four positive significant predictors of the controlling dysfunctional activated/deactivated states function of goal-directed self-talk, whereas emotional stability ($\beta = -0.17$, $p < 0.001$) emerged again as a significant and negative predictor of this goal-directed self-talk function. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they significantly improved the prediction of the controlling dysfunctional activated/deactivated states function of goal-directed self-talk ($R^2 = 0.17$, R^2 change = 0.02). Examination of the beta coefficients from the entire model revealed that agreeableness ($\beta = 0.16$, $p < 0.001$), conscientiousness ($\beta = 0.09$, $p = 0.012$), intellect/openness ($\beta = 0.09$, $p = 0.024$), competence need satisfaction ($\beta = 0.13$, $p = 0.003$), and relatedness need frustration ($\beta = 0.21$, $p < 0.001$) were the five positive significant predictors of the controlling dysfunctional activated/deactivated

states function of goal-directed self-talk, whereas emotional stability ($\beta = -0.12$, $p = 0.002$) emerged again as a significant, negative predictor of this goal-directed self-talk function.

For the creating functional deactivated states function of goal-directed self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance ($R^2 = 0.14$). Examination of the beta coefficients in step 1 indicated that, similarly to the controlling dysfunctional activated/deactivated states function of goal-directed self-talk above, agreeableness ($\beta = 0.17$, $p < 0.001$), intellect/openness ($\beta = 0.13$, $p = 0.001$), and conscientiousness ($\beta = 0.11$, $p = 0.003$) significantly and positively predicted the creating functional deactivated states function of goal-directed self-talk, whereas emotional stability ($\beta = -0.26$, $p < 0.001$) significantly and negatively predicted this function of goal-directed self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they did not significantly contribute to the prediction of the creating functional deactivated states function of goal-directed self-talk ($R^2 = 0.15$, R^2 change $= 0.01$, F change $= 2.31$, $p = 0.076$) over and above that explained by five personality traits alone. Similarly to the controlling dysfunctional activated/deactivated states function of goal-directed self-talk above, examination of the beta coefficients in step 2 indicated that agreeableness ($\beta = 0.17$, $p < 0.001$), intellect/openness ($\beta = 0.11$, $p = 0.008$), conscientiousness ($\beta = 0.10$, $p = 0.006$), and competence need satisfaction ($\beta = 0.09$, $p = 0.038$) were the four positive significant predictors of the creating functional deactivated states function of goal-directed self-talk, whereas emotional stability ($\beta = -0.26$, $p < 0.001$) emerged again as a significant and negative predictor. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they significantly improved the prediction of the creating functional deactivated states function of goal-directed self-talk ($R^2 = 0.17$, R^2 change $= 0.02$). Examination of the beta coefficients from the entire model revealed that agreeableness ($\beta = 0.16$, $p < 0.001$), conscientiousness ($\beta = 0.10$, $p = 0.008$), intellect/openness ($\beta = 0.09$, $p = 0.019$), and relatedness need frustration ($\beta = 0.17$, $p = 0.002$) were the four positive significant predictors of the creating functional deactivated states function of goal-directed self-talk, whereas emotional stability ($\beta = -0.22$, $p < 0.001$) emerged again as a significant, negative predictor of this goal-directed self-talk function.

For the creating functional activated states function of goal-directed self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance ($R^2 = 0.10$). Examination of the beta coefficients in step 1 revealed that extraversion ($\beta = 0.18$, $p < 0.001$), conscientiousness ($\beta = 0.16$, $p < 0.001$), and agreeableness ($\beta = 0.11$, $p = 0.005$) were the three significant (positive) predictors of the creating functional activated states function of goal-directed self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of the creating functional activated states function of goal-directed self-talk ($R^2 = 0.14$, R^2 change $= 0.04$) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 indicated that conscientiousness ($\beta = 0.14$, $p < 0.001$), extraversion ($\beta = 0.13$, $p = 0.001$), agreeableness ($\beta = 0.08$, $p = 0.032$), and competence need satisfaction ($\beta = 0.19$, $p < 0.001$) were the four significant (positive) predictors of the creating functional activated states function of goal-directed self-talk. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they significantly improved the prediction of the creating functional activated states function of goal-directed self-talk ($R^2 = 0.15$, R^2 change $= 0.01$). Examination of the beta coefficients from the entire model revealed that conscientiousness ($\beta = 0.15$, $p < 0.001$), extraversion ($\beta = 0.13$, $p = 0.002$), agreeableness ($\beta = 0.08$, $p = 0.029$), competence need satisfaction ($\beta = 0.17$, $p < 0.001$), relatedness need satisfaction ($\beta = 0.13$, $p = 0.016$), and relatedness need frustration ($\beta = 0.11$, $p = 0.044$) were the six significant and positive predictors of the creating functional activated states function of goal-directed self-talk.

For the instruction function of goal-directed self-talk, the analyses revealed that in step 1, the Big Five personality traits predicted a significant amount of variance ($R^2 = 0.12$). Examination of the beta coefficients in step 1 revealed that conscientiousness ($\beta = 0.21$, $p < 0.001$), extraversion ($\beta = 0.12$, $p = 0.004$), agreeableness ($\beta = 0.10$, $p = 0.008$), and intel-

lect/openness (β = 0.09, p = 0.031) significantly and positively predicted the instruction function of goal-directed self-talk, whereas emotional stability (β = $-$0.15, p < 0.001) significantly and negatively predicted this function of goal-directed self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of the instruction function of goal-directed self-talk (R^2 = 0.14, R^2 change = 0.03) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 revealed that conscientiousness (β = 0.19, p < 0.001), agreeableness (β = 0.08, p = 0.040), and competence need satisfaction (β = 0.14, p = 0.001) were the three significant (positive) predictors of the instruction function of goal-directed self-talk, whereas emotional stability (β = $-$0.15, p < 0.001) emerged again as a significant and negative predictor. Finally, in step 3, when the three BPNs frustration subscales were added as predictors, they did not significantly contribute to the prediction of the instruction function of goal-directed self-talk (R^2 = 0.15, R^2 change = 0.01; F change = 2.11, p = 0.098). Examination of the beta coefficients from the full model revealed that conscientiousness (β = 0.19, p < 0.001), competence need satisfaction (β = 0.13, p = 0.005), and relatedness need satisfaction (β = 0.12, p = 0.024) were the three significant and positive predictors of the instruction function of goal-directed self-talk, whereas emotional stability (β = $-$0.12, p = 0.002) emerged again as a significant and negative predictor.

For the up-regulating self-confidence function of goal-directed self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance (R^2 = 0.16). Examination of the beta coefficients in step 1 revealed that conscientiousness (β = 0.20, p < 0.001), extraversion (β = 0.20, p < 0.001), intellect/openness (β = 0.12, p = 0.002), and agreeableness (β = 0.09, p = 0.012) significantly and positively predicted the up-regulating self-confidence function of goal-directed self-talk, whereas emotional stability (β = $-$0.07, p = 0.045) significantly and negatively predicted this function of goal-directed self-talk. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of the up-regulating self-confidence function of goal-directed self-talk (R^2 = 0.22, R^2 change = 0.06) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 revealed that conscientiousness (β = 0.18, p < 0.001), extraversion (β = 0.14, p < 0.001), and competence need satisfaction (β = 0.25, p < 0.001) were the three significant and positive predictors of the up-regulating self-confidence function of goal-directed self-talk, whereas emotional stability (β = $-$0.07, p = 0.045) was again a significant and negative predictor. Lastly, in the third and final step, when the three BPNs frustration subscales were added as predictors, they significantly improved the prediction of the up-regulating self-confidence function of goal-directed self-talk (R^2 = 0.23, R^2 change = 0.01). Examination of the beta coefficients from the entire model revealed that conscientiousness (β = 0.18, p < 0.001), extraversion (β = 0.14, p < 0.001), competence need satisfaction (β = 0.24, p < 0.001), and relatedness need frustration (β = 0.12, p = 0.020) were the four significant and positive predictors of the up-regulating self-confidence function of goal-directed self-talk.

