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The Italian adaptation of the WOrk-reLated Flow inventory (WOLF) to Sport: The I-WOLFS scale

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ABSTRACT. Il *Flow at work*, costrutto collocato all'interno della psicologia positiva, risulta rilevante in ambito sportivo in quanto si tratta di uno stato psicologico capace di influenzare la prestazione di un atleta. Questo studio ha l'obiettivo di adattare allo sport la scala italiana di Flow at work (I-WOLF). È stata svolta un'analisi fattoriale esplorativa (N = 132) e in seguito confermativa (N = 161) su un gruppo di atleti professionisti. Le analisi hanno restituito una scala a 12 item che contiene le tre dimensioni del Flow at work (Assorbimento, Piacere lavorativo e Motivazione intrinseca). Lo strumento potrà essere utile per la misurazione del Flow at work tra gli atleti, contribuendo alla psicologia del lavoro e dello sport.

SUMMARY. Flow at work is a state of consciousness characterized by absorption, enjoyment and intrinsic motivation. Optimal experiences are crucial in sport since athletes link performances and achievement to psychological states. This study aims to adapt to sport the Italian version of the WOrk-reLated Flow inventory (I-WOLF). Factorial validity of the adapted scale was assessed by exploratory factor analysis (N = 132) and confirmatory factor analysis (N = 161). Participants are professional athletes. The exploratory factor analysis showed a three-factor structure with one item of intrinsic motivation loading on the enjoyment factor. The confirmatory factor analysis finally deleted this item, resulting a 12-item structure which preserves the original 3-factor structure: Absorption, Sport Enjoyment and Intrinsic Motivation. The adaptation of the I-WOLF scale to sport resulted a reliably instrument to measure flow at work among athletes, giving an important empirical contribute to both work and organizational psychology and sport psychology.

Keywords: *Flow at work, Flow sport, Optimal experience, Scale adaptation*

INTRODUCTION

Positive psychology, which particularly focuses on the understanding of positive subjective experiences (Seligman & Csikszentmihalyi, 2000), is more and more capturing the attention of scholars, underlying the importance of understanding human well-being dynamics through the detection and the improvement of social, cultural and personal factors. Positive and optimal experiences are mostly significant in sport, since athletes link performances and achievement to psychological states (Kennedy, Miele & Metcalfe, 2014). Optimal experience refers to positive states of consciousness and such experience is considered optimal since people can control it, have intrinsic motivation and clear goals, thus living the experience in a positive

way (Csikszentmihalyi, 1990). The most studied optimal experience in sport is flow (Swann et al., 2017a), which is functional to experience optimal performance, since pressure, concentration and focused goals foster the flow experience during sport (Swann, Crust & Vella, 2017). According to Csikszentmihalyi (1990), flow is a state of consciousness generated while participating in an activity which enjoys and absorbs the individual, and which is intrinsically rewarding. Therefore, the flow experience emerges when the individual is focused on an activity with attention on clear but also realistic goals, is intrinsically motivated in doing the activity, since it can control it, experiencing a balance between his/her skills and the challenges of a situation.

The first conceptualization of flow has been used within recreational activities and, in particular, in sport practice to understand psychological states associated to optimal experiences (Csikszentmihalyi, 1990), which is important to identify as it makes people able to develop new skills. Indeed, a recent study by Swann, Crust and Vella (2017b) shows that athletes feel energized by flow states, underlying the positive effect on the individual well-being. In fact, studies highlight that flow in sport is related with higher performance and positive psychological outcomes such as self-esteem, well-being (Jackman, Crust & Swann, 2017), and positive moods which can lead to positive evaluations and to the development of efficacy beliefs (Zumeta, Oriol, Telletxea, Amutio & Basabe, 2016). Therefore, flow is considered a crucial construct to understand positive experience in sport, since flow among athletes is considered characterized by intrinsic rewards, enhanced motivation, and total concentration in the performance. This experience, moreover, excludes thoughts and emotions leading to concentration (absorption), and implicates confidence, enjoyment, satisfaction and control over the performance, with relevant results on professional athletes' success during high level competitions (Swann et al., 2017a; Zumeta et al., 2016). As literature on flow shows, therefore, the main characteristics of flow are common both for general workers and for professional athletes. Such characteristics refers to clear goals and feedback to have information about what to do and progressions, challenge-skills balance to use the right skill in the right situation and, in the light of this balance, refers also to novelty, discovery and experimentation (Swann et al., 2017b) to try and adapt the correct skills in new situations.

