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Supplementary Material

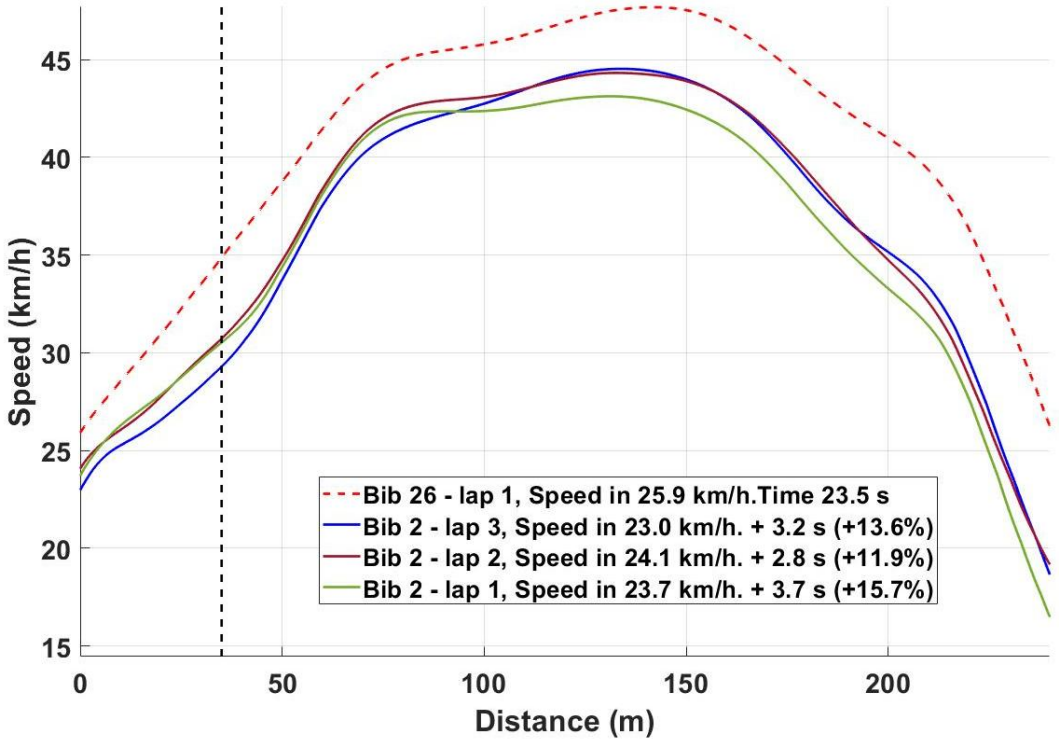

Figure S1 Slides from the theoretical training session showing speed for one skier (Bib 2) compared to the winner of Race1 (Bib 26).

Table S1. Speed [m·s^{-1}] after the acceleration phase (measured by photocells 3-meters apart) in the two downhill segments used during the practical training. Numbers for trial 1-7 (T1-T7) is given.