For the promoting goals function of goal-directed self-talk, the analyses revealed that in step 1, the five personality traits predicted a significant amount of variance (R^2 = 0.13). Examination of the beta coefficients in step 1 revealed that conscientiousness (β = 0.24, p < 0.001) and extraversion (β = 0.20, p < 0.001) were the two significant and positive predictors of the promoting goals function of goal-directed self-talk, whereas emotional stability (β = $-$0.07, p = 0.045) was a significant and negative predictor. In step 2, when the three BPNs satisfaction subscales were added as predictors, they contributed a significant amount to the prediction of the promoting goals function of goal-directed self-talk (R^2 = 0.19, R^2 change = 0.06) over and above that explained by the five personality traits alone. Examination of the beta coefficients in step 2 revealed that conscientiousness (β = 0.22, p < 0.001), extraversion (β = 0.14, p < 0.001), and competence need satisfaction (β = 0.25, p < 0.001) were the three significant and positive predictors of the promoting goals function of goal-directed self-talk, whereas emotional stability (β = $-$0.08, p = 0.034) emerged again as a significant and negative predictor. Lastly, in the third and final step,

when the three BPNs frustration subscales were added as predictors, they significantly improved the prediction of the promoting goals function of goal-directed self-talk ($R^2 = 0.21$, R^2 change = 0.02). Examination of the beta coefficients from the entire model revealed that conscientiousness ($\beta = 0.22$, $p < 0.001$), extraversion ($\beta = 0.13$, $p = 0.001$), competence need satisfaction ($\beta = 0.22$, $p < 0.001$), and relatedness need satisfaction ($\beta = 0.17$, $p = 0.001$) were the four significant and positive predictors of the promoting goals function of goal-directed self-talk.

4. Discussion

Grounded in the BFM of personality traits [34,35] and SDT [46,47], and in line with SDG, the present study aimed, by using a quantitative research design and the OSTQS for the assessment of athletes' spontaneous and goal-directed self-talk, to accomplish the following:

1. Investigate the nomological validity of the OSTQS through a detailed examination of the Pearson's correlations between the OSTQS subscales, and the subscales of the Big Five personality traits, BPNs satisfaction, and BPNs frustration.
2. To examine three unexplored, potential antecedents of athletes' organic, spontaneous and goal-directed self-talk in a state level, and particularly: (a) the big five personality traits as personal antecedents, and (b) athletes' BPNs satisfaction and (c) BPNs frustration within their sport environment as social–environmental antecedents.

4.1. Nomological Validity of OSTQS

With regard to the first aim, the results of the present study provided support to the nomological validity of the OSTQS by showing the relationships among organic, spontaneous self-talk dimensions and goal-directed self-talk functions with their personal (i.e., the Big Five personality traits) and social–environmental antecedents (i.e., BPNs satisfaction and BPNs frustration), according to the existing theoretical models of self-talk in sport [1,3,6,13], the BFM of personality traits [34,35], and SDT [46,47]. Particularly, in line with theoretical predictions, the two positive spontaneous self-talk dimensions, retrospective-positive and anticipatory-positive self-talk, showed positive correlations with the Big Five personality traits and the three forms of BPNs satisfaction, and negative correlations with the three forms of BPNs frustration. Conversely, and in agreement with theoretical predictions, the two negative spontaneous self-talk dimensions, retrospective-negative and anticipatory-negative self-talk, had negative correlations with the Big Five personality traits and the three forms of BPNs satisfaction, and positive correlations with the three forms of BPNs frustration. Regarding goal-directed subscales, in line with theoretical predictions, all goal-directed self-talk functions showed positive correlations with extraversion, agreeableness, conscientiousness, and intellect/openness, and the three forms of BPNs satisfaction, and negative correlations with emotional stability. Finally, with regard to the relationships among goal-directed self-talk functions with the three forms of BPNs frustration, low positive significant correlations were emerged only among the controlling cognitive reactions function with the three forms of BPNs frustration, between the controlling dysfunctional activated/deactivated states function with relatedness need frustration, and among creating functional deactivated states function with competence and relatedness needs frustration, whereas all the other correlations were non-statistically significant.

4.2. Big Five Personality Traits as Antecedents of Athletes' Organic, Spontaneous and Goal-Directed Self-Talk

The Big Five personality traits have not been examined yet as antecedents of athletes' organic self-talk. In step 1 of our three-step hierarchical regression analyses, all Big Five personality traits were found to some extent to be a significant predictor of athletes' organic, spontaneous self-talk dimensions and goal-directed self-talk functions on a state level. Below, we discuss the findings that emerged in step 1 of our hierarchical regression analyses

regarding the predictive effects of each of the Big Five personality traits on athletes' organic, spontaneous and goal-directed self-talk at the state level.

Particularly, extraversion emerged as a significant and negative predictor of athletes' retrospective-negative (e.g., "I'm wrong again") and anticipatory-negative (e.g., "I can't take it anymore") spontaneous self-talk. Similar results were also reported by previous research conducted on athletic populations. Particularly, in a recent study among student athletes, Čopec et al. [76] found that extraversion was negatively related to athletes' primary cognitive appraisal of loss and threat. Moreover, in another study with athletes, Kaiseler et al. [45] reported that extraversion was negatively related to athletes' disengagement/resignation strategy of disengagement-oriented coping, which refers to a strategy used by athletes to disengage from the processes that could lead to their goal attainment (e.g., "I doubt my ability to attain my goal."). Conversely, our results showed that extraversion was a significant and positive predictor of athletes' retrospective-positive (e.g., "I have performed well"), and anticipatory-positive spontaneous self-talk (e.g., "I will succeed"). These results are in line with previous research findings in sport as well as in other areas of psychology. Specifically, Čopec et al. [76] found in a study conducted in a sports setting that extraversion significantly and positively predicted athletes' primary cognitive appraisal of challenge. Similarly, outside of sport, Semmer [42] reported that extraversion was positively related to a positive appraisal of coping resources. Finally, in a 30-day diary study among adult participants with rheumatoid arthritis, Zautra et al. [77] reported that extraversion significantly and positively predicted participants' daily positive interpersonal experiences as well as participants' relationship enjoyment appraisals. With respect to goal-directed self-talk functions, the results of this study indicated that extraversion was a significant and positive predictor of athletes' creating functional activated states, instruction, up-regulating self-confidence, and promoting goals functions of athletes' goal-directed self-talk. Similar results were also reported in previous sport-specific research that examined the relationships between the Big Five personality traits and athletes' coping. For instance, Allen et al. [43] found that extraversion significantly and positively predicted athletes' dispositional problem-focused coping in their sport (i.e., strategies used to actively change and remain in the sport-related stressful situation; e.g., "I did my best to change the situation"). Likewise, Kaiseler et al. [45] reported that extraversion significantly and positively predicted athletes' dispositional task-oriented coping in sport competitions, that is, strategies used to manage the internal and external demands of sport competitions, such as control of thoughts, logical analysis, effort expenditure, mental imagery, and seeking support. Finally, Kaiseler et al. [39] found that extraversion significantly and positively predicted athletes' problem-focused coping strategies of increasing effort (e.g., "I put more effort into my play") and seeking informational social support (e.g., "I asked teammates what they did or would do.") during a specific stressful event in their sport (a situational measure of coping).