Some studies highlighted that people experiences flow during their working time (Bakker, 2008; Csikszentmihalyi & LeFevre, 1989), capturing the attention of work and organizational psychologist on the issue of flow at work, as a focus for human resources management policies improving motivation, job performance and well-being (Zito, Cortese & Colombo, 2016).

Considering the birth and the applicability of flow to sport, and the relevance of flow at work within organizational studies, this study aims to apply to sport a measure used to detect flow at work. In particular, the Italian version of the Flow at Work scale (Zito, Bakker, Colombo & Cortese, 2015) has been adapted to sport, and administrated to professional athletes in order to measure flow at work in the sport activity. The WOrk-reLated Flow inventory (WOLF), originally operationalized by Bakker (2008), detects the three main dimensions considered in the flow research, which are perfectly in line with the characteristics of flow emerging during sports. In particular, the dimensions refer to: first, Absorption (ABS) that is the immersion and the total concentration in the activity, time flies and people don't care about what is happening around them; second, Work Enjoyment which reflects the happiness and the pleasure experienced during the work activity. Applied to sport, this dimension is named Sport Enjoyment (SE); third, Intrinsic Work Motivation which refers to performing a work activity with the intent to experience pleasure and satisfaction. Applied to sport, this dimension, which recalls the intrinsic rewarding aspect, is named Intrinsic Sport Motivation" (ISM).

As flow at work, it is important to offer to Italian researchers a reliable measure of flow in sport, since flow is the principal framework used in research to understand the psychology of optimal experience in sport (Swann et al., 2017b) and such measure is currently lacking in the Italian language. This could represent a contribution for both work and organizational psychologist working with professional athletes, and sport psychologist.

The aim of this study is, therefore, to offer the adaptation of the Italian version of the I-WOLF scale (Zito et al., 2015) to sport, named I-WOLFS. The factorial validity of the I-WOLFS is presented through an exploratory factor analysis performed on a sample of 132 professional athletes, and a confirmatory factor analysis performed on a sample of 161 professional athletes. Moreover, to assess the validity of the scale and to deepen the psychometric characteristics of the I-WOLFS, correlations (Pearson's *r*) have been performed between I-WOLFS and a general index of flow to verify the correspondence with reported flow state, and passion (for sport), as literature suggests as correlated with flow (Vallerand & Houlfort, 2003; Zito & Colombo, 2017).

METHODS

Participants

To perform the factor analyses process, a sample of 293 professional athletes (20.8% football players, 31.8% cyclists, 47.4% skiers), was randomly divided into two subsamples. The first, composed of 132 participants, was used for the exploratory factor analysis: 70.5% male, average age 27 years (*SD* = 10.3), average weekly sport hours 11 (*SD* = 4.7), average sport activity 18 years (*SD* = 8.6).

The second sample, used for the confirmatory factor analysis is composed of 161 athletes: 52.3% male, average age 27 years (*SD* = 11.2), average weekly sport hours 11 (*SD* = 6.1), average sport activity 18.7 years (*SD* = 9.1).

Procedure

The Italian version of the Flow at Work scale (Zito et al., 2015) was adapted from work in general to the sport activity, and it was filled out by professional athletes. Different sports teams were contacted and players voluntarily decided to participate in the study. The research was approved by the Bioethics committee of the researchers' University and by the sports organizations participating in the study. Data were collected through a paper-and-pencil questionnaire and researchers gave to the participants instructions to complete the questionnaire, and information about the anonymity of their data.

