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REVIEW

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Psychological and social factors associated with mental health of European dual career athletes: A systematic review

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Abstract

Dual careers (DCs) are challenging trajectories followed by athletes willing to develop their academic/professional career with their athletic careers. These trajectories usually entail additional stressors, which can decrease athletes' mental health or even increase their risk of mental ill-health. While existing research has recognized the importance of psychological and social factors in both of these areas separately, we lack systematic knowledge on which factors are associated with European DC athlete mental health outcomes, making evidence-based practice more challenging. In this regard, to advance the European DC tradition and to provide a strong base for researchers and practitioners working within this field, this systematic review aims to appraise this evidence identifying and categorizing the psychological and social factors associated with the European DC athletes' mental health. We conducted this review according to Preferred Reporting for Systematic Reviews and Meta-Analysis guidelines and performed the systematic search in six databases, finding 56 eligible articles. Our analysis identified 35 different psychological and social factors, most showing significant associations with athletes' mental health. Notably, affect, stress, motivational climate, mindfulness, resilience, perfectionism, goal orientation, motivation, and basic psychological need satisfaction showed the strongest evidence associated with mental health. Overall, this review provides a comprehensive synthesis of psychological and social factors, advancing the holistic ecological approach in dual careers and athlete mental health. Yet, our results highlight the need to strengthen the evidence regarding these factors and provide specific research avenues, such as focus on DC-specific factors and consideration of DC athlete definition and career trajectories.

KEYWORDS

dual career, psychological, social, sport, student-athlete, well-being

Highlights

- Our systematic review analyzed the psychological and social factors affecting European dual career (DC) athletes' mental health, yielding 56 relevant articles.
- We identified 35 distinct factors, organized into four psychological (Identity, Expectations, and Beliefs; Emotional and Affective Responses; Motivation and Goal-oriented Behavior; and Competencies and Coping Resources) and three social categories (Sport and Academic Climates; DC-Specific Demands; and Interactions with DC Agents). We narratively developed each category and synthesized the findings into a DC development environment working model.
- Our findings illustrate nine factors with the most robust associations with mental health. For future research, we emphasize the need for more detailed characterizations of DC athletes, deeper explorations of DC competencies, and a focus on longitudinal and replication studies to enhance our understanding of DC mental health in Europe.

Beyond practices and competitions, athletes will navigate a complex array of multifaceted stages and transitions during their careers (Wylleman, 2019), each one with idiosyncratic sources of stress associated. Thus, an athlete may concurrently contend with a slump in their sporting performance (athletic level, e.g., Brown et al., 2019), tensions in their personal relationships (psychosocial level, e.g., Jowett & Cramer, 2009), the pressure of exams (academic level, e.g., Stambulova et al., 2015), and the weight of financial concerns (financial level, e.g., Dohlsten et al., 2020). Managing these diverse challenges requires multiple competencies, such as career planning and management skills (e.g., Perez-Rivases et al., 2020). Without these competencies, challenges can have a negative impact on athlete's mental health, such as lowering positive mental health or leading to mental ill-health (Kuettel & Larsen, 2020). Hence, it is essential to understand the various factors that influence athlete's mental health to support them in achieving and maintaining a harmony between the career challenges and athletes' resources to deal with them.

This holistic approach to athletic careers has brought a growing interest in dual career (DC), which is defined as 'a career with two major foci: sport, and studies or work' (Stambulova & Wylleman, 2014, p. 612). Developing a DC pathway gives athletes the possibility for a balanced and healthy life, develops athletes' identities beyond sports, and prepares them for a successful retirement (Debois et al., 2015; European Union, 2012; Torregrossa et al., 2015). However, following a DC can also become a stressful activity that entails additional barriers and demands, such as high expectations in both domains, inadequate recovery, and lack of time, support, or flexibility (see a review Stambulova & Wylleman, 2019), potentially impacting athletes' mental health. Indeed, the current literature presents mixed views on whether DC pathways are more protective or detrimental to mental health compared to other career trajectories (Kegelaers et al., 2022), requiring further attention. In line with different benefits, barriers, and stressors related to DC, Kegelaers et al. (2022) also identified a wide variety of factors surrounding DC athletes' mental health, yet their associations and impact still warrant a more detailed synthesis. Since according to the Holistic Ecological Approach (e.g., Henriksen et al., 2020; Purcell et al., 2022) athletes are embedded within a particular environment that also exerts a significant influence on their mental health, personal and environmental factors are important to understand. Therefore, an in-depth focus on these factors surrounding DC athletes' mental health remains unexplored and necessary.

Consistent with this perspective, the DC development environment (DCDE) working model (see details Henriksen et al., 2020) presents three layers (individual, microlevel, and macrolevel) at three different life domains (athletic, academic, and private) as part of this environment. At the individual level, our review scope is on the psychological aspect of the DC athlete, which refers to 'individual-level processes and meanings that influence mental states' (Upton, 2013). Beyond the individual level lies the microlevel, which refers to the DC athlete's imminent environment, where they have direct interactions on a regular basis. At this level, coaches, teachers, and/or family are some of the main agents influencing the DC athlete. Outside microlevel is macrolevel, which refers to the wider social setting and culture that influences the DC athlete's experiences in a broader sense than their imminent environment on a daily basis. Influence at this level can include the specific national culture, nation's education system, and/or nation's sport system and culture. These layers and domains are transactional and dynamic (i.e., changing over time), creating fluid DCDEs where multiple factors from multiple sources can influence DC outcomes. Following this perspective, this review focuses on the transaction between psychological (individual level) and social factors (microlevel) in the European context that also can be seen as a one, large macrolevel.

Notably, European DC context is multilayered; at the continental level, it is characterized by the separation of the academic domain as school-based education and athletic domain as club-based sports, each working independently. For these to function efficiently for DC purposes, they require effective communication and planning from multiple stakeholders (Stambulova et al., 2024). Furthermore, European research has identified four different types of policy systems to manage DC at the national level (i.e., state-centric regulation, state as facilitator, sport federations as facilitators, and laissez-faire systems;

Aquilina & Henry, 2010) and within these policy systems eight different types of DCDEs at the contextual level (Morris et al., 2021). Thus, while European DC contexts do differ at the national and DCDE contextual levels, they have a common denominator as they are driven by continent-wide policy documents. More fundamental difference is with other DC contexts, such as North American, where athletic and academic resources are often seamlessly integrated at the schools/universities, the environments consist of strong collective identity, and athletes often have high prestige and status in that environment (e.g., Pot & van Hilvoorde, 2013) or Latin American and Caribbean regions, where Pons et al. (2024) highlight lesser attention, policy, and resources given to DC compared to unilateral focus on sports. Consequently, ecological and context-specific DC research that considers the unique characteristics of European DC environments is needed, which researchers have also emphasized the demand to conduct (e.g., Stambulova & Wylleman, 2019; Stambulova et al., 2024).

Despite these potential differences at the European level, athlete mental health is considered as a resource to be successful in the overall European DC environment (Storm et al., 2021). While an ongoing debate regarding how mental health should be conceptualized is currently present (e.g., Lundqvist & Andersson, 2021), even including whether mental health and well-being should be conceptualized as different phenomena (e.g., Wren-Lewis & Alexandrova, 2021), we follow WHO's (2022) view for a balanced perspective and operationalize mental health by utilizing Keyes's (2002) dual-continuum model as a theoretical framework. The dual-continuum model suggests that the presence/absence of mental illness is separate but complementary with the presence/absence of positive mental health. Meaning, to have 'complete mental health', absence of illness is not the only indicator but indicators of positive, desirable mental health should be present as well. Accordingly, the positive mental health continuum in this model comprises of three dimensions corresponding to emotional, psychological, and social well-being, which together create positive mental health. Described briefly (see also Westerhof & Keyes, 2010), emotional well-being (EWB) includes feelings of affective happiness, satisfaction, and interest in life. Additionally, psychological well-being (PWB) includes six elements (self-acceptance, positive relations with others, personal growth, purpose in life, environmental mastery, and autonomy) that together represent individual psychological functioning, while social well-being has five elements (social coherence, social actualization, social integration, social acceptance, and social contribution) that together represent individual's social functioning. Regarding mental illness, the model refers to current, widely established diagnostic criteria (e.g., ICD-11), such as anxiety, depression, or other mental illness outcome that has diagnostic criteria.

Therefore, this model underlines the importance of both positive (i.e., high positive mental health/well-being and absence of mental disorders) and negative (i.e., presence of mental disorders and low positive mental health/well-being) dimensions of mental health. However, as athlete mental health research at first focused mostly on mental ill-health perspective (e.g., Gouttebarge et al., 2019; Kegelaers et al., 2022), in this review, we include the wider research tradition on mental well-being (Lundqvist, 2011), corresponding to Keyes's definition of mental health to provide a more comprehensive state of the literature. Finally, following Souter et al. (2018) who highlight the need to address a wide array of outcomes that can influence an athlete's overall mental health, such as stress (e.g., Hammen, 2015), burnout (Nadon et al., 2022), or competitive anxiety (e.g., Jensen et al., 2018), we include associated outcomes that would not be caught under contemporary conceptualizations of mental health. In sum, we take a wide perspective to mental health operationalization to provide a comprehensive review on the psychological and social factors that can either protect, promote, or harm the complete mental health of DC athletes, even before mental illness diagnosis.