In the present study, agreeableness significantly and positively predicted athletes' anticipatory-positive spontaneous self- talk as well as the controlling cognitive reactions, controlling dysfunctional activated/deactivated states, creating functional activated and deactivated states, instruction, and up-regulating self-confidence functions of goal-directed self-talk. Similar research findings were also reported by Čopec et al. [76] in their study with student athletes, in which they found that agreeableness was positively related to athletes' primary cognitive appraisal of challenge. Moreover, our results are consistent with previous research findings on the relationships between the Big Five personality traits and athletes' coping strategies. In particular, Kaiseler et al. [39] reported that agreeableness was a significant and positive predictor of athletes' problem-focused coping strategy of active coping (e.g., "I took direct action to overcome the performance challenge.") in a specific stressful event in their sport (situational measure of coping). Finally, Kaiseler et al. [45], in a subsequent study, examined athletes' coping during sport competitions from a dispositional perspective and found that agreeableness significantly and positively predicted task-oriented coping, which involves strategies used by athletes to manage the internal and

external demands of sport competitions, such as thought control (e.g., "I try to interpret the situation in a positive manner"), logical analysis (e.g., "I analyze the weakness of my opponents"), effort expenditure (e.g., "I give my best effort."), mental imagery (e.g., "I visualize myself doing a good performance."), relaxation (e.g., "I relax my muscles."), and seeking support (e.g., "I talk to someone who is able to motivate me."). Finally, in a recent meta-analysis of 132 studies (156 independent samples drawn from a variety of different populations), Barańczuk [78] examined the relationships between the Big Five personality traits and emotion-regulation strategies. The researcher found that agreeableness was modestly positively related to the emotion-regulation strategies of reappraisal, problem solving, and mindfulness, which are generally assumed to be adaptive, as they are related to beneficial outcomes in the long term.

In our study, conscientiousness significantly and negatively predicted athletes' anticipatory-negative spontaneous self-talk (e.g., "I want to give up"). Similar findings were also reported by Čopec et al. [76] in their study with collegiate athletes, in which they found that conscientiousness was negatively related to athletes' primary cognitive appraisal of threat. Moreover, in accordance with our finding, Kaiseler et al. [45] reported that conscientiousness significantly and negatively predicted athletes' dispositional disengagement-oriented coping in sport competitions. In contrast, we found that conscientiousness significantly and positively predicted athletes' retrospective-positive (e.g., "I have achieved it") and anticipatory-positive spontaneous self-talk (e.g., "I will win"). These results support the findings of previous relevant research conducted in athletic populations that showed that conscientiousness significantly and positively predicted athletes' perceived stressor control [39] as well as athletes' primary cognitive appraisal of challenge [76]. With regard to goal-directed self-talk functions, the results of our study revealed that conscientiousness significantly and positively predicted athletes' controlling dysfunctional activated/deactivated states, creating functional activated and deactivated states, instruction, up-regulating self-confidence, and promoting goals functions of goal-directed self-talk. These results are in line with those of previous studies that investigated the relationships between the Big Five personality traits and athletes' sport-related coping. More specifically, in a study on athletes' dispositional coping, Allen et al. [44] found that conscientiousness significantly and positively predicted athletes' problem-focused coping in their sport (i.e., strategies aimed to actively change and remain in the sport-related stressful situation; e.g., "I look for ways to solve the problem or change the situation."). Also, in another study on athletes' dispositional coping, Allen et al. [43] reported that conscientiousness significantly and positively predicted athletes' emotion-focused coping in their sport (i.e., strategies aimed to control thoughts and emotions that arise from the sport-related stressful situation while remaining in it; e.g., "I stayed in the situation and tried to control my emotions to better deal with the situation."). Similarly, in a study on athletes' situational coping, Kaiseler et al. [39] found that conscientiousness significantly and positively predicted the problem-focused coping strategies of planning and suppression of competing activities, and the emotion-focused coping strategy of seeking emotional social support (e.g., "I talked about my feelings with someone."). Finally, our results are in line with Barańczuk's meta-analytic findings [78], which indicated that conscientiousness was modestly positively related to the typically adaptive emotion-regulation strategies of problem solving, acceptance, and mindfulness, and modestly negatively related to the typically assumed maladaptive emotion-regulation strategy of avoidance.

The present findings showed that emotional stability significantly and negatively predicted athletes' retrospective-negative (e.g., "Today I have performed very poorly.") and anticipatory-negative spontaneous self-talk (e.g., "I want to give up."). These results are in accordance with previous relevant research findings in sports [39,43–45,76] and in non-sports settings [40,41]. For instance, in their study among student athletes, Čopec et al. [76] reported that emotional stability significantly and negatively predicted athletes' primary cognitive appraisal of loss and threat. Also, other researchers found that neuroticism (low emotional stability) significantly and positively predicted athletes' avoid-

ance coping in their sport both in dispositional [43,44] and situational levels [39] as well as athletes' dispositional disengagement-oriented coping during sport competitions [45]. In contrast, we found that emotional stability significantly and positively predicted athletes' anticipatory-positive spontaneous self-talk. An analogous research finding was also reported by Čopec et al. [76] in their study with student athletes, in which they found that emotional stability was positively related to athletes' primary cognitive appraisal of challenge. With regard to goal-directed self-talk functions, the results of this study revealed that emotional stability was a significant and negative predictor of athletes' controlling cognitive reactions, controlling dysfunctional activated/deactivated states, creating functional deactivated states, instruction, up-regulating self-confidence, and promoting goals functions of goal-directed self-talk. These results suggest that athletes who score higher in emotional stability tend to use less goal-directed self-talk to reconstruct their cognitions, control their dysfunctional activated and deactivated affective states, create functional deactivated affective states, give themselves task instructions, and create facilitative attitudes for the future, mainly by up-regulating self-confidence and promoting mastery and performance-approach goals. Individuals high in emotional stability are characterized by the experience of stable and positive emotional states (e.g., calm, secure, controlled, and even-tempered), rational and positive thoughts, and holding rational beliefs [34,35]. Thus, due to these specific characteristics, athletes higher in emotional stability may need, to a lesser degree, these goal-directed self-talk functions to self-regulate compared with athletes who score lower in this personality trait. Moreover, previous sport-related research has shown that athletes who score lower in neuroticism (higher in emotional stability) tend to use more of the problem-focused coping strategies of planning (e.g., "I thought hard about what steps to take to manage this situation."), suppression of competing activities (e.g., "I stopped doing other things in order to concentrate on my performance."), and increasing effort (e.g., "I worked harder.") during a specific stressful event in their sport [39]. Similarly, Barańczuk's meta-analytic findings [78] revealed that individuals who score lower in neuroticism (higher in emotional stability) tend to use more of the emotion-regulation strategies of problem-focused (i.e., cognitive and behavioral actions aimed at changing the situation) and mindfulness (i.e., present-moment awareness and nonjudgmental acceptance of thoughts, emotions, bodily sensations, and surrounding environment). Thus, it is possible that athletes who score high in emotional stability might rely more on other cognitive (e.g., mental imagery) and emotion-regulation skills (e.g., acceptance and mindfulness) to achieve their goals than on the goal-directed self-talk functions examined in this study. At the present, however, this is only a hypothesis that should be explored in future research.

Finally, our results showed that intellect/openness significantly and positively predicted athletes' retrospective-positive and anticipatory-positive spontaneous self-talk. These findings are consistent with those reported by Čopec et al. [76] in their study with collegiate athletes, where intellect/openness was found to be positively related to athletes' primary cognitive appraisal of challenge. With respect to goal-directed self-talk functions, our results indicated that intellect/openness was a significant and positive predictor of the controlling dysfunctional activated/deactivated states, creating functional deactivated states, instruction, and up-regulating self-confidence functions of goal-directed self-talk. These results align with those of previous studies that investigated the relationships between the Big Five personality traits and athletes' sport-related coping. Particularly, Kaiseler et al. [39] reported that intellect/openness was a significant and positive predictor of athletes' problem-focused coping strategy of planning during a specific stressful event in their sport (situational assessment of coping). Moreover, in their study on athletes' dispositional coping during sport competitions, Kaiseler et al. [45] found that intellect/openness significantly and positively predicted task-oriented coping, that is, strategies used by athletes to manage the internal and external demands of sport competitions, such as thought control (e.g., "I try to get rid of my doubts by thinking positively"), logical analysis (e.g., "I analyze the demands of the competition"), effort expenditure (e.g., "I give a relentless effort."), mental imagery (e.g., "I visualize my all-time best performance"), relaxation

(e.g., "I try to relax my body."), and seeking support (e.g., "I ask other athletes for advice"). Finally, Barańczuk's meta-analytic findings [78] revealed that intellect/openness was modestly positively related to the typically assumed adaptive emotion-regulation strategies of problem solving and mindfulness.

