

## Why are you passive? Understanding teen's sports intentions by QCA and LM

María Huertas González-Serrano\*, Ferrán Calabuig Moreno\*, Josep Crespo Hervás\*, Vicente Prado-Gascó\*\*

*¿POR QUÉ ERES PASIVO? COMPRENDIENDO LAS INTENCIONES DEPORTIVAS DE LOS ADOLESCENTES MEDIANTE QCA Y LM*

**KEYWORDS:** Physical activity, adolescence, QCA, theory of planned behaviour, athletic identity, physical self-concept.

**ABSTRACT:** Physical inactivity is one of the most critical issues in our society. Several studies have pointed that during adolescence Physical Activity levels decline the most, becoming a critical period in the acquisition of active lifelong habits. This study aims an understanding of the variables that predict the intention of being physically active (IPA) in high school students after completing their education, comparing two different methodologies: Lineal Models (LM) and Comparative Qualitative Analysis (QCA). No research has combined these methodologies before to see the intention of being physically active in high school. 307 adolescents from 14 to 19 years old (Mean=15.64 ±1.12), 55.5% boys, participated in the research. To get the results, a Hierarchical Regression Model with two steps; 1: Attitude toward the Behaviour (ATB), Perceived Behavioural Control (PBC) and Subjective Norm (SN); 2: Athletic Identity (AI) and Physical Self-concept (PSC) and a Fuzzy-set Qualitative Comparative Analysis (fsQCA) were performed. The first step explain 26% of IPA while the addition on step to explains 65% ( $\Delta R^2=.38$ ), AI is the most influential aspect ( $\beta=.74$ ). Considering the fsQCA results, none of the conditions is crucial condition of IPA, although low levels of PBC seem to be the most important condition of not having IPA. Regarding sufficiency, five combinations explain 70% of IPA. The three most important combinations where having high levels of PSC and PBC; high levels of AI and ATB; and high levels PBC and ATB (explaining 45%; 60% and 43% respectively of IPA). In general QCA is more explanatory than LM.

Physical inactivity in teenagers is one of the most critical issues of our society. The data of the Survey of Sporting Habits in Spain (Spanish Ministry of Education, Culture and Sport, 2015) shows that physical activity decrease mainly during and after adolescence. This situation is at least worrying, since different authors point that the schooling years' and mainly the whole stage of adolescence represent a critical period in the development of habits of physical activity, and this is usually transfer to adult life (Borde, Smith, Sutherland, Nathan and Lubans, 2017; Kjønnsen, Anderssen and Wold, 2009).

Thereby, driving people to practice physical activity during their childhood and adolescence can keep people physically active throughout their lives (Arias, Castejón and Yuste, 2013). So that is why one of the most crucial goals of Physical Education is to get students involved in physical activities during their spare time (Thornton et al., 2017).

The Theory of Planned Behavior (TCP) by Azjen (1991) has become in recent years the most widely theory used to understand physical activity in young people (Abraham and Graham-Rowe, 2009; Hagger, Chatzisarantis and Biddle, 2002). Other variables that have been studied and have shown their

91 Correspondence: Josep Crespo Hervás. Department of Physical Education and Sports. University of Valencia email: josep.crespo@uv.es  
 \* Department of Physical Education and Sports. University of Valencia  
 \*\* Department of Social Psychology. University of Valencia  
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positive relationship with the physical activity practise are self-concept (Cumming et al., 2011; Simmons and Childer, 2013) and self-identity (Erdvik, Overby and Haugen, 2014; Rhodes, Kaushal and Quinlan, 2016).

Therefore, the aim of the study is to analyse the impact of the variables from the Theory of Planned Behaviour (TPB), Physical Self-concept and Athletic Self-identity on high school students and their intentions of being physically active after completing their education considering through two different methodologies.