Building upon these perspectives, our study seeks to extend the previous research on factors associated with DC athletes' mental health that has left information, such as exact associations, strength, and direction of these association in the dark (Kegelaers et al., 2022). Additionally, these studies have been mostly in the North American context, skewing the results toward that particular context. Thus, we aim to appraise the evidence-based in-depth and to provide a detailed synthesis of the psychological and social factors associated with the European DC athletes' mental health. Our goal is to provide a robust reference point for DC practitioners and researchers, guiding evidence-based practice, and future research.

1 | METHODOLOGY

1.1 | Study design

We conducted this systematic review by following the Preferred Reporting for Systematic Reviews and Meta-Analysis (PRISMA; Page et al., 2021) guidelines and present the results according to the recommendations of Grant and Booth (2009), which are typically narrative with tabular accompaniment. Given that DC athletes' mental health research has been reviewed only with scoping methods at this point (Kegelaers et al., 2022), we deemed it timely to narrow the scope and conduct a systematic review. Literature reviews in general can function as tools to organize and define the structure of a topic, establishing a reference point and directing future endeavors (Mellalieu & Hanton, 2009). Systematic reviews more specifically undertake an exhaustive and systematic search, appraisal, and analysis processes providing a clear and robust state of the evidence, which can be better utilized by the relevant stakeholders (e.g., Siddaway et al., 2019). By conducting a systematic review (rather than other types of reviews), we can appraise the whole evidence base and generate a comprehensive synthesis that represents the current knowledge on the topic. To enhance research transparency and reproducibility, we preregistered a protocol for this systematic review at Open Science Foundation's registry in July 2021 (Link omitted for anonymity reasons).

1.2 | Search and appraisal process

We selected the keywords used to conduct the systematic search with the CHIP tool (Context, How, Issues, and Population; Shaw, 2010). For the selection, we utilized an iterative process involving concept mapping, literature searches, authors' discussions, and feedback from our wider research group. The keywords and complete searches can be found in Table S1. We used the following six databases in the search process: MEDLINE via PubMed, Scopus, SportDiscus, PsycINFO, Web of Science, and DialNet. We conducted the initial searches in April 2022 and updated them last time on 4 July 2023. The eligibility criteria for the article selection included (a) reporting associations between psychological and/or social factors and DC athletes' mental health outcomes as defined in the Introduction. This criteria answers directly to our review aim and excludes studies that, for example, reported only prevalence data or focused on physiological factors; (b) quantitative, empirical studies with original data to focus on how mental health has been studied through validated instruments and operationalizations, given the ambiguity of them as discussed in the Introduction; (c) articles written in English or Spanish to ensure we were able to appraise them accurately; and (d) samples comprising European DC athletes without age restrictions, which included studies explicitly categorized them as DC athletes, student–athletes, or made an explicit statement where it was clear that the athletes were engaged in DC (e.g., elite training centers in France; Isoard-Gautheur et al., 2013). This latter criterion was chosen so that we could identify studies before the label 'DC athlete' became widespread and thus have a more exhaustive evidence base. Exclusion criteria encompassed (a) studies focusing on athletes' wider health habits as to keep the review scope focused (e.g., eating, drinking, sleeping, and smoking) and (b) gray literature (e.g., conference abstracts and doctoral dissertations). We address potential biases (i.e., publication and language) arising from our eligibility criteria in the Limitations subsection in Section 3.

We used the Mendeley reference manager during the appraisal process to manage the data. After completing the database searches and obtaining every reference, the first author conducted both the title/abstract and then the full text appraisal processes. When the article eligibility was not clear, the second and third authors appraised the article and through that discussion, a consensus was reached. After the appraisal process, the first author conducted a manual search of the reference lists of included articles to ensure the comprehensiveness of the search and appraised the articles meeting the eligibility criteria. We created a PRISMA flow diagram (Figure 1) to visualize the study selection process.

1.3 | Data collection

Next, we extracted the data using a standardized form in Excel. The form was developed based on Peters et al.'s (2015) recommendations with a few modifications to fit the current study's objective. As the first step of the extracting process, we coded the articles alphabetically by first author surname, giving each article a bibliographical code. Secondly, the first author extracted the data, using the following themes (a) identification (title, author(s), publication year, country, and publisher), (b) methodology (type, design, and instruments), (c) sample characteristics (sample size, age, sex, nationality, type of DC, sport, and competition level), (d) focus of the study, (e) studied variables, and (f) key findings.

1.4 | Quality appraisal

Finally, we conducted a quality appraisal of the included studies, using the Quality of Survey Studies in the Psychology checklist tool (Q-SSEP; Protogerou & Hagger, 2020). The first author conducted the appraisal process and similarly to the article appraisal process, the second and third authors supervised the process. Q-SSEP was developed specifically to assess psychological research and within it, the studies using the survey methodology, making it the most suitable for this review. The checklist has 20 items, covering four research domains (introduction/rationale, participants, data, and ethics). The checklist is designed to appraise the justification, design, data collection and analysis, and overall quality of reporting in the study. It uses yes/no questions, and based on the total score, an overall quality score is given to each study. If all items are applicable, a score of 75% or higher is appraised as acceptable quality. However, the use of these scores is optional and should serve a purpose, such as functioning as a moderator in a meta-analysis. Therefore, considering our review's aims, we did not use the quality scores in our analyses or exclude any studies based on the quality appraisal.

1.5 | Data analysis and synthesis

Based on recommendations for systematic reviews (e.g., Siddaway et al., 2019), we selected narrative synthesis as the method for summarizing our data. This decision was based on (a) the integrative nature of this research, which requires a method that preserves the richness and complexity of the findings from each study; and (b) the need for flexibility due to the heterogeneity in the analytic techniques and variables identified across studies. We followed the guidelines provided by Popay et al. (2006) for conducting this narrative synthesis. Accordingly, we first analyzed the methodological and sample characteristics of the studies and then, using the grouping method, divided the results into mental health, psychological, and social categories. We categorized mental health outcomes based on Keyes's (2002) mental illness and mental health dual-continuum and psychological and social factors within the DCDE model (Henriksen et al., 2020). Psychological factors were further categorized based on the Cognitive-Affective Personality System (CAPS; Mischel & Shoda, 1995). While these models provided a foundational framework for categorization, we further refined and, in some cases, merged some of the categories to adapt to the peculiarities of DC context (i.e., categories with few studies). This

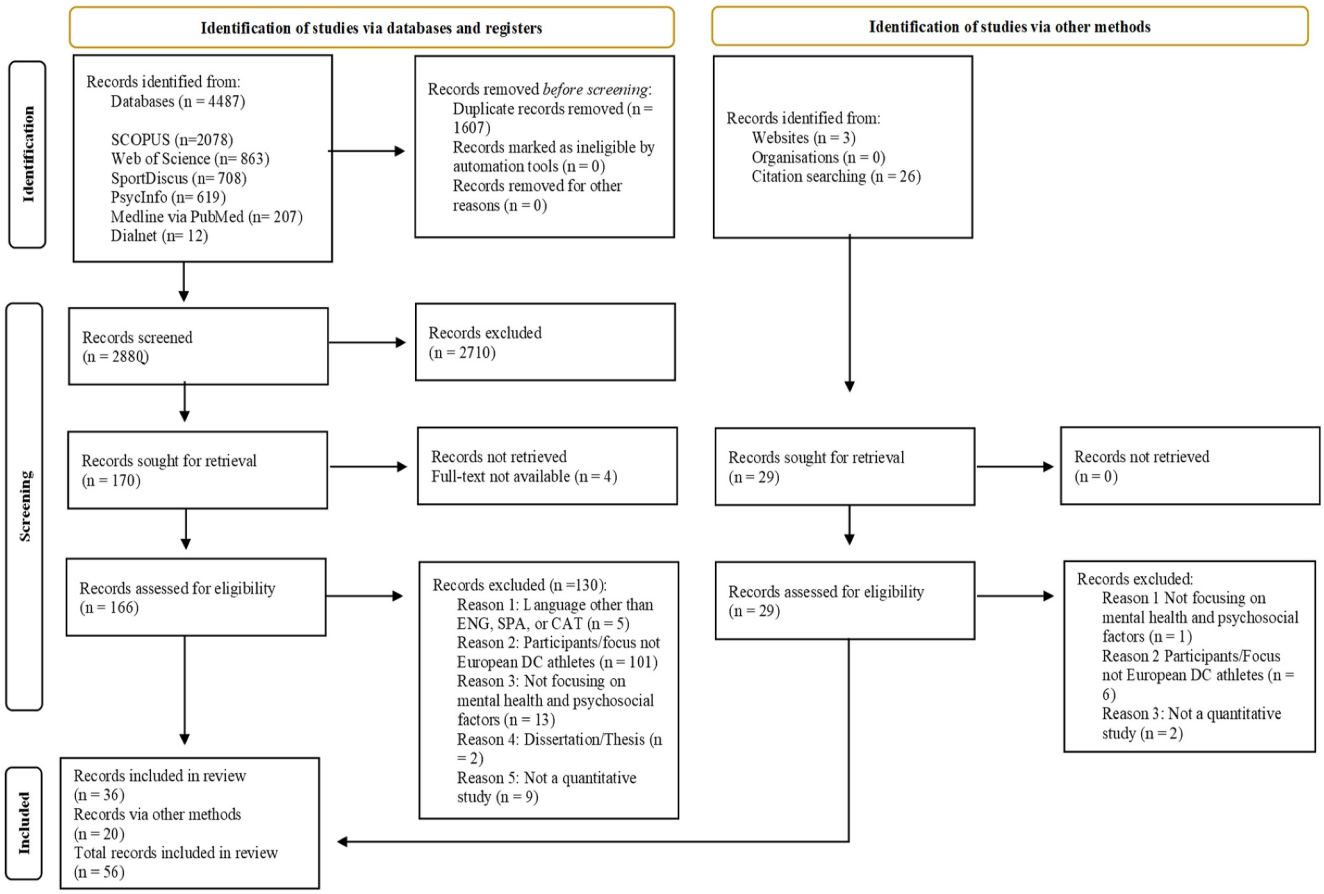

FIGURE 1 Preferred Reporting for Systematic Reviews and Meta-Analysis flowchart.