4.3. BPNs Satisfaction and Frustration as Antecedents of Athletes' Organic, Spontaneous and Goal-Directed Self-Talk

Athletes' BPNs satisfaction and frustration within their sport environment have not been examined yet as antecedents of athletes' organic, spontaneous and goal-directed self-talk. Thus, the present study also aimed to examine whether athletes' BPNs satisfaction and frustration within their sport environment as social–environmental antecedents could predict athletes' organic, spontaneous and goal-directed self-talk. Specifically, we were interested in analyzing whether athletes' BPNs satisfaction and frustration within their sport environment would predict additional variance in athletes' organic, spontaneous and goal-directed self-talk, over and above that accounted for by athletes' Big five personality traits and BPNs satisfaction, respectively.

The results of our three-step hierarchical regression analyses revealed that when the three BPNs satisfaction subscales were added as predictors in step 2, they contributed a significant amount to the prediction of all athletes' spontaneous self-talk dimensions and goal-directed self-talk functions (except for creating functional deactivated states) over and above personality traits. Importantly, athletes' Big Five personality traits explained the highest percentage of variance in all athletes' spontaneous self-talk dimensions and goal-directed self-talk functions, except for the retrospective-positive spontaneous self-talk dimension, where the three BPNs satisfaction subscales made the strongest contribution. Hence, these results demonstrate the incremental validity of BPNs satisfaction over and above personality traits in explaining athletes' retrospective-positive self-talk, suggesting that BPNs satisfaction matters more than the Big Five personality traits to the experience of this spontaneous self-talk dimension (e.g., "I have achieved it").

More specifically, competence need satisfaction emerged in our study as the only significant (positive) predictor of athletes' retrospective-positive and anticipatory-positive spontaneous self-talk, and a significant and negative predictor of athletes' anticipatory-negative spontaneous self-talk. These results support the findings of previous relevant research on the antecedents of athletes' organic self-talk, which has adopted the traditional distinction between organic positive and negative self-talk and their respective sub-dimensions, without considering the contemporary distinction between organic, spontaneous and goal-directed self-talk. Particularly, Karamitrou et al. [10], in a trait examination of athletes' organic self-talk, found that competence need satisfaction was negatively related to the corresponding organic, negative self-talk dimension of disengagement of ASTQS, and positively related to the organic, positive self-talk dimension of confidence of ASTQS, which matches with anticipatory-positive spontaneous self-talk dimension assessed by OSTQS. Likewise, Zourbanos et al. [79] assessed students' self-talk as a trait in the physical education context and reported that students' perceived competence was negatively related to the organic, negative self-talk dimension of disengagement of ASTQS, and positively related to the organic, positive self-talk dimension of confidence of ASTQS. In addition, our results add to the previous research literature on the antecedents of athletes' organic self-talk indicating competence need satisfaction as an antecedent of athletes' retrospective-positive spontaneous self-talk, a new dimension that has not been assessed by ASTQS. However, this new dimension is related to internal-controlled attributions of success (e.g., "I have performed well") and emotional expression (e.g., "Perfectly"), and is directly linked to Attribution theory, a significant research area in sport psychology [6]. Thus, its quantitative examination has been considered worthwhile, as it will aid in understanding its antecedents and consequences as well as in the design, implementation, and evaluation of appropriate organic self-talk interventions [31]. Moreover, competence and autonomy needs satisfaction emerged in our study as significant and negative predictors of athletes'

retrospective-negative spontaneous self-talk. Similar research findings were also reported by Karamitrou et al. [10] in their study with athletes, where competence and autonomy needs satisfaction were found to be negatively related to the similar negative self-talk dimension of worry assessed by ASTQS at the trait level.

Regarding the relationships between BPNs satisfaction and goal-directed self-talk functions, competence need satisfaction emerged in our study as a significant and positive predictor of the controlling dysfunctional activated/deactivated states, creating functional deactivated states, and up-regulating self-confidence functions of goal-directed self-talk. Analogous research findings were also reported by Karamitrou et al. [10] in a trait examination of athletes' organic self-talk, where athletes' competence need satisfaction was found to be positively related to the corresponding organic, positive self-talk dimensions of anxiety control and confidence as measured by ASTQS at the trait level. Likewise, in the context of physical education, Zourbanos et al. [79] reported that students' perceived competence was positively related to the respective positive self-talk dimensions of anxiety control and confidence as assessed by ASTQS at the trait level. Moreover, our results above contribute to the previous research literature on the antecedents of athletes' organic self-talk by indicating competence need satisfaction as a social–environmental antecedent of the controlling dysfunctional deactivated states function of goal-directed self-talk. Even though this goal-directed self-talk function has not been previously considered in the organic self-talk paradigm and has not been assessed by ASTQS [31], it has been found [6–9] to be an important goal-directed self-talk function that athletes use to regulate their dysfunctional deactivated emotions such as disappointment (e.g., "Do not be disappointed"), resignation (e.g., "Do not quit"), and so forth. Therefore, the assessment and quantitative examination of the controlling dysfunctional deactivated states function of goal-directed self-talk are important, as they will aid us in understanding its antecedents and consequences as well as in designing, applying, and evaluating the effectiveness of suitable organic self-talk interventions.

Competence and relatedness needs satisfaction were, in our study, significant and positive predictors of the creating functional activated states, instruction, and promoting goals functions of goal-directed self-talk. In accordance with these findings, Karamitrou et al. [10] also reported that athletes' competence and relatedness needs satisfaction were positively linked to the respective organic, positive self-talk dimensions of psych up and instruction as assessed by ASTQS at the trait level. Moreover, our results extend previous research findings on the antecedents of athletes' organic self-talk by indicating competence and relatedness needs satisfaction as social–environmental antecedents of promoting goals function of goal-directed self-talk. Even though the promoting goals function of self-talk has been discussed in previous self-talk literature [28], it has not been assessed by ASTQS [31]. However, this goal-directed self-talk function is directly linked to achievement goal theories and SDT, which are very significant research areas in sport and exercise psychology. Thus, the assessment and quantitative examination of the promoting goals function of goal-directed self-talk are important, as they will help us to understand its antecedents and its consequences, and also to develop and implement appropriate organic self-talk interventions and evaluate their effectiveness [31].

Finally, contributing further to the previous research literature on the antecedents of athletes' organic self-talk, our results showed that autonomy and relatedness needs satisfaction significantly and positively predicted the controlling cognitive reactions function of goal-directed self-talk. This cognitive reappraisal function of goal-directed self-talk has not been previously considered in the organic self-talk paradigm in sport [6] and has not been assessed by ASTQS [31]. However, in both general and sport psychology, cognitive reappraisal has been deemed an effective cognitive coping strategy [6]. Moreover, it constitutes a core element of the cognitive–behavioral psychotherapeutic approaches, such as Rational-Emotive Behavior Therapy and Cognitive-Behavior Modification that have been previously applied effectively in the sports setting [31]. Hence, its quantitative examination is worthwhile, as it will help us to understand its antecedents and consequences as well

as to develop, implement, and evaluate the effectiveness of appropriate organic self-talk interventions [31].

Concerning athletes' BPNs frustration, the findings of our three-step hierarchical regression analyses indicated that when the three BPNs frustration subscales were added as predictors in step 3, they significantly contributed to the prediction of two negative spontaneous self-talk dimensions and all goal-directed self-talk functions (except for instruction), over and above BPNs satisfaction. These results are in line with SDT propositions [52] and previous relevant research findings [54], which showed that need satisfaction and need frustration are distinct constructs, with need frustration predicting additional variance, over and above that accounted for by need satisfaction in athletes' well/ill-being outcomes.

