

# INPLASY PROTOCOL

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**Support:** None.

**Review Stage at time of this submission:** Formal screening of search results against eligibility criteria.

**Conflicts of interest:** None.

## INTRODUCTION

**Review question / Objective:** This systematic review with meta-analysis was conducted to compare the effects of mental fatigue vs. control conditions in the

## Effects of mental fatigue in physical demands and tactical behavior during small-sided soccer games: A systematic review with meta-analysis

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**Review question / Objective:** This systematic review with meta-analysis was conducted to compare the effects of mental fatigue vs. control conditions in the physical demands and tactical behavior of soccer players during SSGs.

**Condition being studied:** Mental fatigue in soccer players.

**Information sources:** Electronic databases (PubMed, PsycINFO, Scielo, Scopus, SPORTDiscus and Web of Science) were searched for relevant publications prior to the December 26 of 2020.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 4 January 2021 and was last updated on 4 January 2021 (registration number INPLASY202110014).

physical demands and tactical behavior of soccer players during SSGs.

**Rationale:** Mental fatigue may impact physical demands and tactical behavior during sport-related contexts. Small-sided games (SSGs) are often used in training for

developing a specific sport-related context. However, the effects of mental fatigue in the physical demands and tactical behavior during soccer SSGs have not been aggregated for a systematical assessment.

**Condition being studied:** Mental fatigue in soccer players.

## METHODS

**Search strategy:** Electronic databases (PubMed, PsycINFO, Scielo, Scopus, SPORTDiscus and Web of Science) were searched for relevant publications prior to the December 26 of 2020. Keywords and synonyms were entered in various combinations in all fields: (soccer OR football) AND (“small-sided games” OR “conditioned games” OR “SSG” OR “drill-based games” OR “small-sided conditioned games” OR “reduced games” OR “play formats”) AND (“mental fatigue” OR “cognitive fatigue” OR “cognitive effort” OR “mental demands”).

**Participant or population:** Soccer players from any age or sex with regular training practice, belonging to teams with regular competitions.

**Intervention:** Soccer players exposed to mental fatigue-induced protocols before SSGs.

**Comparator:** Control conditions (passive or active, not promoting mental or physical fatigue) before SSGs.

**Study designs to be included:** Counterbalanced cross-over design.

**Eligibility criteria:** Soccer players from any age or sex with regular training practice, belonging to teams with regular competitions; Exposed to mental fatigue-induced protocols before SSGs; Control conditions (passive or active not promoting mental fatigue) before SSGs (e.g., physical fatigue can be considered as active control); Physical demands (distance covered) and tactical behavior (attacking behavior accuracy, decision-making passes accuracy; space exploration index);

Counterbalanced cross-over design (randomized and non-randomized can be included, since all revealing no significant differences in control conditions); Only original and full-text studies written in English.

**Information sources:** Electronic databases (PubMed, PsycINFO, Scielo, Scopus, SPORTDiscus and Web of Science) were searched for relevant publications prior to the December 26 of 2020.

**Main outcome(s):** Physical demands (total distance as the most representative external load measure reported in the literature) and tactical behavior (attacking behavior accuracy since is a determinant of main goal of the game – attack to score; decision-making passes accuracy; space exploration index).

**Data management:** A data extraction was prepared in Microsoft Excel sheet (Microsoft Corporation, Readmon, WA, USA) in accordance with the Cochrane Consumers and Communication Review Group’s data extraction template (19). The Excel sheet was used to assess inclusion requirements and subsequently tested for all selected studies. The process was independently conducted by two authors (FMC and HS). Any disagreement regarding study eligibility was resolved in a discussion. Full text articles excluded, with reasons, were recorded. All the records were stored in the sheet.

**Quality assessment / Risk of bias analysis:** The methodological quality of selected studies was assessed using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement proposed by Von Elm et al (2007). The STROBE scale, a checklist composed by 22 items, was followed to assess quality of the studies included in the meta-analysis. The items and subitems of the STROBE statement were scored as 0 or 1, with a score of 1 provided for each checklist item that was properly completed. Using the modified checklist for cross-over design studies, a maximum score of 32 would indicate the article

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fulfilled requirements for a high-quality publication.

**Strategy of data synthesis:** Aiming to establish consistency in data analyzing and reporting, only measures that were analyzed three or more times for different articles were included. Two main outcomes were considered for extraction: (i) physical demand; and (ii) tactical behavior. For the case of physical demand, only the total distance (measured in meters [absolute values], or meters per minute [standardized value]) was included since is the most valid and reliable measure (in microtechnology systems) among those measures related to time-motion analysis, while is often reported across the studies. For the case of tactical behavior, the criteria for data extraction were: (i) individual measure (related to a player); (ii) measure a behavior with ball; (iii) measure the accuracy of a behavior related with the ball.

**Subgroup analysis:** None.

**Sensibility analysis:** None.

**Language:** English.

**Country(ies) involved:** Portugal; Chile; Spain.

**Keywords:** Football; athletic performance; drill-based games; conditioned games; decision making.

**Contributions of each author:**

**Author 1 - Filipe Manuel Clemente -** Lead the project, run the data search and methodological assessment, and wrote and revised the original manuscript.

**Author 2 - Rodrigo Ramirez-Campillo -** Analyzed and interpreted the data, wrote the statistical report and revised the original manuscript.

**Author 3 - Daniel Castillo -** Run the data search and methodological assessment and wrote and revised the original manuscript.

**Author 4 - Javier Raya-González -** Run the data search and methodological assessment and wrote and revised the original manuscript.

**Author 5 - Ana Filipa Silva -** Wrote and revised the original manuscript.

**Author 6 - José Afonso -** Wrote and revised the original manuscript.

**Author 7 - Hugo Sarmiento -** Wrote and revised the original manuscript.

**Conflicts of interest:** Filipe Manuel Clemente, Rodrigo Ramirez-Campillo, Daniel Castillo, Javier Raya-González, Ana Filipa Silva, José Afonso and Hugo Sarmiento declare that they have no conflicts of interest relevant to the content of this review.