adaptation was necessary to accommodate the varying breadth of research across different topics, ensuring a comprehensive and representative overview of the existing studies. Third, we summarized each study in a tabular mode to display the included studies, the methodological approach used, and the main findings of each one (Table 1) and in a graphical mode to provide a visual synthesis of our findings (Figure 2). Fourth, we provided a narrative synthesis of the studies based on the mentioned grouping, exploring the associations between psychological and social factors and mental health.

2 | RESULTS

2.1 | Study selection

Database searches produced 4487 records. Figure 1 details this process with the PRISMA flowchart. Of those, 1607 records were identified as duplicates, and 2710 records were discarded during the title and abstract screening for not meeting the eligibility criteria (e.g., Nikander et al., 2022 focus on self-esteem; Galli et al., 2014 participants not European DC athletes). Finally, of 166 full texts appraised, we included 36 in the systematic review (excluded e.g., Hill et al., 2010 participants not DC athletes; Kipp & Weiss, 2013 participants North American). From the reference list search, we included 17 additional studies, and finally, three studies meeting the eligibility criteria came up during the writing of the manuscript through nonsystematic searches on Google Scholar. Thus, the final count for the included articles in this systematic review is 56 articles. The list of excluded studies with justifications is available upon request.

2.2 | Quality appraisal

While the majority of the studies met the acceptable scores for introductions, provided accurate results, and discussion regarding their study, the overall reporting lacked transparency on the conduct and ethics of the study (see Table S4 for each study appraisal). Yet, it is likely that the majority of the issues raised by this quality appraisal can be solved by paying more attention to the transparency of the research when designing the study and writing the manuscripts (e.g., following accepted guidelines or framework).

Regarding ethics, 44.6% of studies did not declare conflict of interest or funding information, some only the other. Additionally, 33.9% of the studies did not report whether they obtained informed consent. Further, 87.5% did not report if they debriefed the participants in any way, and none reported that they justifiably waived it.

With the participant and data collection reporting, most of the studies lost points due to three items: not reporting the complete

TABLE 1 Overview of the articles included in this systematic review.

Bibliographic code	Methodology	Study sample characteristics	Psychological/social factors	Mental health outcomes	Key findings
1. Aunola et al. (2018)	Longitudinal	Finnish high school DC athletes (*N* = 368, 435 parents; M = 16; F = NR)	Parental affection and control	Burnout	Maternal affection protected against school burnout and paternal protected against sport but only with low control
2. Basiaga-Pasternak (2018)	Cross-sectional	Polish high school DC athletes (*N* = 222; M = 18.1; F = 48.6%)	Cognitive scripts	Competitive anxiety	Positive perception about oneself and others decreased competitive anxiety
3. Berntsen et al. (2019)	Longitudinal	Norwegian high school DC athletes (*N* = 102; M = 17; F = 31.3%)	Motivational climate	Subjective vitality (PWB)	Coach support for BPNS was positively associated with subjective vitality
4. Cartigny et al. (2022)	Cross-sectional	British university, school, and working DC athletes (*N* = 159; M = 20.7; F = 63.5%)	Coping	Quality of life and burnout	Acceptance was associated with a higher quality of life and lower burnout than others. Positive coping was also associated with a higher quality of life but not lower burnout than negative coping
5. Drew and Matthews (2019)	Cross-sectional	Irish university DC athletes (*N* = 185; M = 20.8; F = 35%)	Resilience and help-seeking	Depression and anxiety	Informal help-seeking was positively associated with depression but not with anxiety. Higher resilience was associated with both lower depressive and anxiety symptoms
6. Gerber et al. (2018)	Longitudinal	Swiss DC athletes (*N* = 197; M = 16.8; F = 37%)	Stress and mental toughness	Burnout and depression	Stress was negatively associated with burnout and depression. Mental toughness was protective for burnout when stress was high, but not for depression
7. Gustafsson et al. (2015)	Cross-sectional	Swedish high school DC athletes (*N* = 233; M = 17.5; F = 42.9%)	Mindfulness, affect, and stress	Burnout and stress	All factors were associated with stress and burnout
8. Gustafsson and Skoog (2012)	Cross-sectional	Swedish high school DC athletes (*N* = 217; M = 17.2; F = 36%)	Optimism and stress	Burnout and stress	All factors were associated with stress and burnout
9. Gustafsson et al. (2013)	Cross-sectional	Swedish high school DC athletes (*N* = 238; M = 17; F = 29.8%)	Hope, affect, and stress	Burnout and stress	All factors were associated with stress and burnout
10. Gustafsson et al. (2016)	Cross-sectional	Swedish high school DC athletes (*N* = 237; M = 17; F = 47.7%)	Perfectionism and family influence	Burnout	Athletes with higher perfectionism reported higher burnout regardless of the environment
11. Haerens et al. (2018)	Cross-sectional	Belgian school DC athletes (*N* = 202; M = 15.6; F = 31%)	BPNS, motivation, and motivational climate	Mental well- and ill-being	Higher BPNS, autonomous motivation, and autonomy-supporting coaching style were associated with the highest well-being and lowest ill-being
12. Healy et al. (2020)	Cross-sectional	British university DC athletes (*N* = 362; M = 20.4; F = 44.2%)	Goal orientation	Mental well-being	Higher autonomous and lower controlled goal motives were associated with higher well-being
13. Ingrell et al. (2019)	Longitudinal	Swedish secondary school DC athletes (*N* = 78; M = 12.7; F = 38.5%)	Goal orientation	Burnout	Task orientation reduced burnout symptoms, while ego orientation did not have a significant association
14. Into et al. (2020)	Cross-sectional		Motivational climate	Burnout	Disempowering coaching climate was associated with a

(Continues)

TABLE 1 (Continued)

Bibliographic code	Methodology	Study sample characteristics	Psychological/social factors	Mental health outcomes	Key findings
		Finnish high school DC athletes (*N* = 414; M = NR, range = 17–18; F = 49%)			higher level of sport and school burnout
15. Isoard-Gautheur et al. (2012)	Longitudinal	French high school DC athletes (*N* = 309; M = 15.4; F = 50.8%)	Motivational climate, BPNS, and motivation	Burnout	Autonomy satisfaction, intrinsic motivation, and autonomy-supporting coaching style lowered burnout
16. Isoard-Gautheur et al. (2013)	Longitudinal	French high school DC athletes (*N* = 309; M = 15.4; F = 50.8%)	Motivational climate, competence, and goal orientation	Burnout	Athletes with the lowest burnout symptoms perceived a task-orientated climate, had more mastery goals, and perceived to be more competent
17. Kaiseler et al. (2017)	Cross-sectional	British university DC athletes (*N* = 202; M = 19.8; F = 25.7%)	Mindfulness	Stress	Two facets of mindfulness negatively predicted stress, whereas one facet positively predicted stress
18. Madigan et al. (2015)	Longitudinal	British further education DC athletes (*N* = 101; M = 17.7; F = 20.8%)	Perfectionism	Burnout	Perfectionistic concerns predicted higher burnout symptoms but perfectionistic strivings lower symptoms
19. Madigan et al. (2016)	Longitudinal	British further education DC athletes (*N* = 141; M = 17.3; F = 12.1%)	Perfectionism and motivation	Burnout	Motivation mediated the relationship between perfectionism and burnout
20. Madigan and Nicholls (2017)	Longitudinal	British further education DC athletes (*N* = 93; M = 17.7; F = 26.9%)	Mental toughness	Burnout	Higher mental toughness predicted lower burnout symptoms
21. Martinent et al. (2014)	Longitudinal	French secondary school DC athletes (*N* = 145; 13.9; F = 31.7%)	Motivation	Burnout	Motivation was correlated with burnout, but the temporal sequence suggested that burnout predicted motivation and not vice versa
22. Martinez-Gonzalez et al. (2022)	Cross-sectional	Spanish university DC athletes (*N* = 414; M = 20.6; F = 49.8%)	Goal orientation and goal motivation	Subjective vitality (PWB) and burnout	Goal orientations were associated with burnout and subjective vitality
23. Martinez-Gonzalez et al. (2021)	Longitudinal	Spanish university DC athletes (*N* = 127; M = 21.1; F = 50%)	Resilience and goal motivation	Subjective vitality (PWB)	Resilience and autonomous goal motives were associated with subjective vitality
24. Moen et al. (2019b)	Cross-sectional	Norwegian high school DC athletes (*N* = 670; M = 18; F = 51.7%)	Resilience, affect, and stress	Burnout and performance satisfaction (EWB)	Resilience, affect, and stress were correlated with burnout and perceived performance
25. Moen, Myhre, and Sandbakk (2016)	Cross-sectional	Norwegian high school DC athletes (*N* = 356; M = 18.2; F = 46.3%)	Passion, affect, performance, worry, coach–athlete relationship	Burnout	All factors, except for obsessive passion, were associated with burnout
26. Moen, Myhre, and Stiles (2016)	Cross-sectional	Norwegian high school DC athletes (*N* = 318; M = 18.2; F = 45.6%)	Passion, performance, stress, and worry	Burnout	All factors, except for obsessive passion, were associated with stress and burnout
27. Moen et al. (2015a)	Cross-sectional	Norwegian high school DC athletes (*N* = 382; M = 18.5; F = 43.5%)	Mindfulness and stress	Burnout and performance satisfaction (EWB)	Mindfulness was related positively to performance and negatively to stress and burnout. Stress was related to burnout positively

