

# Effects of different pre-race warm-up routines on anxiety, thinking performance, and skiing performance in alpine skiers

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|----------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Submission date</b><br>06/06/2026   | <b>Recruitment status</b><br>No longer recruiting | <input type="checkbox"/> Prospectively registered<br><input checked="" type="checkbox"/> Protocol                       |
| <b>Registration date</b><br>10/06/2026 | <b>Overall study status</b><br>Completed          | <input type="checkbox"/> Statistical analysis plan<br><input type="checkbox"/> Results                                  |
| <b>Last Edited</b><br>08/06/2026       | <b>Condition category</b><br>Other                | <input type="checkbox"/> Individual participant data<br><input checked="" type="checkbox"/> Record updated in last year |

## Plain English summary of protocol

### Background and study aims

Alpine skiing requires athletes to be physically ready, emotionally stable, and able to make quick decisions before a race. Pre-race sport-specific activation, commonly known as a warm-up or activation routine, may influence anxiety, attention, decision-making, and skiing performance. However, it is not clear whether different activation doses have different effects in alpine skiers. This study aimed to compare the acute effects of three pre-race sport-specific activation routines on competitive state anxiety, executive function, and skiing performance in alpine skiers.

### Who can participate?

Alpine skiers aged 18–35 years with sport-specific training experience who were able to complete normal training and testing procedures and provided written informed consent.

### What does the study involve?

Each participant completed three activation routines on separate test days in a randomized crossover order: a 5-minute low-intensity routine, a 10-minute moderate-intensity routine, and a 15-minute moderate-to-high-intensity routine. There was an interval of approximately 48–72 hours between testing sessions. Before and after each activation routine, participants completed questionnaires assessing competitive anxiety and self-confidence and cognitive tasks assessing executive function. Skiing performance was also recorded during a standardized skiing test.

### What are the possible benefits and risks?

Participants may better understand their psychological and cognitive readiness under different pre-race activation conditions. The study was a low-risk, non-drug sport intervention. Possible risks included temporary fatigue, increased heart rate, muscle soreness, attention fatigue, and minor sport-related risks such as imbalance or falls during skiing tests. Participants were monitored by researchers and coaches during testing, and they could withdraw at any time.

Where is the study run from?

Harbin Sport University, China, and associated alpine skiing training/testing settings.

When did the study start and end?

January 2026 to April 2026.

Who is funding the study?

Harbin Sport University, China.

Who is the main contact?

Jianxin Kang, Harbin Sport University, kangjianxin@hrbipe.edu.cn

## Contact information

### Type(s)

Scientific, Principal investigator

### Contact name

Mr Mingxuan Li

### Contact details

School of Winter Olympic Sports, Harbin Sport University

Harbin

China

150008

+86 13609829292

13609829292@163.com

### Type(s)

Principal investigator, Public

### Contact name

Prof Jianxin Kang

### Contact details

School of Winter Olympic Sports, Harbin Sport University

Harbin

China

150008

+86 13609829292

kangjianxin@hrbipe.edu.cn

## Additional identifiers

## Study information

### Scientific Title

Acute effects of different doses of pre-race sport-specific activation on competitive state anxiety, executive function, and skiing performance in alpine skiers: a randomized crossover trial

## **Acronym**

PSSA-AS

## **Study objectives**

This study aimed to compare the acute effects of three doses of pre-race sport-specific activation on competitive state anxiety, executive function, and skiing performance in alpine skiers. Specifically, the study compared a 5-minute low-intensity activation routine, a 10-minute moderate-intensity activation routine, and a 15-minute moderate-to-high-intensity activation routine in a randomized crossover design. The purpose was to identify whether different activation doses produce different short-term effects on athletes' psychological readiness, cognitive control, and skiing performance before simulated competition.