More specifically, compared to autonomy and relatedness needs frustration, competence need frustration emerged in our study as the only significant (positive) predictor of athletes' retrospective-negative self-talk (after competence need satisfaction). This finding makes conceptual sense. Athletes who experience a high sense of inefficacy or even failure and helplessness in their sport due to social–environmental influences (e.g., "There are times when I am told things that make me feel incompetent") also report increased levels of retrospective-negative self-talk (e.g., "Today I have performed very poorly"). Further, this finding is in line with SDT propositions [52] and previous sport-related research [54], where competence need frustration was found to be a significant (positive) predictor of athletes' exhaustion. Moreover, compared to the frustration of the two other needs, competence need frustration emerged in our study as the only significant (positive) predictor of the controlling cognitive reactions function of goal-directed self-talk. This finding implies that when athletes experience high feelings of ineffectiveness and failure due to the frustration of their competence need within a sport environment (e.g., "There are situations where I am made to feel inadequate"), they also use increased levels of the controlling cognitive reactions function of goal-directed self-talk (e.g., "Everyone makes mistakes"; "Everyone can have a bad day"). Similarly, compared to autonomy and competence needs frustration, in this study, relatedness need frustration emerged as the only significant (positive) predictor of the controlling dysfunctional activated/deactivated states, creating functional deactivated and activated states, and up-regulating self-confidence functions of goal-directed self-talk. These results suggest that athletes who feel isolated and excluded by significant others within their sport environment (e.g., "I feel I am rejected by those around me") also report increased use of goal-directed self-talk aimed at controlling their dysfunctional activated/deactivated states (e.g., "Do not worry"; "Do not be disappointed"), creating functional deactivated (e.g., Calm down) and activated states (e.g., "Give it all"), and up-regulating their self-confidence (e.g., "Believe in yourself"). Cognitive reappraisal has been considered an adaptive cognitive coping [6] and emotion-regulation strategy [78]. Also, goal-directed self-talk is a type of psychological skill, a rational mental process that helps athletes regulate themselves [5]. Thus, all functions of goal-directed self-talk can be considered as athletes' adaptive responses in the face of a variety of challenges in their sport. As a result, the above findings do not support the SDT proposition [52,53] that BPNs frustration contributes to dysfunctional behavior and ill-being, and previous SDT-based empirical findings [52–57] which showed the positive and negative relationships between BPNs frustration and maladaptive and adaptive consequences, respectively. A possible explanation for these results might be that athletes who feel ineffectiveness or as a failure, isolated and excluded within their sport environment need more of these functions of goal-directed self-talk to self-regulate, due to the additional psychological challenges they face because of the active frustration of these needs. Furthermore, according to SDT, although need frustration relates to ill-being and the development of maladaptive coping patterns, there are resilience factors that can protect against these negative consequences, such as the capacity to autonomously regulate behavior even under threat or pressure [52]. According to Deci and Ryan [46], having a need supportive instead of a need thwarting history allows for the development of greater capacities for autonomy. This capacity for autonomy, in turn, is reinforced by awareness and/or mindfulness [52].

Unexpectedly, and in contrast to SDT and previous relevant research [52–55], autonomy and relatedness needs satisfaction emerged in our study as significant and positive predictors of athletes' anticipatory-negative and retrospective-negative self-talk, respectively. Similarly, autonomy need frustration emerged as a significant and positive predictor of athletes' retrospective-positive self-talk. These unexpected findings could have been the result of a statistical artifact. More specifically, in order not to compromise the ecological validity of the results, we examined the three BPNs together in a single hierarchical regression model instead of three separate models for each of the three BPNs. But, in a single hierarchical regression model with multiple independent variables, the regression path coefficients represent the unique effect of each predictor on the dependent variable. Thus, keeping this in our mind, the unexpected positive relationships mentioned above may be the result of statistical suppressor effects, given the observed interrelationships among the three BPNs. However, when each BPN was modeled by itself, the results revealed that autonomy need satisfaction emerged as a non-significant predictor of athletes' anticipatory-negative self-talk, whereas autonomy need frustration emerged as a significant and positive predictor of athletes' anticipatory-negative self-talk. Similarly, relatedness need satisfaction emerged as a non-significant predictor of athletes' retrospective-negative self-talk, whereas relatedness need frustration emerged as a significant and positive predictor of athletes' retrospective-negative self-talk. Conversely, autonomy need satisfaction emerged as a significant and positive predictor of athletes' retrospective-positive self-talk, whereas autonomy need frustration emerged as a non-significant predictor of athletes' retrospective-positive self-talk. Overall, the above findings are in line with those of previous SDT-based studies that showed that BPNs satisfaction constructs are often more pertinent in understanding the presence of well-being as opposed to the absence of ill-being [54,55,58,59,67]. Moreover, the above results are consistent with previous SDT-based research findings indicating that ill-being is more related to the presence of need frustration than to the absence of need satisfaction [54–56].

4.4. Practical Implications, Limitations, and Future Research Directions

With regard to the predictive power of each BPN, importantly, in the full models of our regression analysis, competence need satisfaction emerged as the most powerful predictor of athletes' retrospective-positive and anticipatory-positive spontaneous self-talk as well as of the creating functional activated and up-regulating self-confidence functions of goal-directed self-talk. Moreover, compared to the satisfaction of autonomy and relatedness needs, competence need satisfaction was in our study: (a) the strongest predictor of athletes' retrospective-negative and anticipatory-negative spontaneous self-talk as well as of instruction and promoting goals functions of goal-directed self-talk, and (b) the only significant predictor of the controlling dysfunctional activated/deactivated states and creating functional deactivated states functions of goal-directed self-talk. Similarly, compared to the frustration of autonomy and relatedness needs, competence need frustration emerged in our study as the single significant predictor of athletes' retrospective-negative spontaneous self-talk. The frequency and strength with which competence need satisfaction and frustration predicted athletes' spontaneous self-talk dimensions and goal-directed self-talk functions in our study support previous SDT-based research evidence regarding its salient role for the participants' optimal functioning in sport and related physical activity contexts [10,58,59,63,71]. Thus, from an applied perspective, the above findings suggest that for a decrease in athletes' retrospective-negative and anticipatory-negative spontaneous self-talk and maximization of their retrospective-positive and anticipatory-positive spontaneous self-talk and goal-directed self-talk, the satisfaction of competence need seems to be of the highest importance.

Overall, and from a practical perspective, the results of this study stress the importance of the development of sport environments that not only support but also avoid thwarting athletes' BPNs, if it is desirable to enhance athletes' goal-directed self-talk and retrospective-positive and anticipatory-positive spontaneous self-talk, while simultaneously diminishing

athletes' retrospective-negative and anticipatory-negative spontaneous self-talk. Based on findings linking positive or negative thoughts to performance, Zinsser et al. [80] reported that "inappropriate thinking or misguided thinking usually leads to negative feelings and poor performance, just as appropriate or positive thinking leads to enabling feelings and good performance" (p. 284). In other words, goal-directed self-talk, and retrospective-positive and anticipatory-positive spontaneous self-talk can be considered more appropriate to athletes than retrospective-negative and anticipatory-negative spontaneous self-talk. Also, in terms of SDG3, goal-directed self-talk, and retrospective-positive and anticipatory-positive spontaneous self-talk will foster athletes' physical and mental health and well-being; whereas retrospective-negative and anticipatory-negative spontaneous self-talk will decrease them. Previous SDT research in sport and related contexts has indicated that an empowering coach-created motivational climate (i.e., task-involving, autonomy-supportive, and socially supportive) is linked to greater BPNs satisfaction [81–83], whereas a disempowering coach-created motivational climate is linked to greater BPNs frustration [81–83]. Moreover, previous research [30] on the antecedents of athletes' organic self-talk as assessed by the ASTQS, indicated that an empowering coach-created motivational climate is positively linked to athletes' organic, positive self-talk and negatively related to athletes' organic, negative self-talk, whereas a disempowering coach-created motivational climate was positively linked to athletes' organic negative self-talk. Thus, interventions that educate coaches on how to create a more empowering and less disempowering motivational climate (e.g., Empowering Coaching™; [84]) have the potential to maximize athletes' goal-directed self-talk as well as retrospective-positive and anticipatory-positive spontaneous self-talk and diminish athletes' unproductive retrospective-negative and anticipatory-negative spontaneous self-talk. Along with these types of interventions, the additional implementation of interventions aimed at significant others who influence athletes' BPNs satisfaction and frustration within their sport (e.g., parents, peers, and sport clubs staff) is worthy of investigation.