	Segment 10									Segment 12						
Bib	***T1****	**T2**	**T3**	**T4**	**T5**	***T6****	**T7****	**Δ% T7-T1**	**Δ% T7-T6**	***T1****	**T2**	**T3**	**T4**	**T 5**	**T6****	**Δ% T6-T1**
2	*8.7*	10.1	9.7	10.1	9.8	*8.3*	10.1	**17**	**22**	*10.3*	10.8	11.0	10.6	10.4	10.5	**1**
4	*9.2*	10.3	9.9	9.8	9.7	*9.0*	9.8	**7**	**9**	*10.8*	10.6	10.4	10.5	10.1	11.4	**6**
6	*9.7*	10.1	10.1	9.6	10.1	*9.9*	10.0	**3**	**2**	*8.2*	10.3	10.3	10.7	10.9	10.5	**28**
7		10.2	9.8	9.6	9.4	*8.8*	9.7		**10**	*8.5*	10.2	10.4	10.4	10.1	10.3	**21**
8	*9.8*	10.3	10.0	10.3	10.1	*9.4*	9.9	**1**	**6**	*9.7*		11.3	10.5	10.3	10.8	**11**
11	*8.9*	9.4	9.7	9.9	9.5	*9.3*	9.9	**11**	**7**	*9.7*	9.7	10.2	10.1	10.0	10.3	**5**
14	*8.9*	9.9	9.9	9.9	10.0	*9.1*	9.7	**8**	**7**	*9.8*	10.6	10.5	10.0	10.2	10.3	**6**
17	*9.5*	9.7	10.5	10.6	9.9	*8.7*	9.9	**4**	**15**	*9.3*	10.5	11.0	10.8	11.6	10.4	**12**
19	*10.3*	9.8	10.0	10.0	9.7	*8.9*	10.1	**-1**	**14**	*9.7*	8.8	10.2	10.0	8.7	10.3	**7**
22	*9.1*	10.0	10.1	10.1	9.8	*9.2*	9.9	**9.**	**8**	*9.5*	9.0	10.9	10.8	11.2	10.5	**11**
24	*9.2*	10.5	10.1	10.5	10.1	*8.8*	10.5	**15**	**20**	*10.1*	10.4	10.9	10.8	10.9	10.9	**8**
25	*8.4*	9.9	9.4	9.4	9.9	*8.6*	9.9	**18**	**15**	*10.0*	9.9	9.1	10.0	9.8	10.5	**4**
26	*10.5*	10.9	11.1	10.2	9.9	*9.9*	10.6	**1**	**7**	*10.0*	9.9	9.1	10.0	9.8	10.5	**4**
28	*9.2*	10.3	9.9	10.4	10.4	*9.6*	10.4	**13**	**8**	*10.6*	11.1	11.5	11.1	10.9	10.8	**2**
30	*9.9*	9.7	10.0	10.1	10.5	*9.0*	10.3	**3**	**14**	*9.5*	10.6	10.5	10.3	11.0	10.5	**10**
Ave	*9.4*	10.1	10.0	10.0	9.9	*9.1*	10.1	**7.9**	**10.9**	*9.7*	10.2	10.5	10.4	10.4	10.6	**9.0**
Std	*0.6*	0.4	0.4	0.3	0.3	*0.4*	0.3	**6.0**	**5.3**	*0.7*	0.6	0.7	0.3	0.7	0.3	**6.8**

T = trial, bib = bib number, * = the skiers were asked to simulate technical solution in Race 1,
**** the skiers were asked to ski as they planned to do in Race 2**

Table S2. Photocell measurements: Individual (mean lap value) values for instant speed after the acceleration phase ($Speed_{PC2-PC1}$) and approximate time for the skier in a tucked position ($Time_{PC3-PC2}$) for Race1 and Race2. Maximum speed flat and uphill measurements (V_{max}) in flat and uphill terrain.