## Method

### Participants

High schools students ( $N=307$ ) from a high school of Valencia ( $N_{total} = 337$ ) have participated in the research, aged between 14 to 19 years old, with an average age of 15.64 ( $\pm 1.12$ ). 55.5% were boys (170) and 44.5% were girls (137). The criterion to select the sample was students who were able to complete their education soon, so 3<sup>th</sup> and 4<sup>th</sup> secondary school' students, and 1<sup>st</sup> and 2<sup>nd</sup> high school diploma' students participated in the research.

### Instruments

*Intention to be Physically Active (IPA)*: Moreno, Moreno and Cervelló (2007), this scale is composed with five items showing good reliability ( $\alpha = .81$ ).

*Physical abbreviated self-concept questionnaire (CAF-A)*: From Rodríguez-Fernández, Axpe and Goñi (2015). The scale consists of eight items grouped in four factors that present adequate psychometric properties ( $\alpha = .71$  for the Sport's Competence,  $\alpha = .89$  Strength,  $\alpha = .87$  for the Physical Condition and  $\alpha = .81$  for the Body Attractiveness. The whole scale  $\alpha = .80$ ).

*Questionnaire on the Theory of Planned Behavior (TPB)*: Tirado, Neipp, Quiles, and Rodríguez-Marín (2012). The questionnaire is composed of 17 items grouped in three factors. The values obtained for reliability were  $\alpha = .85$  for the control of perceived behaviour,  $\alpha = .86$  for attitude toward the behaviour and  $\alpha = .76$  for the Subjective Norm.

*Scale of Identification with Physical Exercise (EIS-E)* of Modrona, Guillén and González (2010). The scale is composed of nine items to measure the identification of students with the role of physical activity practitioners showing good reliability indexes ( $\alpha = .96$ ).

### Procedure

The above-mentioned questionnaires were done collectively during usual class lessons, approximately 30 minutes from March to May of 2016. Three people who were previously trained, participated in data collection. The effect of item's order in the questionnaires was controlled. The necessary consents from schools and parents were obtained.

### Data analysis

The predictive capacity of the variables of the study on the Intention of being Physically Active (IPA) was evaluated by two different statistical techniques, a Hierarchical Regression Model using SPSS v.23 and a *Fuzzy-set Qualitative Comparative Analysis (fsQCA)* by means of fsQCA 2.0.

To make fsQCA, raw data responses are transformed into fuzzy-set responses. Firstly, all missing data were deleted from, and all variables were calculated by multiplying their item scores. Before performing, the analysis values must be recalibrated between 0 and 1. To make the recalibration with more than two values we need to consider three thresholds, the first one (0) considers that an observation with this value is fully out-side the set (low agreement); the second one (0.5) considers a median point, neither inside nor outside the set (intermediate level of agreement), finally the last value (1) considers the observation to be fully in the set (high level of agreement) This process was the direct method of calibration proposed by the author of the methodology (Ragin, 2008), and it is the most used on literature. Literature suggests that with continuous variables or with factors, the three thresholds must be percentile 10, 50 and 90 (Woodside, 2013). Finally, necessary and sufficient conditions tests evaluate the effect of the different variables on the IPA and on the absence of IPA.

## Results

First of all, the main descriptive and calibrated values for the variables studied were presented (see Table 1).

*Hierarchical Regression Model*. Secondly, we proceeded to analyse the predictive power of the variables on the IPA by means of a hierarchical regression. In the model ( $R^2_{adjusted} = .65$ ), two differential steps were established, first the Theory of Planned Behaviour variables (ATB, NS and PBC) ( $\Delta R^2 = .26$ ,  $p < .000$ ; D-W= 1.82) were included; then in the second step athletic identity (AI) and physical self-concept (PSC) were included ( $\Delta R^2 = .38$ ,  $p < .000$ ; D-W= 1.91). In general, it seems

that the variables included into the second step have greater predictive capacity than the rest. Specifically in the prediction of the IPA when considering all the variables, it seems that only AI ( $\beta = .74$ ;  $p < .000$ ; FIV = 2.03) and PSC ( $\beta = .11$ ;  $p = .01$ ; FIV = 1.35) predicts IPA. While NS ( $\beta = -.01$ ;  $p = .78$ ; FIV = 1.88), PBC ( $\beta = .01$ ;  $p = .89$ ; FIV = 1.38), ATB ( $\beta = .01$ ;  $p = .80$ ; FIV = 1.21) do not predict IPA.