Given the cross-sectional nature of the present study, it is important to notice that no causal links can be inferred from the current findings. It can only be speculated that athletes' Big Five personality traits and BPNs satisfaction and frustration within their sport influence their state organic self-talk, based on theoretical grounds and some experimental studies [17,49]; however, it is plausible that the identified links reflect bidirectional relationships. Moreover, it is very possible that (a) athletes' Big Five personality traits also influence athletes' BPNs satisfaction and frustration within their sport, and their trait organic self-talk; and (b) the associations between athletes' Big Five personality traits and their state organic self-talk can be mediated by athletes' BPNs satisfaction and frustration, and their trait organic self-talk. Hence, future research could implement longitudinal and experimental designs that would allow investigation of potential bidirectional relationships, mediation processes, and causal inferences. Second, we have not included gender and race in our analyses. Therefore, future studies may examine how gender and race as moderator variables influence our examined relationships. Third, the retrospective self-report methodology that was utilized may have limited the information obtained. Particularly, as self-reports rely on human memory, the information sometimes may have been forgotten or recalled inaccurately [85]. However, self-reports provide access to individuals' perceptions, motives, and cognitions that cannot be obtained through objective methods [86].

5. Conclusions

Despite the above limitations, the present findings provide valuable information regarding the predictive role of the Big Five personality traits (as personal antecedents) and BPNs satisfaction and frustration within sport environment (as social–environmental antecedents) on athletes' organic, spontaneous and goal-directed self-talk at the state level. Moreover, our results indicate the incremental value of BPNs satisfaction and frustration to the prediction of athletes' organic, spontaneous and goal-directed self-talk, over and above athletes' Big Five personality traits and BPNs satisfaction, respectively. Finally, the

present study provides evidence regarding the nomological validity of OSTQS through a detailed examination of the relationships between athletes' spontaneous and goal-directed self-talk and the variables of the Big Five personality traits and BPNs satisfaction and frustration within their sport environment. Overall, the results of this study contribute to the achievement of SDG3 of the 2030 Agenda for Sustainable Development, to the developing research areas that examine the antecedents of athletes' organic self-talk and athletes' big five personality traits, as well as to the considerable amount of previous SDT research, and they may guide future research on the areas. Finally, from a theoretical perspective, the present study could contribute to further development of the theoretical frameworks of self-talk by indicating for the first time the antecedents of athletes' organic, spontaneous and goal-directed self-talk at the state level.

References

1. Latinjak, A.T.; Hatzigeorgiadis, A.; Comoutos, N.; Hardy, J. Speaking clearly . . . 10 years on: The case for an integrative perspective of self-talk in sport. *Sport Exerc. Perform. Psychol.* **2019**, *8*, 353–367. [CrossRef]
2. Zourbanos, N.; Hatzigeorgiadis, A.; Chroni, S.; Theodorakis, Y.; Papaioannou, A. Automatic Self-Talk Questionnaire for Sports (ASTQS): Development and preliminary validity of a measure identifying the structure of athletes' self-talk. *Sport Psychol.* **2009**, *23*, 233–251. [CrossRef]
3. Van Raalte, J.L.; Vincent, A.; Brewer, B.W. Self-talk: Review and sport-specific model. *Psychol. Sport Exerc.* **2016**, *22*, 139–148. [CrossRef]
4. Theodorakis, Y.; Hatzigeorgiadis, A.; Zourbanos, N. Cognitions: Self-talk and performance. In *The Oxford Handbook of Sport and Performance Psychology*; Murphy, S., Ed.; Oxford University Press: New York, NY, USA, 2012; pp. 191–212. ISBN 9780199971206.
5. Latinjak, A.T.; Hardy, J.; Hatzigeorgiadis, A. Pieces of the self-talk jigsaw puzzle: An introduction. In *Self-Talk in Sport*, 1st ed.; Latinjak, A.T., Hatzigeorgiadis, A., Eds.; Routledge: London, UK, 2020; pp. 11–27. ISBN 9780429460623.
6. Latinjak, A.T.; Zourbanos, N.; López-Ros, V.; Hatzigeorgiadis, A. Goal-directed and undirected self-talk: Exploring a new perspective for the study of athletes' self-talk. *Psychol. Sport Exerc.* **2014**, *15*, 548–558. [CrossRef]

7. Latinjak, A.T.; Hatzigeorgiadis, A.; Zourbanos, N. Goal-directed and spontaneous self-talk in anger- and anxiety-eliciting sport-situations. *J. Appl. Sport Psychol.* **2017**, *29*, 150–166. [CrossRef]

8. Latinjak, A.T.; Torregrossa, M.; Comoutos, N.; Hernando-Gimeno, C.; Ramis, Y. Goal-directed self-talk used to self-regulate in male basketball competitions. *J. Sports Sci.* **2019**, *37*, 1429–1433. [CrossRef] [PubMed]

9. Latinjak, A.T.; Masó, M.; Calmeiro, L.; Hatzigeorgiadis, A. Athletes' use of goal-directed self-talk: Situational determinants and functions. *Int. J. Sport Exerc. Psychol.* **2020**, *18*, 733–748. [CrossRef]

10. Karamitrou, A.; Comoutos, N.; Hatzigeorgiadis, A.; Theodorakis, Y. A self-determination approach to understanding of athletes' automatic self-talk. *Sport Exerc. Perform. Psychol.* **2017**, *6*, 340–354. [CrossRef]

11. Karamitrou, A.; Galanis, E.; Theodorakis, Y.; Comoutos, N. Organic self-talk antecedents: An interpretative review and implications for practice. In *Self-Talk in Sport*, 1st ed.; Latinjak, A.T., Hatzigeorgiadis, A., Eds.; Routledge: London, UK, 2020; pp. 77–90. ISBN 9780429460623.

12. Tod, D.; Hardy, J.; Oliver, E. Effects of self-talk: A systematic review. *J. Sport Exerc. Psychol.* **2011**, *33*, 666–687. [CrossRef] [PubMed]

13. Hardy, J.; Oliver, E.; Tod, D. A framework for the study and application of self-talk in sport. In *Advances in Applied Sport Psychology: A Review*, 1st ed.; Mellalieu, S.D., Hanton, S., Eds.; Routledge: London, UK, 2009; pp. 37–74. ISBN 9780203887073.

14. Conroy, D.E.; Metzler, J.N. Patterns of self-talk associated with different forms of competitive anxiety. *J. Sport Exerc. Psychol.* **2004**, *26*, 69–89. [CrossRef]

15. Zourbanos, N.; Theodorakis, Y.; Hatzigeorgiadis, A. Coaches' behavior, social support, and athletes' self-talk. *Hell. J. Psychol.* **2006**, *3*, 117–133.

16. Zourbanos, N.; Hatzigeorgiadis, A.; Theodorakis, Y. A preliminary investigation of the relationship between athletes' self-talk and coaches' behavior and statements. *Int. J. Sports Sci. Coach.* **2007**, *2*, 57–66. [CrossRef]

17. Zourbanos, N.; Hatzigeorgiadis, A.; Tsiakaras, N.; Chroni, S.; Theodorakis, Y. A multimethod examination of the relationship between coaching behavior and athletes' inherent self-talk. *J. Sport Exerc. Psychol.* **2010**, *32*, 764–785. [CrossRef] [PubMed]

18. Zourbanos, N.; Hatzigeorgiadis, A.; Goudas, M.; Papaioannou, A.; Chroni, S.; Theodorakis, Y. The social side of self-talk: Relationships between perceptions of support received from the coach and athletes' self- talk. *Psychol. Sport Exerc.* **2011**, *12*, 407–414. [CrossRef]

19. Harwood, C.; Cumming, J.; Fletcher, D. Motivational profiles and psychological skills usage within elite youth sport. *J. Appl. Sport Psychol.* **2004**, *16*, 318–332. [CrossRef]

20. Van de Pol, P.K.; Kavussanu, M. Achievement goals and motivational responses in tennis: Does the context matter? *Psychol. Sport Exerc.* **2011**, *12*, 176–183. [CrossRef]

21. Thibodeaux, J.; Winsler, A. Stay positive: Self-talk in relation to motivational climate, goal orientation, and self-talk encouragement in tennis. *Res. Q. Exerc. Sport.* **2022**, *93*, 769–780. [CrossRef] [PubMed]

22. Van Raalte, J.L.; Brewer, B.W.; Rivera, P.M.; Petitpas, A.J. The relationship between observable self-talk and competitive junior tennis players' match performances. *J. Sport Exerc. Psychol.* **1994**, *16*, 400–415. [CrossRef]

23. Perry, C., Jr.; Marsh, H. Listening to self-talk, hearing self-concept. In *Doing Sport Psychology*, 1st ed.; Andersen, M.B., Ed.; Human Kinetics: Champaign, IL, USA, 2000; pp. 61–76. ISBN 10 0736000860.