Measures

- *Flow sport*. It was used the Italian version of the Flow at Work scale (Zito et al., 2015) applied to sport as profession. The scale consists of thirteen items divided into the three dimensions: Absorption (four items), Sport Enjoyment (four items), and Intrinsic Sport Motivation (five items). Items were assessed on a 7-point frequency scale ranging from 1 = Never, to 7 = Always.
- *Passion*. It was used the Italian version of the Passion for work scale (Zito & Colombo, 2017), applied to sport. Passion represents a strong inclination toward an activity in which people spends time and energy. Passion is measured through two dimensions, depending on the type of the internalization of the passionate activity. The first dimension is Harmonious Passion (HP, seven items) for an activity in harmony with the life of the individual which produces motivation and engagement. The second dimension is Obsessive Passion (OP, 7 items) characterized by pressure linked to the passionate activity which becomes pervasive in the individual's life. The scale was assessed on a Likert scale ranging from 1 = Not agree at all, to 7 = Very strongly agree.
- *General flow*. It was measured with the Flow Short Scale (Rheinberg, Vollmeyer & Engeser, 2003) to assess general flow since the scale measures, through ten items, the general feeling of flow. The Likert scale ranges from 1 = Not at all, to 7 = Very much.

Data analysis

To assess the factorial validity of the Italian version of the Flow at Work scale applied to sport, data analysis first performed an exploratory factor analysis (EFA) with SPSS 24, and then a confirmatory factor analysis (CFA) with Mplus 7. A sample of 293 professional athletes was divided into two subsamples: the first composed of 132 participants for the EFA and the second composed of 161 participants for the CFA. The sample was randomly splitted, and it was balanced in order to have a sample of at least 150 subjects for conducting the CFA (Guadagnoli & Velicer, 1988). According to literature (Bollen & Long, 1993), the model was assessed by several goodness-of-fit criteria: the chi-square value (χ^2); the Comparative Fit Index (CFI); the Tucker-Lewis Index (TLI); the Root Mean Square Error of Approximation (RMSEA); the Standardized Root Mean Square Residual (SRMR).

Moreover, Cronbach's alphas were calculated for each factor and correlations were performed (on the whole sample) to verify the association between the scale of flow at work applied to sport and other relevant variables expected to be correlated, such as passion for sport and a general measure of flow.

RESULTS

Considering the structure of the original scale of Flow at Work (Bakker, 2008) and of the Italian version of the scale (Zito et al., 2015), EFA was performed through a 3-factor solution with oblimin rotation (Kaiser's normalization) and

ML extraction. EFA shows a 3-factor structure of the scale in line with literature, but on item of ISM (item 11 "I do sport I enjoy it") loaded the factor of SE (Table 1). More specifically, the structure showed three factors: SE (five items, α = .87), ISM (four items, α = .71), and ABS (four items, α = .85). Factor loadings range between |.68| and |.88| for SE, between |.51| and |.94| for ISM, and between |.51| and |.96| for ABS.

Therefore, the 13-item solution with five items for the SE factor, has been tested in the confirmatory factor analysis.

The factor solution absorbs 59% of the total variance: SE explains 34% of the variance, ISM explains 15%, and ABS explains 10%.

Finally, within factors correlations the higher resulted between SE and ABS (r = .42), followed by the correlations between SE and ISM (r = .36), and between ABS and ISM (r = .18), in line with the original version of the scale (Bakker, 2008).

CFA was performed on this factor solution, but fit indices were not completely satisfactory, particularly as for RMSEA and SRMR which resulted too high: χ^2 = 151.960; df = 60; p<.00; CFI = .90; TLI = .87; RMSEA = .10; SRMR = .11. In order to verify the structure of the scale, also the original version of the scale was tested (four items for SE, five items for ISM, four items for ABS) through CFA, but also in this case fit indices were not acceptable with high RMSEA and SRMR, and low CFI and TLI: χ^2 = 199.411; df = 62; p<.00; CFI = .85; TLI = .81; RMSEA = .12; SRMR = .09. Considering the loading score of item 11 in the EFA and the low score of this item in these CFAs, a model without item 11 has been tested. Fit indices were now satisfactory, also adding correlations between items (Figure 1) which are consistent both semantically and theoretically: χ^2 = 85.927; df = 47; p<.001; CFI = .95; TLI = .93; RMSEA = .07; SRMR = .06. Different models were therefore tested (Table 2) and, in line with literature (Bakker, 2008) and the previous Italian version of the scale applied to work (Zito et al., 2015), the best model resulted the 3-factor one which empirically showed its factorial validity.