*Fuzzy-set qualitative comparative analysis.* We start testing whether any of the causal conditions can be considered a necessary condition for the high IPA and for the low IPA. Based on the results obtained (see Table 2) it seems that none of the conditions is crucial for IPA to occur. Since all the consistency values of the conditions are less than .90 (Ragin, 2008).

Later, in relation to sufficient conditions, the combination of conditions that lead to high levels of IPA (Table 3) was calculated. Regarding sufficient conditions, all variables are present for the high level of IPA. The frequency cutoff in the truth table is set on 1 and the consistency cutoff on 0.875937. The intermediate solution indicates five combinations of causal conditions that can produce high level of IPA (see Table 3). These combinations explain 70% of high levels of IPA (solution coverage: 0.696866; solution consistency: 0.838610) and seem to be adequate (consistency  $> .75$ ).

The three most important combinations where having high levels of PSC and PBC; high levels of AI and ATB; PBC and ATB (explaining 45%; 60% and 43% respectively of the intention to be physically active). In general QCA is more explanatory than LM.

## Discussion

It is important for Physical Education teachers to know the variables that predict Intentions to be Physically Active after finishing High School. In this sense, they will be able to reach one of their main aims, to promote the long-time Physical Activity practice. In this study we tried to fill this gap firstly adding new variables to the Theory of Planned Behaviour and then considering two different methodologies: Hierarchical Linear Regressions and fsQCA models.

Considering the Hierarchical Regressions, the different variables explain 65% of variance of Intentions to be Physically Active after completing Secondary Education. The Athletic Identity and the Physical Self-concept are more explanatory variables than the Theory of Planned Behaviour variables for the

Intention to be Physically Active. Specially, the Athletic Identity is the most important variable to predict the intention to be Physically Active. These results follow previous literature as De Bruijn and Van den Putte, (2012) and Hamilton and White (2008). However, the linear hierarchical regressions don't take into account the interaction or combination between variables.

The fsQCA models have the possibility to take this into account. The results of this model suggested that there is not any necessary condition to have high level of Intentions to be Physically Active neither to have low levels, after completing compulsory school. On the other hand, considering the sufficient analysis there are five combinations of conditions that explains 70% of high levels of Intentions to be Physically Active. The three most important are having high level of Perceived Self-Concept and Perceived Behaviour Control; having high level of Athletic Identity and Attitude Toward Behaviour; and having high level of Perceived Behaviour Control and Attitude Toward Behaviour.

The Perceived Behaviour Control is the condition that takes part on these three solutions, and the combination with Athletic Identity is the most explanatory (60% of high levels of Intentions to be Physically Active after finishing secondary school). On overall, it seems that fsQCA explained a larger variance of Intention to be Physically Active than the linear hierarchical regressions models.

Therefore Physical Education teachers should work to make their students feel prepared to do regular physical activity in their spare time (Perceived Behaviour Control). Moreover, they should promote on them to feel as an active person considering physical activity as an essential part of them (Athletic Identity). In this way, we could decrease the inactivity physical levels of the population by engaging people to the lifelong physical activity in one of the most important stage for it, the adolescence. Finally, we found a limitation in this study, which is the scarce sample of high school students from only one high school of one Spanish region, so these results are not generalizable for the entire population. For this reason, future researches should be done with a largest population of adolescents to go in depth with these results, using these two comparative methodologies in order to get a better understand and to be able to generalized the results.