24. Van Raalte, J.L.; Cornelius, A.E.; Brewer, B.W.; Hatten, S.J. The antecedents and consequences of self-talk in competitive tennis. *J. Sport Exerc. Psychol.* **2000**, *22*, 345–356. [CrossRef]

25. Latinjak, A.T.; Masó, M.; Comoutos, N. Goal-directed self-talk used during technical skill acquisition: The case of novice ultimate frisbee players. *Sport Psychol.* **2018**, *32*, 60–65. [CrossRef]

26. Hatzigeorgiadis, A.; Biddle, S.J.H. Negative self-talk during sport performance: Relationships with pre-competition anxiety and goal-performance discrepancies. *J. Sport Behav.* **2008**, *31*, 237–253.

27. Santos-Rosa, F.J.; Montero-Carretero, C.; Gómez-Landero, L.A.; Torregrossa, M.; Cervelló, E. Positive and negative spontaneous self-talk and performance in gymnastics: The role of contextual, personal and situational factors. *PLoS ONE.* **2022**, *17*, e0265809. [CrossRef]

28. Hardy, J.; Hall, C.R.; Hardy, L. Quantifying athlete self-talk. *J. Sports Sci.* **2005**, *23*, 905–917. [CrossRef] [PubMed]

29. Latinjak, A.T.; Corbalan-Frigola, J.; Alcoy-Fabregas, P.A.U.; Barker, J.B. Spontaneous self-talk: An insight into the cognitive component of emotions in sport. *Int. J. Sport Psychol.* **2020**, *51*, 28–46. [CrossRef]

30. Zourbanos, N.; Haznadar, A.; Papaioannou, A.; Tzioumakis, Y.; Krommidas, C.; Hatzigeorgiadis, A. The relationships between athletes' perceptions of coach-created motivational climate, self-talk, and self-efficacy in youth soccer. *J. Appl. Sport Psychol.* **2016**, *28*, 97–112. [CrossRef]

31. Karamitrou, A.; Comoutos, N.; Brisimis, E.; Hatzigeorgiadis, A.; Krommydas, C.; Galanis, E.; Loules, G.; Tzioumakis, Y.; Papaioannou, A.; Goudas, M.; et al. Organic Self-Talk Questionnaire for Sport: Development and validation of a theory-based, state measure of athletes' organic self-talk. *Psychol. Sport Exerc.* **2023**. *submitted for publication*.

32. Castleberry, S.B.; Shepherd, C.D.; Ridnour, R. Effective interpersonal listening in the personal selling environment: Conceptualization, measurement, and nomological validity. *J. Mark. Theory Pract.* **1999**, *7*, 30–33. [CrossRef]

33. Cervone, D.; Pervin, L.A. *Personality: Theory and Research*, 11th ed.; Wiley: New York, NY, USA, 2010; ISBN 10:047048506X.

34. Costa, P.T.; McCrae, R.R. *Revised NEO Personality Inventory and NEO Five-Factor Inventory: Professional Manual*; Psychological Assessment Resources: Odessa, FL, USA, 1992.

35. McCrae, R.R.; Costa, P.T. *Personality in Adulthood: A Five Factor Theory Perspective*, 2nd ed.; Guilford Press: New York, NY, USA, 2003.

36. Lazarus, R.S.; Folkman, S. *Stress, Appraisal, and Coping*; Springer: New York, NY, USA, 1984.

37. Lazarus, R.S. *Psychological Stress and the Coping Process*; McGraw-Hill: New York, NY, USA, 1966.

38. Stanisławski, K. The coping circumplex model: An integrative model of the structure of coping with stress. *Front. Psychol.* **2019**, *10*, 694. [CrossRef]

39. Kaiseler, M.; Polman, R.C.J.; Nicholls, A.R. Effects of the big five personality dimensions on appraisal coping, and coping effectiveness in sport. *Eur. J. Sport Sci.* **2012**, *12*, 62–72. [CrossRef]

40. Eysenck, M. Trait anxiety and stress. In *Handbook of Life Stress, Cognition and Health*; Fisher, S., Reason, J., Eds.; Wiley: Chichester, UK, 1988; pp. 476–482.

41. Gunthert, K.C.; Cohen, L.H.; Armeli, S. The role of neuroticism in daily stress and coping. *J. Pers. Soc. Psychol.* **1999**, *77*, 1087–1100. [CrossRef]

42. Semmer, S.K. Personality, stress, and coping. In *Handbook of Personality and Health*; Vollrath, M.E., Ed.; Wiley: Chichester, UK, 2006; pp. 73–113.

43. Allen, M.S.; Greenlees, I.; Jones, M. An investigation of the five-factor model of personality and coping behaviour in sport. *J. Sports Sci.* **2011**, *29*, 841–850. [CrossRef]

44. Allen, M.S.; Frings, D.; Hunter, S. Personality, coping, and challenge and threat states in athletes. *Int. J. Sport Exerc. Psychol.* **2012**, *10*, 264–275. [CrossRef]

45. Kaiseler, M.; Levy, A.; Nicholls, A.R.; Madigan, D.J. The independent and interactive effects of the Big-Five personality dimensions upon dispositional coping and coping effectiveness in sport. *Int. J. Sport Exerc. Psychol.* **2019**, *17*, 410–426. [CrossRef]

46. Deci, E.L.; Ryan, R.M. *Intrinsic Motivation and Self-Determination in Human Behavior*; Plenum Press: New York, NY, USA, 1985; Volume 39.

47. Deci, E.L.; Ryan, R.M. The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychol. Inq.* **2000**, *11*, 227–268. [CrossRef]

48. Brisimis, E. The Content and the Factors that Influence Students' Self-Talk in the Physical Education Course. Ph.D. Thesis, University of Thessaly, Volos, Greece, 2021.

49. Oliver, E.J.; Markland, D.; Hardy, J.; Petherick, C.M. The effects of autonomy-supportive and controlling environments on self-talk. *Motiv. Emot.* **2008**, *32*, 200–212. [CrossRef]

50. Oliver, E.J.; Markland, D.; Hardy, J. Interpretation of self-talk and post-lecture affective states of higher education students: A self determination theory perspective. *Br. J. Educ. Psychol.* **2010**, *80*, 307–323. [CrossRef] [PubMed]

51. Ryan, E.; Deci, E. Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemp. Educ. Psychol.* **2020**, *61*, 101860. [CrossRef]

52. Vansteenkiste, M.; Ryan, R.M. On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *J. Psychother. Integr.* **2013**, *23*, 263–280. [CrossRef]

53. Vansteenkiste, M.; Ryan, R.M.; Soenens, B. Basic psychological need theory: Advancements, critical themes, and future directions. *Motiv. Emot.* **2020**, *44*, 1–31. [CrossRef]

54. Bartholomew, K.J.; Ntoumanis, N.; Ryan, R.M.; Thøgersen-Ntoumani, C. Psychological need thwarting in the sport context: Assessing the darker side of athletic experience. *J. Sport Exerc. Psychol.* **2011**, *33*, 75–102. [CrossRef]