		$Speed_{PC2-PC1}$				$Time_{PC3-PC2}$				Vmax [$m \cdot s^{-1}$]	
Sub	**GRP**	**Race1 [$m \cdot s^{-1}$]**	**Race2 [$m \cdot s^{-1}$]**	**Δ [$m \cdot s^{-1}$]**	**Δ [%]**	**Race1 [s]**	**Race2 [s]**	**Δ [s]**	**Δ [%]**	**Flat**	**Uphill**
1	0	8.3	8.8	0.5	5.9	19.8	17.5	2.3	11.6	9.6	5.8
2	1	8.3	10.0	1.7	18.6	21.0	17.4	3.7	17.1	9.2	5.8
3	0	8.6	9.3	0.7	8.0	21.0	18.3	2.7	12.9	9.3	5.4
4	1	8.1	9.3	1.2	14.0	21.8	17.4	4.4	20.2	9.2	5.9
5	0	8.1	9.0	1.0	11.3	23.3	18.0	5.3	22.7	8.9	5.5
6	1	9.6	10.4	0.8	8.4	19.1	16.4	2.7	14.1	9.2	5.7
7	1	8.4	10.1	1.8	19.0	21.0	17.1	3.8	18.6	8.7	5.3
8	1	8.2	10.7	2.5	26.6	22.1	16.7	5.4	24.4	9.1	5.6
10	0	9.1	9.9	0.8	8.2	20.9	18.0	2.8	13.9	9.1	5.8
11	1	8.4	10.1	1.8	19.0	21.8	17.3	4.5	20.6	9.0	5.7
13	0	9.8	10.1	0.4	3.5	19.1	16.9	2.2	11.5	9.2	5.8
14	1	8.2	9.5	1.3	15.2	21.9	17.3	4.6	21.0	9.3	5.9
16	0	8.9	9.5	0.6	6.3	19.6	17.0	2.6	13.3	9.3	6.1
17	1	8.1	9.4	1.3	14.9	21.1	17.5	3.6	17.1	7.5	4.5
18	0	8.8	9.3	0.5	5.3	20.2	17.8	2.4	11.9	9.0	5.4
19	1	8.8	10.2	1.4	14.2	19.4	16.9	2.5	12.9	9.1	5.9
20	0	9.2	9.9	0.8	7.9	19.7	17.5	2.2	11.2	9.1	5.5
23	0	8.5	9.0	0.6	6.4	21.7	18.7	3.0	13.8	8.9	5.3
24	1	8.6	9.8	1.2	12.8	21.3	17.0	4.4	20.2	8.8	5.5
25	1	8.4	10.0	1.6	16.9	21.6	17.9	3.7	17.1	9.0	6.2
26	1	9.0	10.2	1.2	12.8	19.0	17.1	2.0	10.0	9.4	6.3
27	0	7.8	9.2	1.3	15.8	22.3	18.2	4.1	18.4	8.6	5.1
28	1	8.7	9.6	0.9	9.4	20.4	17.7	2.6	13.2	9.4	5.8
29	0	9.0	9.4	0.4	3.9	21.2	17.5	3.6	17.5	9.3	5.7
30	1	8.5	10.1	1.6	17.1	19.7	17.1	2.6	13.2	8.6	5.3
31	0	8.8	9.3	0.5	5.5	21.1	19.1	2.0	9.5	8.9	5.3
INT		**8.74**	**9.40**	**0.66**	**7.34**	**20.81**	**17.89**	**2.92**	**15.01**	**9.09**	**5.56**
Std		0.39	0.37	0.41	4.36	1.05	0.38	4.57	0.95	0.46	0.42
CON		**8.52**	**9.96**	**1.44**	**15.63**	**20.79**	**17.20**	**3.59**	**18.79**	**8.97**	**5.66**
Std		0.51	0.38	0.27	3.23	1.17	0.63	4.26	0.93	0.26	0.27

INT = intervention group
CON = control group

Table S3. Individual values for total race-time, mean relative heart rate (%HR) and rate of perceived exertion (RPE) for Race1 and Race2.