TABLE 1 (Continued)

Bibliographic code	Methodology	Study sample characteristics	Psychological/social factors	Mental health outcomes	Key findings
28. Moen et al. (2015b)	Cross-sectional	Norwegian high school DC athletes (*N* = 382; M = 18.5; F = 43.5%)	BPNS	Burnout	BPNS were negatively related to burnout
29. Moen, Hrozanova, and Myhre (2017)	Cross-sectional	Norwegian high school DC athletes (*N* = 358; M = 18.2; F = 46%)	Affect, coach–athlete relationship, and worry	Performance satisfaction (EWB)	Positive and negative affect and coach–athlete relationship were significantly associated with performance satisfaction
30. Moen et al. (2019a)	Cross-sectional	Norwegian high school DC athletes (*N* = 670; M = 18; F = 51.7%)	Resilience and coach–athlete relationship	Burnout	Resilience and coach–athlete relationship were associated with burnout
31. Moen and Myhre (2017)	Cross-sectional	Norwegian high school DC athletes (*N* = 358; M = 18.2; F = 46%)	Affect, coach–athlete relationship, and worry	Burnout	Affect, worry and coach–athlete relationship were associated directly with burnout
32. Moen, Myhre, et al. (2017)	Cross-sectional	Norwegian high school DC athletes (*N* = 358; M = 18.2; F = 46%)	Affect, worry, and performance satisfaction	Burnout	Effect and worry were directly associated with burnout
33. Ntoumanis and Biddle (1998)	Cross-sectional	British university DC athletes (*N* = 146; M = 21; F = 42.5%)	Self-confidence and motivational climate	Competitive anxiety	Performance climate via self-confidence was associated with low levels of anxiety intensity and facilitative perceptions of both anxiety modes
34. Ntoumanis and Biddle (2000)	Cross-sectional	British university DC athletes (*N* = 356; M = 20.8; F = 37.4%)	Coping	Competitive anxiety	Problem-focused coping was related to lower competitive anxiety
35. Pons et al. (2020)	Cross-sectional	Spanish secondary school, high school, and university DC athletes (*N* = 544; M = 15.9; F = 48.5%)	Academic course, and training conditions	Mental ill-being	More demanding academic course and poor training conditions were associated with higher ill-being
36. Reinboth and Duda (2006)	Longitudinal	British university DC athletes (*N* = 128; M = 19.6; F = 69.5%)	BPNS and motivational climate	Subjective vitality (PWB)	Autonomy and relatedness were positive indicators of subjective vitality
37. Robinson and Freeston (2015)	Cross-sectional	British university DC athletes (*N* = 160; M = 19.8; F = 51.3%)	Intolerance of uncertainty and self-confidence	Competitive anxiety	Intolerance of uncertainty was positively related to competitive anxiety and self-confidence negatively
38. Rosenvinge et al. (2018)	Cross-sectional	Norwegian high school DC athletes (*N* = 611; M = 16; F = 36.2%)	Perfectionism	Psychological distress	Two perfectionistic concerns; concern over mistakes and doubt about actions were associated with psychological distress
39. Shannon et al. (2019)	Cross-sectional	British university DC athletes (*N* = 138; M = 21.1; F = 47%)	Attitudes, norms, behaviors, and intentions of self-managing mental health	Motivation to manage mental health	Autonomous and controlled motivation alongside perceived behavioral control were associated with better self-management intentions. Autonomous motivation also positively predicted attitudes, subjective norms, and perceived behavioral control
40. Shannon et al. (2020)	Cross-sectional	British university DC athletes (*N* = 240; M = 20.5; F = 42.7%)	Mindfulness and autonomy satisfaction	Mental well-being and stress	Mindfulness and autonomy satisfaction positively predicted well-being and negatively stress

(Continues)

TABLE 1 (Continued)

Bibliographic code	Methodology	Study sample characteristics	Psychological/social factors	Mental health outcomes	Key findings
41. Sheehan et al. (2018)	Longitudinal	Irish university DC athletes (*N* = 38; M = 20; F = 47.3%)	BPNS, motivational climate, and motivation	Depression, anxiety, and total mood disturbance	The athletic, academic, and social challenges did not undermine athletes' mental health. BPNS, intrinsic and extrinsic motivation, and task climate were negatively associated with anxiety
42. Smith et al. (2011)	Longitudinal	British university DC athletes (*N* = 97; M = 20.1; F = 63.9%)	Motivational climate, goal motivation, and BPNS	Emotional well-being	Support for autonomy, higher BPNS, and autonomous goals were linked with higher mental well-being
43. Smith et al. (2010)	Cross-sectional	Swedish high school DC athletes (*N* = 206; M = 17.2; F = 35.4%)	Peer motivational climate and stress	Burnout	Higher stress, team conflict, and overall lower task climate were associated with higher burnout
44. Sorkkila et al. (2018)	Longitudinal	Finnish high school DC athletes (*N* = 391; M = 16; F = 51%)	Goal orientation	Burnout	Mastery goals in sport and school were negatively associated with burnout symptoms within the same domain
45. Sorkkila et al. (2017)	Cross-sectional	Finnish high school DC athletes (*N* = 391, 448 parents; M = 16; F = 51%)	Expectations	Burnout	High individual and parental expectations in one domain were associated with less burnout in the same domain but with more burnout in the other domain
46. Sorkkila et al. (2019)	Longitudinal	Finnish high school DC athletes (*N* = 491; M = 16; F = 49%)	Resilience	Burnout	Resilience was associated with lower burnout
47. Stenling et al. (2017)	Longitudinal	Swedish high school DC athletes (*N* = 247; M = 17.8; F = 44.1%)	Motivation and motivational climate	Mental ill-being	Athletes' controlled motivation and perception of controlling coaching were positively correlated with mental ill-being
48. Stenling et al. (2015)	Longitudinal	Swedish high school DC athletes (*N* = 164; M = 17.8; F = 44%)	Motivation, motivational climate, and BPNS	Psychological well-being	Autonomous motivation, autonomous supporting coaching, and BPNS were associated with better mental well-being
49. Stoeber et al. (2007)	Cross-sectional	German university and high school DC athletes (*N* = 466; M = 19.9; F = 41.4%)	Perfectionism	Competitive anxiety	Striving for perfection was associated with lower competitive anxiety but the negative reaction to imperfection was linked with higher anxiety
50. Tingaz et al. (2022)	Cross-sectional	Turkish university DC athletes (*N* = 363; M = 21.5; F = 35.8%)	Mindfulness and self-compassion	Happiness (EWB)	Mindfulness and self-compassion were positively associated with happiness
51. Tingaz et al. (2023)	Cross-sectional	Turkish university DC athletes (*N* = 363; M = 21.5; F = 38.2%)	Mindfulness	Stress, anxiety, and depression	Mindfulness was negatively related to all outcomes
52. Turner et al. (2022)	Cross-sectional	British university DC athletes (*N* = 781; M = 20.6; F = 48.9%)	Beliefs and motivation	Anxiety and depression	High irrational beliefs, high amotivation, and high controlled motivation were associated with more anxiety and depression symptoms

TABLE 1 (Continued)

Bibliographic code	Methodology	Study sample characteristics	Psychological/social factors	Mental health outcomes	Key findings
53. Van Yperen (1998)	Longitudinal	Dutch high school DC athletes (*N* = 59; M = 15.6; F = 0%)	Performance, chance of dismissal, and parental support	Mental ill-being	The poor performance led to worse mental health. This effect was influenced by the chance of dismissal and parental support
54. Zhou et al. (2016)	Longitudinal	British university DC athletes (*N* = 92; M = 20.2; F = 44.4%)	Athletic and team identity	Mental well-being	Higher team identity was associated with better mental well-being
55. Zhou et al. (2015)	Cross-sectional	British university DC athletes (*N* = 1785; M = 20; F = 41.3%)	Athletic identity	Happiness (EWB)	Athlete identity for team sport players (not for individual sports) was positively correlated with happiness
56. Zhou et al. (2014)	Cross-sectional	British university DC athletes (*N* = 243; M = 20.6; F = 60%)	Athletic identity and team cohesion	Happiness (EWB)	Team cohesion and athletic identity were positively related to happiness

Abbreviations: F, female (gender distribution); M, mean age; NR, not reported.