	IPA	ATB	NS	PBC	AI	PSC
Mean	1689.19	6971.42	265.48	447.85	1551.27	3119.73
SD	1132.50	5338.74	214.75	215.71	1181.01	3908.57
Minimum	3	12	1	1	1	2
Maximum	3125	15625	625	625	3125	15625
<i>Calibration values</i>						
Percentile 10	144	1101	24	81	28	83
Percentile 50	1875	4800	212	525	1500	1296
Percentile 90	3125	15625	625	625	3125	10000

*Note:* intention to be physically active (IPA); attitude toward the behaviour (ATB), perceived behavioural control (PBC) and subjective norm (SN); athletic identity (AI); physical self-concept (PSC).

Table 1. Descriptive and calibration values

	IPA		~IPA	
	Consistency	Coverage	Consistency	Coverage
ATB	.68	.70	.54	.51
~ATB	.53	.55	.69	.66
NS	.70	.68	.56	.51
~NS	.49	.55	.65	.67
PBC	.53	.80	.29	.40
~PBC	.61	.48	.86	.63
AI	.77	.80	.42	.40
~AI	.42	.44	.79	.76
PSC	.76	.72	.53	.47
~PSC	.45	.50	.69	.73

Table 2. Necessary conditions of IPA

Frequency cut off: 1; consistency cut off: 0.800523; All variables are present	Raw coverage	Unique coverage	Consistency
PSC*PBC	.45	.04	.89
AI*ATB	.60	.19	.88
PBC*ATB	.43	.00	.91
AI*PBC*~NS	.21	.00	.94
~AI*PBC*NS	.16	.00	.81

*note:* intention to be physically active (IPA); attitude toward the behaviour (ATB), perceived behavioural control (PBC) and subjective norm (SN); athletic identity (AI); physical self-concept (PSC). Solution coverage: 0.696866; Solution consistency: 0.838610

Table 3. Intermediate solution of sufficiency analysis

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**PALABRAS CLAVE:** Actividad física, adolescencia, educación secundaria, teoría del comportamiento planificado, identidad atlética, auto-concepto físico.

**RESUMEN:** La inactividad física es uno de los temas más críticos en nuestra sociedad. Diferentes estudios han señalado que durante la adolescencia los niveles de Actividad Física disminuyen, convirtiéndose en un período crítico en la adquisición de hábitos activos que perduren a lo largo de toda la vida. Es por ello que este estudio tiene como objetivo comprender las variables que predicen la intención de ser físicamente activo (IFA) en estudiantes de secundaria después de completar su educación, comparando dos metodologías diferentes: Modelos Lineales (ML) y Análisis Cualitativo Comparativo (ACC). Ninguna investigación ha combinado anteriormente estas metodologías para conocer la intención de ser físicamente activo en la escuela secundaria. 307 adolescentes de 14 a 19 años ( $\square = 15,64$

$\pm 1,12$ ), 55,5% varones, participaron en la investigación. Para obtener los resultados, se realizó un Modelo de Regresión Jerárquica con dos pasos 1: Actitud hacia el Comportamiento (AHC), Control del Comportamiento Percibido (CCC) y Norma Subjetiva (NS); 2: Se añadió la identidad atlética (IA) y el autoconcepto físico (AF), y un análisis comparativo cualitativo de Fuzzy-set (fsQCA). El primer paso explica el 26% de IFA mientras que la adición en el siguiente paso explica el 65% ( $\Delta R^2 = .38$ ), siendo IA el aspecto más influyente ( $\beta = .74$ ). Considerando los resultados de la fsQCA, ninguna de las condiciones es condición necesaria de las IFA, aunque los niveles bajos de CCC parecen ser la condición más importante de no tener IFA. En cuanto a la suficiencia, cinco combinaciones explican el 70% de las IFA. Las tres combinaciones más importantes donde tienen altos niveles de AF y CCC; altos niveles de IA y AHC; CCC y AHC (explicando un 45%, 60% y 43%, respectivamente, de IPA). En general, el ACC es más explicativo que el ML.

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