		Time [s]			%HR [% of HR_{max}]			RPE		
Sub	**GRP**	**Race1**	**Race2**	**Δ**	**Race1**	**Race2**	**Δ**	**Race1**	**Race2**	**Δ**
1	0	1648	1463	185	92.1	92.2	-0.1	20	20	0
2	1	1718	1496	222	90.7	90.3	0.4	20	20	0
3	0	1728	1508	220	86.3	83.7	2.6	19	20	-1
4	1	1773	1487	286	91.3	91.1	0.1	19	19	0
5	0	1858	1521	337	86.5	88.7	-2.2	19	20	-1
6	1	1650	1398	252	91.0	93.0	-2.0	20	20	0
7	1	1789	1506	283	92.0	91.9	0.1	20	20	0
8	1	1777	1470	307	92.8	93.0	-0.3	19	20	-1
10	0	1772	1567	205	91.3	90.4	0.9	20	19	1
11	1	1723	1462	261	90.6	91.0	-0.4	20	20	0
13	0	1586	1391	195	93.3	94.7	-1.4	19	20	-1
14	1	1725	1430	295	91.0	90.8	0.2	19	18	1
16	0	1653	1435	218	88.9	88.3	0.6	20	20	0
17	1	1761	1555	206	89.9	91.0	-1.1	19	20	-1
18	0	1682	1539	143	92.8	93.0	-0.1	20	20	0
19	1	1607	1465	142	89.7	91.4	-1.7	18	19	-1
20	0	1585	1444	141	91.3	93.8	-2.4	19	19	0
23	0	1639	1549	90	91.8	91.2	0.7	18	18	0
24	1	1817	1454	363	90.1	92.3	-2.3	17	19	-2
25	1	1720	1566	154	84.5	84.8	-0.2	20	20	0
26	1	1487	1419	68	90.1	91.3	-1.2	19	18	1
27	0	1727	1500	227	92.1	93.1	-1.0	20	19	1
28	1	1637	1525	112	87.9	88.4	-0.5	19	19	0
29	0	1678	1489	189	91.8	91.5	0.3	18	19	-1
30	1	1582	1509	73	90.8	89.7	1.2	19	18	1
31	0	1699	1643	56	90.9	91.6	-0.7	18	19	-1
INT		**1697.6**	**1481.6**	**216.0**	**90.2**	**90.7**	**-0.6**	**19.1**	**19.3**	**-0.1**
STD		**89.8**	**47.1**	**89.2**	**1.9**	**2.0**	**1.0**	**0.8**	**0.8**	**0.8**
CON		**1687.9**	**1504.1**	**183.8**	**90.8**	**91.0**	**-0.2**	**19.2**	**19.4**	**-0.3**
STD		**73.9**	**64.5**	**68.9**	**2.2**	**2.9**	**1.4**	**0.8**	**0.6**	**0.7**
Δ INT-CON		**9.7**	**-22.5**	**32.2**	**-0.6**	**-0.3**	**-0.3**	**0.0**	**-0.1**	**0.1**

Time = total race time, INT= intervention group, CON = control group, GRP = group, GRP value 1 is INT, GRP value 0 is CON, Δ = value for Race1 – value for Race2, HR_{max} = the highest HR obtained during the races

Moving variance and the total variance acceleration metric

Let $a \in x, y, z$ be a sequence of acceleration samples of length N, and W denote the described odd numbered moving window $1 < W < N$. Then the algorithm moving window w_j, where $j > 1$, will handle the W truncation around the beginning and end of the signal a, and is defined by:

$$w_j = min(W, 2(j-1)+1, 2(N-j)+1)$$

Let the sample average be given by:

$$\mu(a,j) = \frac{1}{w_j} \sum_{i=j-(w_j-1)/2}^{j+(w_j-1)/2} a\,(i)$$

And the sample variance by:

$$var(a,j) = \frac{1}{w_j - 1} \sum_{i=j-(w_j-1)/2}^{j+(w_j-1)/2} |a(i) - \mu(a,j)|^2$$

$$var(a,1) = \sum_{i=1}^{2} \left| a(i) - \frac{a(1)+a(2)}{2} \right|^2$$

$$var(a,N) = \sum_{i=N-1}^{N} \left| a(i) - \frac{a(N-1)+a(N)}{2} \right|^2$$

Then the $totVarAcc$ metric can be formulated as:

$$totVarAcc = \sum_{a \in (x,y,z)} \left\{ \frac{1}{N} \sum_{i=1}^{N} v\,ar(a,i) \right\}$$

Furthermore, by compiling an array, $movvar(a,W)$, of the variances,

$$movvar(a,W) = [var(a,1), var(a,2), \ldots, var(a,N)]$$

the $totVarAcc$ metric can be written:

$$totVarAcc = \sum_{a \in (x,y,z)} \left\{ \frac{1}{N} \sum_{i=1}^{N} m\,ovvar(a,W)_i \right\}$$

where i denotes the i'th element of the array $movvar(a,W)$. Matlab provides the $movvarfunction$ to generate the above-presented array.