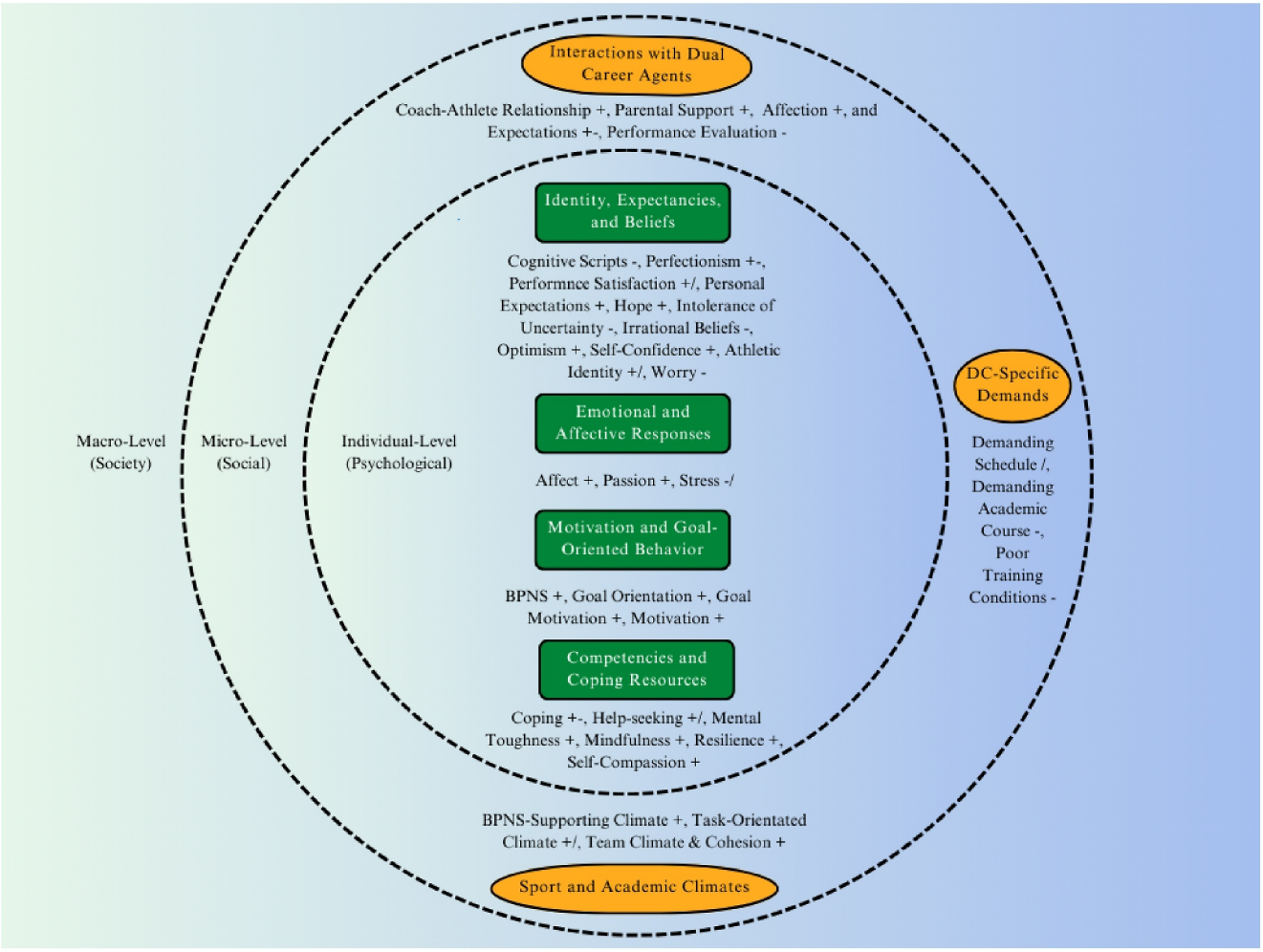

FIGURE 2 Psychological and social factors within the DCDE associated with European DC athletes' mental health. Boxes in the inner circle represent the individual level (psychological factors). The outer circle represents the microlevel (social factors) surrounding the psychological factors. Beyond that is the macrolevel which was unaddressed in the current review. Dashed lines represent the transactional nature between the levels. + sign denotes a positive association, − sign denotes a negative association, and/sign denotes no significant association. If one factor had multiple potential outcomes, the positive one is shown here. DCDE, dual career development environment.

description of participants' characteristics (i.e., at minimum age, gender, ethnicity/race, and socioeconomic status), not providing the measures in full, and/or not justifying their sample size. Additionally, topic-specific characteristics were reported inconsistently, making the participant comparison difficult (e.g., competition level, commitment, and experience).

Lastly, the context of the data collection was reported in most studies (84%), but only 28.6% reported all three items regarding data collection (i.e., when, where, and who collected the data). With data analysis, many studies lacked detail in measurement validity (47.4%, although Cronbach's alphas were reported often), justifications for their chosen data analysis techniques (35.7%), and/or attrition rates and methods of treating attrition (42.9%).

2.3 | Research and sample characteristics

The full research and sample characteristics can be found in Table S2. Results revealed an increased interest in the topic since the publication of the European Union's guidelines on DC in 2012. Out of the analyzed studies, only 16.1% were conducted before 2013, while 28.6% were conducted between 2013 and 2016. Another significant surge in research activity occurred post-2016, with many reviews and statements addressing athlete's mental health after this year (e.g., Reardon et al., 2019; Rice et al., 2016). Geographically, 13 European countries have contributed to the international literature on this topic, with the Northern European countries being the most prolific. Methodologically, almost two-thirds (64.3%) used a cross-sectional design, and one-third (35.7%) used a longitudinal design. A majority of the studies, accounting for 66.1%, had sample sizes exceeding 200 participants; however, power calculations were a rare feat in these studies.

In this systematic review, studies primarily focused on student–athletes, as only one had working DC athletes as a part of their sample (4). About 48.2% of the studies focused on high school participants, 33.9% to the university participants, and 3.6% to the secondary school participants; while other 5.4% had a mixed sample and 8.9% did not state the education level clearly. The mean age was 18.5 (SD = 2.19) and the gender composition within these studies was mixed in 96.4% of the cases; only 7.1% of studies reported information regarding ethnicity, and 1.8% regarding the socioeconomic status of the sample. Regarding the sport-specific characteristics, the specific sport type, competition, and expertise levels were diverse and usually included participants from different levels without clearly differentiating them. Only 32.1% reported sport experience, and within these studies, the mean was 8.3 years of experience playing their sport and only 26.8% reported commitment to their sport/DC, which averaged 11.5 h/week for training time. One study reported 25 h/week of overall DC-related activities including training time.

Regarding mental health outcomes, the mental illness dimension encompassed 19.7% of outcomes (measured as anxiety, depression, and mental ill-being). In addition to clearly labeled outcomes of anxiety and depression, the mental ill-being label includes three studies utilizing General Health Questionnaire, each analyzing it differently and reporting more general symptoms of mental illness as a result. In addition, one study combined instruments of depression and negative affect to create a combined mental ill-being score.

Mental health dimension contained 25.8% of outcomes (measured as affect, happiness, quality of life, performance satisfaction, subjective vitality, and mental well-being). While mental health has not been studied through dual-continuum operationalization yet in this context, all the studies discussed mental health or well-being with variability in the operationalizations and measurement of these concepts. We utilized the labels used in the original articles and if lacking, assigned the label corresponding to the instrument used (e.g., happiness considered as an aspect of EWB). For the EWB label, one study used a combination of life satisfaction and affect to measure it, and others focused only to a part of EWB (i.e., happiness and performance satisfaction). For PWB, one study utilized GHQ's positive items to form a PWB score, and others studied it through subjective vitality. Also, mental well-being, which is conceptualized to include both emotional and PWB, was studied explicitly. Two studies used the Warwick-Edinburgh Mental Well-Being scale and two utilized a combination score of vitality and affect. Finally, social well-being was not studied, although quality of life includes aspects of it with psychological and physical well-being. Thus, the positive mental health results currently show building blocks of it, not the whole thing.