Deepening the model, all items load only on the intended factors and factors loading range between |.60| and |.87| for ABS, between |.78| and |.90| for SE, and between |.39| and |.56| for ISM (Figure 1).

Correlations between factors are good and, in line with exploratory factor analyses, the model shows a high correlation between SE and ISM, and between SE and ABS.

This factor solution resulted balanced in the number distribution of items and also Cronbach's alphas are good: SE (four items), α = .87, ISM (four items), α = .70, and ABS (four items) α = .82.

As for correlations (Table 3), as expected, these three factors positively correlate with the general flow index, with a higher correlation in particular between general flow and ABS (r = .56) and SE (r = .47). Furthermore, general flow is highly and positively associated with the total flow sport (r = .60), which is highly and positively correlated also with HP (r = .57) and OP (r = .53), in line with literature. Moreover, the three dimensions of flow applied to sport also positively correlate with the two dimensions of passion for sport showing a higher correlation between ABS and OP (r = .49) and a higher correlation between SE and HP (r = .47).

CONCLUSIONS

The aim of this study is to adapt the I-WOLF scale to sport, in order to offer to both organizational and sport psychologists, an instrument useful to detect flow as optimal experience.

EFA shows the original three-factor structure, but one item of the ISM factor loads on the SE factor. Even if this loading does not reflect the original scale, looking at the item statement (item 11 "I do sport I enjoy it") this result seems to be consistent both from a semantic standpoint, and with literature suggesting that enjoyment is a type of intrinsic motivation (Bakker, 2008). Therefore, it was decided to keep this solution which presented, however, the original structure composed by Absorption, Sport Enjoyment and Intrinsic Sport Motivation.

Correlations between factors are interesting: if literature on flow at work suggests that enjoyment and motivation are mostly correlated due to workers' pleasure in doing an activity that motives them (Bakker, 2008), in this step of analysis enjoyment is highly correlated with absorption. This could be related to the absorption that characterize the sport activity which has a gradual build-up (Swann et al., 2017b), during which the athlete explores options and gains confidence and enjoying the activity.

CFA performed first the version with item 11 within the SE factor, but fit indices were not satisfactory. It was decided to verify this analysis using the original version of the scale, but also in this case fit indices were not acceptable. Item 11 was therefore deleted by analyses and the 12-item solution resulted good. Different models were tested, and the 3-factor model respected the original structure of the scale.

Table 1 – Exploratory factor analysis: 13 items, 3-factor solution (ML extraction; Oblimin rotation; Kaiser's normalization), N = 132

Item Number	Items	Factors		
		SE	ISM	ABS
6	Faccio sport con molto piacere	.88	−.16	.05
7	Facendo sport mi sento felice	.82	−.02	.01
5	Fare sport mi fa stare bene	.73	.04	−.01
8	Mentre sto facendo sport mi sento allegro	.70	.15	−.04
11	Faccio sport perché mi piace	.68	.11	.06
13	La mia motivazione deriva dallo sport in sé e non dalla retribuzione	−.14	.94	−.06
9	Farei sport anche se fossi pagato di meno	−.01	.73	.01
12	Quando faccio sport lo faccio per me stesso	.10	.58	.03
10	Penso che vorrei fare sport anche nel mio tempo libero	.24	.51	.11
3	Quando sto facendo sport mi dimentico di tutto quello che mi circonda	−.17	.04	.96
4	Sono totalmente immerso nello sport	.13	−.06	.84
1	Quando faccio sport non penso a nient'altro	−.31	.01	.65
2	Mi faccio coinvolgere dallo sport	.22	.02	.51
Alpha		.87	.71	.85
Mean (item)		6.40	6.07	5.37
Standard Deviation		.73	.99	1.11

Correlation between factors	Factors		
	SE	ISM	ABS
SE	1		
ISM	.36	1	
ABS	.42	.18	1

Legenda. SE = Sport Enjoyment; ISM = Intrinsic Sport Motivation; ABS = Absorption.

Moreover, the scale resulted now more balanced with four items in each factor.

The added correlations between items, are distributed among the three dimensions, the interesting one is between one item of SE and one item of ISM, underlying again the correspondence between these two constructs.