## **Ethics approval required**

Ethics approval required

## **Ethics approval(s)**

Approved 10/01/2026, Academic Ethics Committee of Harbin Sport University (No. 1 Dacheng Street, Nangang District, Harbin, 150008, China; +86 451 82721320; hpeij@163.com), ref: 2026045

## **Primary study design**

Interventional

## **Allocation**

Randomized controlled trial

## **Masking**

Open (masking not used)

## **Control**

Dose comparison

## **Assignment**

Crossover

## **Purpose**

Basic science, Sports performance and psychological-cognitive readiness

## **Study type(s)**

## **Health condition(s) or problem(s) studied**

Sports-related competitive state anxiety, executive function, and skiing performance readiness in alpine skiers

## **Interventions**

Each participant completed three pre-race sport-specific activation conditions on separate test days in a randomized crossover order. The three conditions were:

1. ACT5\_LOW: a 5-minute low-intensity sport-specific activation routine.
2. ACT10\_MOD: a 10-minute moderate-intensity sport-specific activation routine.
3. ACT15\_MODHIGH: a 15-minute moderate-to-high-intensity sport-specific activation routine.

Participants completed all three intervention conditions in a randomized crossover design. Before data collection, the order of the three activation conditions was assigned using a computer-generated randomization list based on the six possible crossover sequences. Each participant was assigned to one of these sequences before the first testing session. Each condition was completed on a separate testing day, with an interval of approximately 48-72 hours between conditions to reduce carryover effects. Because the intervention conditions differed in duration and intensity, masking of participants and field staff was not possible.

The activation routines were land-based and included dynamic mobility exercises, lower-limb and core activation, and movement-preparation exercises similar to the movement characteristics of alpine skiing. Each participant completed all three conditions, with a washout interval of approximately 48–72 hours between conditions to reduce carryover effects. During each testing session, sleep duration, sleep quality, caffeine intake, subjective fatigue, and environmental information were recorded. Participants completed pre-race psychological measurements, the assigned activation routine, post-activation psychological measurements, executive-function tests including Stroop and Flanker tasks, and a standardized skiing test. Relative heart rate and rating of perceived exertion were recorded as manipulation-check indicators.

### **Intervention Type**

Behavioural

### **Primary outcome(s)**

1. Competitive state anxiety measured using the Competitive State Anxiety Inventory, including cognitive anxiety, somatic anxiety, and self-confidence dimensions at immediately before and immediately after each pre-race sport-specific activation condition on each testing day
2. Executive function measured using Stroop interference and Flanker interference scores from computerized executive-function tasks at immediately before and immediately after each pre-race sport-specific activation condition on each testing day
3. Skiing performance measured using first-section skiing time during the standardized skiing test at after each pre-race sport-specific activation condition on each testing day

### **Key secondary outcome(s)**

### **Completion date**

30/04/2026

## **Eligibility**

### **Key inclusion criteria**

1. Alpine skiers with sport-specific training experience
2. Aged 18–35 years
3. Able to participate in normal training and testing during the study period
4. Willing to participate and able to provide written informed consent

**Healthy volunteers allowed**

Yes

**Age group**

Adult

**Lower age limit**

18 Years

**Upper age limit**

35 Years

**Sex**

All

**Total final enrolment**

53

**Key exclusion criteria**

1. Acute injury or medical condition affecting participation in testing
2. Cardiovascular, neurological, psychiatric, or psychological disorders
3. Use of medications likely to affect mood, cognition, or motor response
4. Inability to complete all testing procedures

**Date of first enrolment**

17/01/2026

**Date of final enrolment**

30/04/2026

**Locations****Countries of recruitment**

China

**Sponsor information****Organisation**

Harbin Sport University

**Funder(s)****Funder type****Funder Name**

# Results and Publications

## Individual participant data (IPD) sharing plan

IPD sharing plan summary  
Not expected to be made available

### Study outputs

| Output type                                   | Details | Date created | Date added | Peer reviewed? | Patient-facing? |
|-----------------------------------------------|---------|--------------|------------|----------------|-----------------|
| <a href="#">Participant information sheet</a> |         |              | 08/06/2026 | No             | Yes             |
| <a href="#">Protocol file</a>                 |         |              | 08/06/2026 | No             | No              |