Last, 54.5% of outcomes were grouped into Associated Outcomes with Mental Health (measured as burnout, competitive anxiety, mental health literacy, and psychological distress; which is conceptualized as negative mental health states and includes anxiety and depressive symptoms, perceived stress; which is conceptualized as the individual perception about how much general stress they are experiencing, and total mood disturbance). Interestingly, the majority of the studies fell to this category, which would not be found without the wider operationalization, adding a wealth of relevant information to this review. The interest in burnout explains why this category has received the most focus as 37.9% of studies investigated it. Burnout has also been studied with the most consistency, as when set aside a specific research line into DC-specific burnout; all studies utilized Athlete Burnout Questionnaire. For a detailed quantitative summary of all the factors and their corresponding measurement instruments, please see Table S3.

2.4 | Narrative synthesis

For the narrative synthesis, the variables identified in our study were categorized into either psychological or social factors (micro and macrolevels) within the DCDE model. Accordingly, the social factors were divided at the microlevel into (1) *Sport and Academic Climates*, which encompass the atmosphere created by significant others

within the sport and studies domains; (2) *DC-Specific Demands*, which comprise the specific challenges and pressures arising from DC context; and (3) *Interactions with DC Agents*, highlighting the interpersonal dynamics with the agents surrounding DC athletes (e.g., coaches, teachers, and parents). No studies were found at the macrolevel.

For the psychological factors, we divided the identified variables into four categories: (1) *Identity, Expectations, and Beliefs*, which include self-conceptions and expectations within DC paths (e.g., sport/academic identity and self-confidence), their expectations on the environment or their own performance (e.g., performance expectations, and optimism), and their beliefs on how they should behave and perform in these domains (e.g., perfectionism and rational/irrational beliefs); (2) *Emotional and Affective Responses*, which encompass feelings, emotions, and affective experiences; (3) *Motivation and Goal-oriented Behavior*, focusing on the goals, motivations, and values that guide DC athletes' decisions and actions; and (4) *Competencies and Coping Resources*, involving behaviors, competencies, and strategies for managing demands, stressors, and internal states raised by the DC context. In the following, we narratively present our findings following the grouping divisions. Additionally, we summarize these results into two graphic elements. Table 1 provides a comprehensive overview of the studies, while Figure 2 synthesizes the psychological and social factors within the DCDE model.

2.4.1 | Factors in the dual career development environment

Sport and academic climates

Results revealed only studies referring to the sport context. Within this context, research framed in self-determination theory (Ryan & Deci, 2000) suggests that when environments offer a supportive climate for the athletes' basic psychological needs, they experience an increase in mental well-being and a decrease in mental ill-being. Indeed, the coach-created autonomy-supportive climate was linked to lower burnout levels (15), enhanced mental, emotional, and PWB (11, 42, 48), and reduced mental ill-being (11). Conversely, a controlling climate led to increased mental ill-being among athletes (47). Moreover, coaches' support of athletes' basic psychological needs was positively associated with higher subjective vitality (PWB, 3). Additionally, coaches fostering an empowering climate (i.e., a climate that combines achievement goal theory and self-determination theory and is both task-oriented and supportive of athletes' basic psychological needs) were associated with athletes' reduced burnout in sport and school domains (14), indicating that negative effects in sports could adversely affect academic well-being in DC athletes. Regarding the impact of task or mastery climates compared to ego climates, findings based exclusively on achievement goal theory showed a connection with task climate and lower burnout (16) and trait anxiety scores (41). However, none of these climates significantly affect total mood disturbance, depression (41), or competitive anxiety (33), except for ego climate improving competitive anxiety via self-confidence. Finally, a peer-created task-oriented climate decreased burnout, whereas a higher level of team conflict, characteristic of an ego climate, increased it (43). Related to this, higher team cohesion was correlated with increased happiness (EWB) among athletes (56).

Dual career-specific demands

DC-specific demands were scarcely studied and showed contradicting results. While one study found that the overall DC challenges during the season did not significantly impact athletes' mental ill-being (40), another examination during the COVID-19 revealed that athletes enrolled in more demanding academic courses and reporting suboptimal training conditions experienced notably poorer mental health outcomes than their peers (35).

Interactions with dual career agents

This category revealed research primarily related to two main agents: the coach and the family, showing that both agents are involved in important dynamics for the mental health of athletes. Studies showed that athletes who perceive a positive relationship with their coach tended to have higher performance satisfaction (EWB, 29) and lower burnout scores (25, 30, 31) with resilience emerging as a mediating factor in this relationship (30). Moreover, when performance was rated poor by coaches, athletes reported more symptoms of mental health issues (53). However, mental health only deteriorated if athletes perceived themselves to be in danger of deselection and did not perceive having adequate parental support. Thus, perceived availability of parental support plays a crucial role in buffering the negative impact of potential deselection on athletes' mental health (53), suggesting that the role of family, particularly parents, is significant. Continuing with the family's role, paternal affection was found to reduce sport-related burnout symptoms, whereas maternal affection primarily lowered school-related burnout symptoms (1). However, these beneficial effects were nullified when parents exerted control simultaneously. Finally, parents holding higher expectations for success in one domain (either sport or academia) correspondingly reduced DC athletes' burnout scores in that specific domain (45). Conversely, these elevated expectations increased burnout symptoms in the other domain. Additionally, an ego-involving climate that is linked to parental expectations showed potential to exacerbate the adverse effects of perfectionism on burnout (10).

Identity, expectations, and beliefs

Regarding DC athletes' self-conception, research suggests that confidence in their own ability is relevant for mental health. Specifically, athletes with higher self-confidence experienced lower competitive anxiety and often interpreted it as facilitative (33, 37). Similarly, athletes with positive perceptions of themselves and their environment showed decreased levels of competitive anxiety (2). Sporting identity also emerged as a factor related to mental health with interesting nuances. In this regard, athletes with a stronger athletic identity perceived greater happiness (EWB) overall (56), yet the effect only emerged in team sports (55). Furthermore, in one study,

team identity, but not athletic identity, showed a significant relation to mental well-being (54). Regarding personal expectations, high performance expectations in either academic or sport domains decreased burnout in that specific domain but increased it in the other (45), highlighting the potential harm of unrealistic DC expectations on mental health. Additionally, one study showed that when athletes rated their sport performance as poor, they reported more burnout symptoms (25; 26) but another did not find it a significant predictor of burnout (32).

Regarding explanatory styles, more hopeful DC athletes faced fewer symptoms of stress and burnout, with stress and positive affect acting as mediators (9). Similarly, optimistic DC athletes exhibited lower burnout with mediation from stress (8). Regarding beliefs, elevated levels of perfectionism were linked to higher burnout (10). Research approaching specific dimensions of perfectionism highlighted concerns over mistakes and doubt about actions as the components related to higher levels of psychological distress (38). Furthermore, perfectionistic concerns (i.e., negative reactions to imperfection) correlated with higher burnout (18, 19) and competitive anxiety (49), whereas perfectionistic strivings were linked to lower scores of these variables, hinting at potential protective mechanisms. One study also showed that autonomous motivation played a mediating role between perfectionism and lower burnout (19). Meanwhile, intolerance of uncertainty was linked to higher competitive anxiety (37), with self-confidence acting as a mediator. Lastly, irrational beliefs were found to exacerbate anxiety and depression (52), and higher levels of worry were consistently associated with increased burnout (25, 26; 31, 32) but notably not with performance satisfaction (EWB, 29).

Emotional and affective responses

In the affective domain, our findings highlighted the significant impact of both positive and negative affect on DC athletes' mental health. Thus, individuals exhibiting higher negative affect demonstrated decreased performance satisfaction (EWB, 24, 29) and increased levels of stress and burnout, as evidenced across several studies (7, 9, 24, 25, 31, 32). Conversely, those with higher positive affect experienced reduced stress and burnout, and this positive affect also contributed to increased performance satisfaction (EWB, 24, 29). Notably, positive affect served as a crucial mediator in the relationship between hope and burnout (9), as well as between mindfulness and burnout (7). In addition, the dynamics of passion in relation to burnout showed differences regarding the type of passion. Harmonious passion was found to have a protective influence on burnout (25; 26), while obsessive passion did not show a significant effect. The role of stress in the context of athlete mental health was particularly multifaceted. Higher stress levels were consistently linked to increased burnout and depression across numerous studies (6, 7, 8, 9, 27, 43). However, the relationship between stress and performance satisfaction (EWB) was more complex: while one study found that stress lowered performance satisfaction (EWB, 27), another indicated no direct effect between such variables (24). The mediating role of stress was also present in the relationship between optimism and burnout (8), as well as between hope and burnout (9), where both hope and optimism appeared to reduce stress which, in turn, lowered burnout. Nevertheless, this mediating effect was not consistently observed across all factors, as one study (7) found that stress did not significantly mediate the relationship between mindfulness and burnout.

Motivation and goal-oriented behavior

In the context of goals and values, our review found a complex interplay between basic psychological needs satisfaction (BPNS), goal orientation, goal motivation, overall motivation, and mental health outcomes. Firstly, BPNS emerged as a crucial element. Higher fulfillment of these needs was significantly linked to enhanced mental, emotional, PWB (11, 42, 48), reduced mental ill-being (11), anxiety (41), and burnout (28). When delving into the individual components of BPNS, we observed distinct patterns; higher autonomy satisfaction was associated with increased subjective vitality (PWB, 36), greater mental well-being, and reduced stress and burnout (15, 40); higher competence satisfaction was inversely related to burnout (15, 16) but had no significant effect on subjective vitality (PWB, 36); and higher relatedness satisfaction was linked to greater subjective vitality (PWB, 36) but did not significantly lower burnout (15). Moreover, BPNS also played a mediating role between certain climates and mental health outcomes, such as task-involving climate and subjective vitality (PWB, 36), and autonomy-supporting climate and burnout (15). Autonomy satisfaction further mediated the relationship between mindfulness and both mental well-being and stress (40).