Again, also in this analysis, correlations between factor resulted interesting from empirical and theoretical standpoints. The correlation between SE and ISM and between SE and ABS are quite similar, showing a balance between the relation between enjoyment and motivation as linked to each other (Bakker, 2008; Davis et al., 1992), and the enjoyment which seems to grow during the absorption dynamics (Swann et al., 2017b).

Table 2 – Results of the confirmatory factor analysis: 12-item solution, model comparison (N = 161)

MODEL	X^2	df	p	RMSEA	CFI	TLI	SRMR	Model comparison	ΔX^2	df	p
Model 1: 3-Factor Model	85.927	45	.001	.07	.95	.93	.06				
Model 2: 2-Factor Model ABS+SE, ISM	270.485	53	.000	.16	.73	.67	.12	M2-M1	184.558	8	–.001
Model 3: 2-Factor Model ABS+ISM, SE	228.057	53	.000	.14	.78	.73	.11	M3-M1	142.13	8	.000
Model 4: 2-Factor Model SE+ISM, ABS	201.761	53	.000	.13	.82	.77	.10	M4-M1	115.834	8	.000
Model 5: 1-Factor Model	336.900	54	.000	.18	.65	.58	.12	M5-M1	250.973	8	.000

Legenda. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual;ABS = Absorption; SE = Sport Enjoyment; ISM = Intrinsic Sport Motivation.

As for the correlations to verify the psychometric characteristics of the 12-item scale, this study confirms the validity of the I-WOLFS, since all the dimensions positively correlate with the general flow index. In particular, this index highly correlates with ABS, suggesting that individuals identify in the total concentration a crucial aspect of the flow experience (Bakker, 2008). Moreover, the high correlation between the general flow index and SE, shows the centrality of enjoyment during the flow experience (Zito et al., 2016), in line with literature suggesting enjoyment as reflecting happiness and positive judgments about the quality of the working life (Bakker, 2008), or activity.

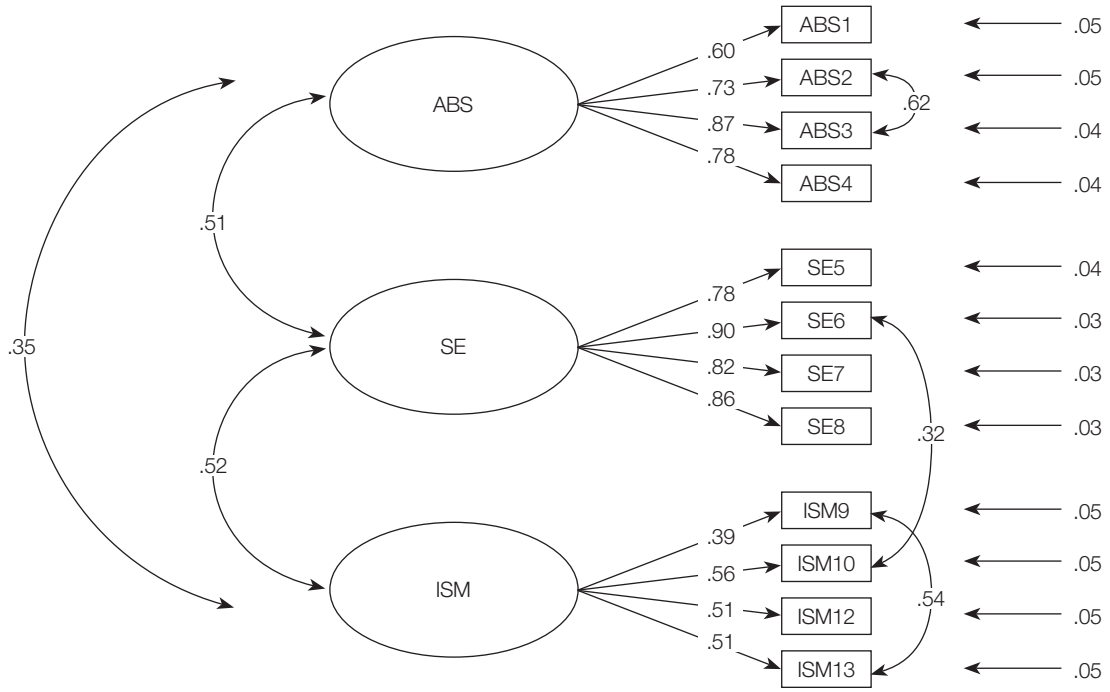
Finally, flow dimensions show positive relationships with OP and HP, in line with literature (Vallerand & Houlfort, 2013; Zito & Colombo, 2017), reinforcing the idea that flow can be associated to a positive passion such as HP, which fosters engagement and well-being (Zito & Colombo, 2017). The positive correlation between flow and OP is supported by literature suggesting that people that find important their activity and are dedicated, are absorbed experimenting flow experiences (Zito & Colombo, 2017). This is also in line with the energizing effect of flow among athletes so that they would continue the activity and feel they cannot wait to do it (Swann et al., 2017b). Being completely immersed in the activity, or being under pressure in doing it, could excessively increase the absorption (Csikszentmihalyi, 1990) and this has to be monitored to verify that athletes are not experiencing under pressure situations straining them or reducing their performance.