55. Bartholomew, K.J.; Ntoumanis, N.; Ryan, R.M.; Bosch, J.A.; Thøgersen-Ntoumani, C. Self-Determination Theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Pers. Soc. Psychol. Bull.* **2011**, *37*, 1459–1473. [CrossRef] [PubMed]

56. Chen, B.; Vansteenkiste, M.; Beyers, W.; Boone, L.; Deci, E.L.; Van der Kaap-Deeder, J.; Duriez, B.; Lens, W.; Matos, L.; Mouratidis, A.; et al. Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motiv. Emot.* **2015**, *39*, 216–236. [CrossRef]

57. Ryan, R.M.; Deci, E.L.; Vansteenkiste, M.; Soenens, B. Building a science of motivated persons: Self-determination theory's empirical approach to human experience and the regulation of behavior. *Motiv. Sci.* **2021**, *7*, 97–110. [CrossRef]

58. Adie, J.W.; Duda, J.L.; Ntoumanis, N. Autonomy support, basic need satisfaction, and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motiv. Emot.* **2008**, *32*, 189–199. [CrossRef]

59. Gagné, M.; Ryan, R.M.; Bargmann, K. Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *J. Appl. Sport Psychol.* **2003**, *15*, 372–390. [CrossRef]

60. Sarrazin, P.; Vallerand, R.J.; Guillet, E.; Pelletier, L.; Cury, F. Motivation and dropout in female handballers: A 21 month prospective study. *Eur. J. Soc. Psychol.* **2002**, *32*, 395–418. [CrossRef]

61. Ntoumanis, N.; Standage, M. Morality in sport: A self-determination theory perspective. *J. Appl. Sport Psychol.* **2009**, *21*, 365–380. [CrossRef]

62. Mack, D.E.; Wilson, P.M.; Oster, K.G.; Kowalski, K.C.; Crocker, P.R.E.; Sylvester, B.D. Well-being in volleyball players: Examining the contributions of independent and balanced psychological need satisfaction. *Psychol. Sport Exerc.* **2011**, *12*, 533–539. [CrossRef]

63. Reinboth, M.; Duda, J.L.; Ntoumanis, N. Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motiv. Emot.* **2004**, *28*, 297–313. [CrossRef]

64. Taylor, I.M.; Bruner, M.W. The social environment and developmental experiences in elite youth soccer. *Psychol. Sport Exerc.* **2012**, *13*, 390–396. [CrossRef]

65. Quested, E.; Ntoumanis, N.; Viladrich, C.; Haug, E.; Ommundsen, Y.; Van Hoye, A.; Mercé, J.; Hall, H.K.; Zourbanos, N.; Duda, J.L. Intentions to drop-out of youth soccer: A test of the basic needs theory among European youth from five countries. *Int. J. Sport Exerc. Psychol.* **2013**, *11*, 395–407. [CrossRef]

66. Lonsdale, C.; Hodge, K.; Rose, E. Athlete burnout in elite sport: A self-determination perspective. *J. Sports Sci.* **2009**, *27*, 785–795. [CrossRef] [PubMed]

67. Quested, E.; Duda, J.L. Exploring the social-environmental determinants of well- and ill-being in dancers: A test of basic needs theory. *J. Sport Exerc. Psychol.* **2010**, *32*, 39–60. [CrossRef]

68. Balaguer, I.; González, L.; Fabra, P.; Castillo, I.; Mercé, J.; Duda, J.L. Coaches' interpersonal style, basic psychological needs and the well- and ill-being of young soccer players: A longitudinal analysis. *J. Sports Sci.* **2012**, *30*, 1619–1629. [CrossRef] [PubMed]

69. Goldberg, L.R. A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In *Personality Psychology in Europe*; Mervielde, I., Deary, I., De Fruyt, F., Ostendorf, F., Eds.; Tilburg University Press: Tilburg, The Netherlands, 1999; Volume 7, pp. 7–28.

70. Ypofanti, M. Cognitive Behavioral Therapy for Smoking Cessation: The Role of Personality Traits and Physical Activity. Ph.D. Thesis, University of Thessaly, Volos, Greece, 2015.

71. Standage, M.; Duda, J.L.; Ntoumanis, N. A model of contextual motivation in physical education: Using constructs from self determination and achievement goal theories to predict physical activity intentions. *J. Educ. Psychol.* **2003**, *95*, 97–110. [CrossRef]

72. McAuley, E.; Duncan, T.; Tammen, V.V. Psychometric properties of the intrinsic motivation inventory in a competitive sport setting: A confirmatory factor analysis. *Res. Q. Exerc. Sport.* **1989**, *60*, 48–58. [CrossRef]

73. Richer, S.; Vallerand, R.J. Construction and validation of the perceived relatedness scale. *Rev. Eur. Psychol. Appl.* **1998**, *48*, 129–137.

74. Ntoumanis, N.; Quested, E.; Patterson, L.; Kaffe, S.; Backhouse, S.H.; Pavlidis, G.; Whitaker, L.; Barkoukis, V.; Smith, B.J.; Staff, H.R.; et al. An intervention to optimise coach-created motivational climates and reduce athlete willingness to dope (CoachMADE): A three-country cluster randomised controlled trial. *Br. J. Sports Med.* **2021**, *55*, 213–219. [CrossRef]

75. Cohen, J. A power primer. *Psychol. Bull.* **1992**, *112*, 155–159. [CrossRef]

76. Čopec, D.; Karlović Vragolov, M.; Buško, V. Individual dispositions and situational stressors in competitive sport: The role of stress mindset in the cognitive appraisals processes. *Front. Psychol.* **2022**, *13*, 829053. [CrossRef]

77. Zautra, A.J.; Affleck, G.G.; Tennen, H.; Reich, J.W.; Davis, M.C. Dynamic approaches to emotions and stress in everyday life: Bolger and Zuckerman reloaded with positive as well as negative affects. *J. Pers.* **2005**, *73*, 1511–1538. [CrossRef] [PubMed]

78. Barańczuk, U. The five factor model of personality and emotion regulation: A metaanalysis. *Personal. Individ. Differ.* **2019**, *139*, 217–227. [CrossRef]

79. Zourbanos, N.; Papaioannou, A.; Argyropoulou, E.; Hatzigeorgiadis, A. Achievement goals and self-talk in physical education: The moderating role of perceived competence. *Motiv. Emot.* **2014**, *38*, 235–251. [CrossRef]

80. Zinsser, N.; Bunker, L.; Williams, J.M. Cognitive techniques for building confidence and enhancing performance. In *Applied Sport Psychology: Personal Growth to Peak Performance*, 4th ed.; Williams, J.M., Ed.; Mayfield Publishing Company: Mountain View, CA, USA, 2001; pp. 284–311.

81. Chu, T.L. The Roles of Coaches, Peers, and Parents in High School Athletes' Motivational Processes: A Mixed-Methods Study. Ph.D. Thesis, University of North Texas, Denton, TX, USA, 2018.

82. Hancox, J.E.; Quested, E.; Ntoumanis, N.; Duda, J.L. Teacher-created social environment, basic psychological needs, and dancers' affective states during class: A diary study. *Pers. Individ. Differ.* **2017**, *115*, 137–143. [CrossRef]

83. Castillo-Jiménez, N.; López-Walle, J.M.; Tomás, I.; Tristán, J.; Duda, J.L.; Balaguer, I. Empowering and disempowering motivational climates, mediating psychological processes, and future intentions of sport participation. *Int. J. Environ. Res. Public Health* **2022**, *19*, 896. [CrossRef]

84. Duda, J.L. The conceptual and empirical foundations of Empowering Coaching™: Setting the stage for the PAPA project. *Int. J. Sport Exerc. Psychol.* **2013**, *11*, 311–318. [CrossRef]

85. Nisbett, R.E.; Wilson, T.D. Telling more than we can know: Verbal reports on mental processes. *Psychol. Rev.* **1977**, *84*, 231–259. [CrossRef]

86. Guerrero, M.C.M. *Inner Speech-L2: Thinking Words in a Second Language*; Springer: New York, NY, USA, 2005.