Exploring goal orientation, we found that task/mastery orientations were generally beneficial, correlating with higher subjective vitality (PWB, 22) and lower burnout (13, 16, 44). Interestingly, the impact on burnout was domain-specific in sports versus school contexts (44). Ego/performance orientation presented a more ambiguous picture. While it was indirectly associated with lower levels of competitive anxiety, fully mediated by self-confidence (33), it showed no significant link with subjective vitality (PWB, 22) and had inconsistent relationships with burnout (13, 44). When examining goal motivation, autonomous goals were consistently beneficial, associated with higher mental and EWB (12, 42) and lower burnout (22), and variable effects on subjective vitality (PWB, 22, 23). Controlled motives, conversely, were linked to poorer mental health outcomes with decreased mental well-being and subjective vitality (PWB) and increased burnout symptoms (12, 22, 23), although some nonsignificant associations were reported as well with subjective vitality (PWB) and EWB (22, 42). The broader spectrum of motivation revealed that intrinsic motivation could be considered a protective factor for mental health with associations with lower anxiety (41) and burnout (15), higher mental and PWB (11, 48), and more functional attitudes and self-management behaviors toward mental health (39). Extrinsic motivation was associated with lower anxiety but did not significantly impact depression or mood disturbance (41). On the other hand, controlled motivation had largely detrimental effects, linked to higher levels of anxiety, depression (52), mental ill-being (11, 47), lower mental well-being (11), and burnout (21), though

interestingly, it still increased intentions toward mental health self-management (39). Athletes with no clear motives (i.e., amotivation) displayed higher levels of anxiety, depression (52), burnout (15, 21), and lower overall mental well-being (11). Notably, the sequence between motivation as a general concept and burnout appears to be relatively inverse, where burnout predicts motivation (21). Another more granular analysis into distinct types of motivation reveals distinct relationships. Athletes who exhibited autonomous motivation experienced lower levels of burnout, while controlled motivation was associated with higher levels of burnout, particularly in contexts where it intersects with perfectionist traits (19).

Competencies and coping resources

Our analysis revealed intricate interconnections between the different personal competencies and resources used to cope with DC demands and mental health outcomes, including coping strategies, help-seeking behavior, self-compassion, mental toughness, mindfulness, and resilience. Regarding coping, we found that adaptive coping strategies such as active coping, emotional support, positive reframing, planning, religion/spirituality, and separately acceptance significantly improved athletes' quality of life and effectively reduced burnout (4). In contrast, maladaptive coping strategies such as denial, substance use, behavioral disengagement, venting, and self-blame led to a decrease in quality of life and an increase in burnout (4), with alcohol use as a coping mechanism notably lowering mental well-being (54). Interestingly, the type of coping strategy also influenced anxiety levels. Problem-focused coping was associated with lower competitive anxiety, while emotion-focused and avoidance strategies correlated with higher competitive anxiety (34). The role of help-seeking was also pivotal, with athletes engaging in informal help-seeking behaviors experiencing positive effects on depression, though this did not significantly affect anxiety (5). This indicates the specific, nuanced impacts of different self-regulatory strategies on mental health aspects.

The study of self-compassion revealed that athletes who were more self-compassionate reported higher levels of happiness (EWB, 50), reinforcing the role of affective states in athlete mental health. Similarly, those who practiced mindfulness reported enhanced performance satisfaction and happiness (EWB, 27, 50), mental well-being (40), and reductions in anxiety, depression (51), stress (7, 17, 27, 40, 51), and burnout (7, 27). However, the effectiveness of mindfulness was nuanced, with aspects like awareness and non-judgment reducing stress, while the observe facet was potentially increasing it (17). This complexity was further defined by the mediating roles of affect, autonomy satisfaction, coping effectiveness, decision rumination, and self-compassion in the mindfulness–mental health relationship (7, 17, 40, 50). The mediating role of stress between mindfulness and burnout varied, being significant in some studies (27) but not in others (7), suggesting the intricate dynamics of mindfulness in mental health management. Regarding competencies, resilience has gotten increased attention, while less studies have approached mental toughness. Yet, mental toughness emerged as a potentially significant protective factor against burnout, particularly in high-stress situations (6, 20). However, its impact on depression was less clear (6), suggesting its benefits could be more specific to certain mental health outcomes. Lastly, resilience was identified as a significant protective factor against a range of mental health challenges as more resilient athletes demonstrated lower levels of anxiety and depression (5), reduced burnout (30, 46), and stress (30) along with higher subjective vitality (PWB, 23). However, resilience did not directly affect performance satisfaction (EWB, 24) but mediated effects between the coach–athlete relationship and burnout (30), as well as between autonomous goals and subjective vitality (PWB, 23), results that further underscore its complex role in athlete mental health.

3 | DISCUSSION

This systematic review provides a synthesis of the psychological and social factors associated with the mental health of European DC athletes. Our findings demonstrate a new way to utilize the DCDE working model by showing how factors on the different levels within it are associated with mental health as an outcome. Moreover, we reviewed factors associated with mental health outcomes from a wide perspective (i.e., mental ill-health, positive mental health, and associated outcomes with mental health), which ensures a comprehensive capture of the existing knowledge, beyond the ill-health approach. Therefore, our review is the first to synthesize the psychological and social factors in a DC-specific and ecological manner, providing systematic and detailed information regarding the European DC context. These results are especially beneficial for DC stakeholders working directly with the athletes within the DCDEs as the factors are malleable and within stakeholders' control. However, the evidence is still limited in many parts due to scattered research interest, which limits the practical implications coming out of this review. Consequently, the review's main contributions are providing a comprehensive synthesis of the current state of the evidence, advancing ecological and context-specific approaches, and providing future considerations through a systematic appraisal of the literature.

3.1 | Factors within the dual career development environment

As an overview of the current evidence, we found 35 different psychological and social factors within DCDE that are associated with European DC athletes' mental health. Specifically, we first highlight the associations of nine factors, which have been incorporated the most regularly in the literature (the direction of each influence is presented within parentheses): affect (+), stress (–), BPNS (+), goal orientation (+), motivational climate (+), motivation (+), mindfulness (+), resilience (+), and perfectionism (–and +). While these findings generally concur with the extant literature, our context-specific synthesis provides focused information, where positive affect, BPNS, adaptive motivation, goal orientation, motivational climate

plus resilience, and mindfulness are positively associated with DC athletes' mental health. On the other hand, stress had generally a negative association, and perfectionism depended on its nature (adaptive vs. maladaptive). While most of the other associations were significant as well, they lacked the amount of investigation to draw wider conclusions for applied settings and require further attention.

Second, our results emphasize that European DC athletes' mental health is impacted by both the sport and academic environments, as athletes can experience stressors from each context and the consequences can be domain-specific. In this regard, our results show that the potential stressors in the DC environment, such as lack of resources and high expectations can negatively influence DC athletes' mental health. Furthermore, European DC athletes who perceived more stress generally reported higher burnout symptoms. This stress can arise from a specific context (i.e., either sport or studies) and it has a transactional nature between the individual and their environment (Lazarus, 1991, 1999), which was highlighted by the findings regarding that burnout in DC athletes can be sport and/or school-specific. Additionally, highlighting this transaction, our results show that different factors at the psychological level (i.e., resilience, mental toughness, hope, optimism, and coping effectiveness) alleviate DC athletes' stress and thus can protect mental health in the long run, highlighting the importance of DC athletes' personal competencies in the stress–mental ill-health relationship (e.g., Hammen, 2015).

Thirdly, our results indicate that a significantly greater focus of research has been at the psychological level than at the wider microlevel and macrolevel. Furthermore, the focus at the psychological level has been with general factors more than with DC-specific factors and that the majority focus at the microlevel has been on the sports sphere, in contrast to the lesser attention given to the academic sphere. This leaves the DC-specific context and its influence on DC athletes' mental health still relatively unexplored and as we highlight in this Discussion, important, and necessary to consider.