A study limitation is the use of a small sample that not involves all the disciplines, but it includes both team and individual sports that is a source for this preliminary adaptation based, however, on a robust and reliable measure. Moreover, this study used a self-report questionnaire and a cross-sectional research design that does not permit the establishment of definitive relations of causality between variables. Another limitation of this study is to not have collected data by using the ESM procedure (Csikszentmihalyi, 1990), a method which measures flow using beeper that daily remind to respondents to answer to a questionnaire. However, considering the impracticability of wearing electronic devices during a performance (Jackman et al., 2017), the retrospectively measurement is the best in this sample.

Findings highlight that the I-WOLFS scale is a reliable measure to detect flow among professional athletes and this measure can be used by almost two main disciplines: work and organizational psychology and sport psychology.

Measuring flow applied to professional activity is beneficial both for performance, and for the individual well-being. The awareness about the flow dynamics and the level of flow experienced, can orient the athlete and the team manager to balance the skills and the requests both in the

Figure 1 – Results of the confirmatory factor analysis – 12-item solution (N = 161)



Note. ABS = Absorption; SE = Sport Enjoyment; ISM = Intrinsic Sport Motivation.

Table 3 – Correlations, Means and Standard Deviations (Pearson's r) (N = 293)

	M	SD	1	2	3	4	5	6	7
1. FLOW SPORT_TOTAL	5.95	.69	(.82)						
2. ABS	5.25	1.13	.79**	(.82)					
3. SE	6.41	.76	.78**	.47**	(.87)				
4. ISM	6.19	.88	.66**	.19**	.37**	(.70)			
5. GENERAL FLOW INDEX	5.25	.81	.60**	.56**	.47**	.30**	(.85)		
6. HP	5.83	.75	.57**	.37**	.47**	.44**	.53**	(.75)	
7. OP	4.82	1.28	.53**	.49**	.39**	.28**	.48**	.47**	(.90)

Note. ** $p<.01$ level. Cronbach's alpha's on the diagonal (between brackets).
Legenda. ABS = Absorption; SE = Sport Enjoyment; ISM = Intrinsic Sport Motivation; HP = Harmonious Passion; OP = Obsessive Passion.

workout and in the competition, to formulate orientation feedback and to set up realistic and clear goals. As at work, in fact, flow requires open goals (Swann et al., 2017a) and goals influence the performance and the subjective experience with consequences on psychological outcomes, such as happiness, satisfaction and well-being (Swann et al., 2017b). Considering

the relevance for these topics, future studies should consider to detect the relationship between the positive experience during sport and other variables related to well-being, that give also the possibility to set up own goals and procedures, such as job crafting (Cenciotti et al., 2016).

For team manager, therefore, results very important to foster flow experiences among athletes, creating athletic preparations and conditions which particularly focuses on the specific individual skills to face the challenge-skill balance, and on shared and definite goals. Working on specific skills, on the development of new abilities can lead to an enhanced motivation and self-esteem which can improve the individual performance. This could be a precious strategy that would enhance also general team performance: the positive emotions and experiences go through a contagion which creates group emotions.

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