3.2 | Holistic ecological approach

Our findings revealed intricate interactions between the athlete and their microlevel, supporting the importance of adopting a holistic ecological approach to examine the factors affecting European DC athletes' mental health (e.g., Henriksen et al., 2020). To illustrate this point, we can first rely on BPNS, which we found to be frequently associated with better mental health with athletes, both as an environmental and personal factor. Self-determination theory (Ryan & Deci, 2000) conceptualizes BPNS as psychosocial by nature, meaning that while BPNS is a part of athletes' personal experience, those needs are simultaneously influenced by the environment athletes participate in, requiring a holistic view. Secondly, a few studies investigated mediation models where psychological factors mediated the association between microlevel factors and mental health outcomes, demonstrating a potential mechanism for the change. These results highlight the intricate relationships between factors within DCDE and why accurate interventions might require this holistic perspective to be acknowledged. As these studies were still in the minority, their results, such as better coach–athlete relationship increasing resilience, which then lowers burnout, provide initial strength for the consideration of the holistic ecological approach in the future. Thirdly, the results on stress and burnout mentioned in the previous paragraph show strong evidence for the consideration of a holistic ecological approach. Not only the results show the environment's role (context-specificity) in burnout, but through the transactional model of stress and coping (Lazarus, 1991, 1999), the results highlight the person–environment transaction. Thus, as stress and burnout can arise from a specific context, the environment needs to be taken under consideration and also importantly consider the athletes' role in this transaction. Therefore, our findings weigh on the importance of adopting an ecological approach and developing an environment that supports athletes, helps them manage their DC, and safeguards their mental health, actions supported by previous expert statements (e.g., Reardon et al., 2019; Stambulova et al., 2024), and reviews (Kegelaers et al., 2022; Kuettel & Larsen, 2020).

3.3 | European DC context

While we point out that the European DC context differs from the North American one, our review results also reveal similarities regarding the associations at the microlevel. To illustrate, our most robust results showed positive associations of mental health with functional motivational climates, coach–athlete relationships, and social support from the family, which is consistent with the research conducted in the North American context. In this regard, Alexander et al. (2023) shed light on the negative impact of a controlling and abusive coaching climate on DC athletes' mental health, whereas Saxe et al. (2022) conducted a comprehensive ecological examination of the environment, highlighting the significant influence of the coach's behavior, relationships, and climate on athlete mental health, both positively and negatively. While these studies were exploratory, there are multiple studies concurring with their implications in the North American system, such as the positive effects of functional motivational climate (e.g., Habeeb et al., 2023; Hwang & Choi, 2016; Mellano et al., 2022), better coach–athlete relationships (e.g., Simons & Bird, 2023; Yukhymenko-Lescroart et al., 2022), and social support (e.g., Simons & Bird, 2023; Sullivan et al., 2020) on mental health. These factors are either coach- or family-related, meaning they are present across contexts at the microlevel, and it seems that their influence is similar across the contexts as well.

Therefore, our results seem to demonstrate a transversal importance of these factors in DC athletes' mental health across contexts. Yet, even when there are similarities at the microlevel across DC contexts, it is important to point out that some contexts may be more challenging than others, due to differences at the macrolevel (e.g., policy, culture, and sport systems). For example, the relationship between family social support and mental health might

be comparable, but European DC athletes might receive less organizational, financial, or material support due to the fewer resources available. In fact, this seems to be pertinent already in the comparisons between European countries, where sport system and DC support can differ depending on the DC context (Kuettel et al., 2018). As our review did not identify any studies at the macrolevel, that could be a fruitful future avenue to address a wider social and cultural influence on DC athletes' mental health, such as analyzing different DCDE's influence on athlete mental health.

3.4 | Identified gaps and future considerations

In addition to the future directions to address the identified gaps amid the Discussion, our results show similarities with Woods et al. (2022), with most of the factors associated with athlete burnout studied only once or twice. In our review, only nine factors were studied at least five times, and the results were further diversified due to the different outcomes studied. Only mindfulness–stress and both affect and stress-burnout relationships have been studied multiple times, suggesting stronger evidence. Thus, from a quantitative perspective, more replication studies across multiple independent samples, longitudinal investigations, and subsequent meta-analyses are necessary to effectively bridge the gap between research and robust applied practice recommendations.

Secondly, although this review has emphasized lack of studies on the wider environment, it is crucial to take the holistic ecological approach in the future, so as not to overlook the significance of athletes' personal approaches for promoting and protecting their mental health. Illustrating, our results indicate consistent support for individual level themes, including (a) strategies, such as goal setting, mindfulness, and coping skills; (b) competencies, such as resilience and mental toughness; and (c) emotional states, such as positive affect to protect their mental health. Furthermore, athletes' competencies and strategies still lack strength of evidence in many parts. For example, DC practitioners would benefit from future research developing and evaluating the role DC strategies and competencies could have on DC athletes' mental health (e.g., career planning and emotional awareness; De Brandt et al., 2018; Sallen et al., 2018).

Finally, in line with Kegelaers et al. (2022), a closer consideration on the categorization of 'DC athlete' can contribute to advancing our understanding in this context. While the commonly used definition encompasses athletes having a major focus on sports and education or work, such focus can be subjective without further information. It is important to consider that the original EU guidelines targeted elite or talented athletes pursuing highly demanding athletic careers while preparing for career outside sports (European Union, 2012). However, non-elite athletes may also follow a DC, with different levels of dedication and performance than their elite counterparts. In fact, in this review, we found several studies with various levels of competition and dedication or even without adequate information. Therefore, it may be beneficial to account for the dedication toward sports and studies in a more detailed manner (e.g., Astridge et al., 2021; McKay et al., 2022), as athletes' demands and required competencies can differ depending on each scenario. In addition, analyzing athletes' career trajectories to pursue a DC (see Torregrossa et al., 2020), would facilitate more accurate understanding and support for each trajectory (Pons et al., 2024).

3.5 | Practical implications

Our results as a whole suggest that DC organizations need to pay attention to the psychological and social factors as relevant for mental health. Especially crucial for organizations is the focus on the climate as these are often created top-down. Currently, our findings indicate the benefits for implementing climates higher in BPNS, empowering, and task orientation to promote better mental health. We suggest that the DCDE working model is a promising and context-specific way for DC organizations to understand, and based on that understanding, develop their organizational focus to support DC athletes' mental health successfully.

For DC practitioners and coaches, this review contains a synthesis of the factors associated with DC athletes' mental health with the current evidence surrounding each of them. With this, they have evidence-based synthesis to support DC athletes' mental health, a resource to develop their own work, and potentially even instigate organizational awareness from bottom-up. Especially useful in this sense are the higher-order categories that we grouped the factors in, as they provide stronger evidence as a whole and demonstrate the importance of that particular theme.

3.6 | Strengths & limitations

In this review, we adopted a wide operationalization of mental health that enabled an integration of a large body of knowledge surrounding mental health. However, we acknowledge that mental health is a complex and evolving phenomenon, and our operationalization is not without limitations. First, we note that scholars have proposed an advanced conceptual framework to the dual-continuum model, compared to the one we described (e.g., Lomas & VanderWeele, 2023). Second, we note that positive mental health outcomes can emerge even through negative experiences, which we did not describe (Malhotra & Chebiyyam, 2016). Third, while we utilized the dual-continuum model as the main framework, which incorporates the mental illness diagnostics, the research field in general still has multiple views on theoretical perspective with critiques of the diagnostic validity, for example, with cut-offs, biases, and societal influence (see description, Lundqvist & Andersson, 2021, p. 5). Further, the same diagnostic concern has been raised for positive psychology, especially when 'diagnosing' mental health (Thompson, 2017). Thus, we recommend approaching athlete mental health mindfully, recognizing the inherent theoretical limitations of each

perspective and considering how to compensate such limitations to move toward a more accurate and nuanced understanding of athlete mental health.

Methodologically, our review brings out three key strengths for the DC research line. First, we used a comprehensive search strategy that included a wide variety of keywords designed to locate both general and specific words used to maximize the search efficiency. Second, we conducted the search through six well-known databases, suggesting an in-depth review result. Third, through the quality appraisal, we were able to find some prevalent omissions in the conduct and report process within this topic that can help improve the quality in the future. Yet, some methodological limitations should be noted in our review. First, a single reviewer developed the appraisal processes due to resource restrictions in this review. However, we safeguarded against this with clearly predefined and explicitly discussed criteria, while having two other authors supervising the process, and appraising the borderline articles. Second, our criteria to limit the eligibility to certain languages and peer-reviewed studies does introduce potential language and publication bias into this review. Yet, we only excluded five studies based on language and did not locate any Spanish language studies eligible for our review, indicating less studies to be found in other languages than English. Third, we included only quantitative studies, which raises a probability that some associations are missed because they have been found through qualitative or mixed-methods studies. However, we excluded only 11 studies based on the methodology (of which six were intervention studies), leaving the potential effect small.

4 | CONCLUSION

Our work provides a comprehensive and systematic review of the psychological and social factors associated with European DC athletes' mental health. The results suggest that their mental health is associated with a wide variety of factors from different sources, showing the need to recognize the complex interplay between individual and environmental factors to understand and support athletes' mental health. Thus, our systematic review specifically highlights the importance of context-specific (e.g., Europe) and ecological (e.g., DCDE) approaches in this field (see also Stambulova et al., 2024). While our study recognizes further research avenues to build a larger, more robust evidence base, the results also function as a resource for DC organizations and DC practitioners working in the European DC context to better support mental health successfully. The key take-home message from this review is that there are multiple factors associated with better mental health, which we can affect inside DCDEs and directly with DC athletes.

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CONFLICT OF INTEREST STATEMENT

The authors have competing interests.

DATA AVAILABILITY STATEMENT

All the resources of this articles are shared as supplementary files. The authors are also happy to share any other information upon request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.