



Are achievement goals different among morning and evening-type adolescents?



Cristina Escribano *, Juan Francisco Díaz-Morales

Departamento de Psicología Diferencial y del Trabajo, Facultad de Psicología, Universidad Complutense de Madrid, Campus de Somosaguas, s/n, 28223 Madrid, Spain

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ABSTRACT

The interest in the extent to which time-of-day preferences affect school performance is increasing. Apart from biological factors, Morning and Evening types differ in their lifestyle and personality traits which may have implications into diverse areas such as their motivation to learn. Taking into account available data, the aim of the present study was to investigate achievement goals which Morning-, Neither- and Evening-type adolescents accomplish at school. Participants were 342 students aged 12 to 15 (53.5% girls). Morning-types showed higher Learning and Performance Goals than Evening-types, and these goals were positively related to self-reported academic performance. Achievement goals were more associated to self-reported grades in Evening-types than in Neither- and Morning-types. It seems that encouraging pupils to achieve good results in order to advance in their studies may improve school performance, especially among Evening-types.

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1. Introduction

In recent years, the interest in the influence of individual time-of-day preferences on academic performance has been increased (Horzum, Önder, & Beşoluk, 2014; Tonetti, Natale & Randler, 2015). Morning-types (M-types) or “larks” prefer to wake up and go to bed early and feel at their best moment during the morning (mental, physical, and social activities) whereas Evening-types (E-types) or “owls” have difficulty in waking up early as they prefer later bedtimes and rise times, become progressively more alert throughout the day and feel at their best moment at the end of the day. Neither-types (N-types) show an intermediate position and represent the majority of the population. Morningness/eveningness is usually assessed by self-reported measures (Adan et al., 2012; Díaz-Morales, 2015; Tonetti, Adan, Di Milia, Randler & Natale, 2015).

A change toward eveningness appears during puberty, consequence of both the maturation processes typical of puberty (Hagenauer, Perryman, Lee, & Carskadon, 2009), and the many changes in the adolescent's life such as school demands, new social relationships, and family atmosphere (Crowley et al., 2014; Díaz-Morales & Escribano 2014; Díaz-Morales, Escribano, Jankowski, Vollmer, & Randler, 2014).

Students are usually taught and tested during the morning school day despite the shift toward eveningness during adolescence. For this reason, morning school schedules seem to be an advantage for M-types, who tend to obtain higher grades and better attention levels (Escribano & Díaz-Morales, 2014a; Vollmer, Pötsch, & Randler, 2013).

Morningness/eveningness has also been related to personality traits (Adan et al., 2012). Previous studies indicated that conscientiousness was positively related with morningness followed by agreeableness. Openness to experience, extraversion and neuroticism were negatively associated (see Tsaousis, 2010). Furthermore, E-types showed a more pronounced intolerance for repetitive experiences and routine tasks (Muro, Gomà-i-Freixanet, & Adan, 2012), and lower persistence scores (Randler & Saliger, 2011), characteristics that, a priori, are relevant to an adequate performance at school. In addition, the study of the relationship between learning–thinking styles and chronotype has demonstrated that M- and E-types differ in cerebral hemisphere preference and E-types were described as right-thinkers (i.e. right-hemisphere preference) who were creative, intuitive, affective, and inclined to cultural individualism, and M-types as left-thinkers (i.e. left-hemisphere preference) who preferred verbal and analytic strategies in processing information, and cultural collectivism (Díaz-Morales, 2007; Fabbri, Antonietti, Giorgetti, Tonetti, & Natale, 2007). Hemisphere preference has been related to academic performance being M-types and left-thinkers the group who reported the highest subjective level of achievement and E-types and right-thinkers the group who reported the lowest level (Díaz-Morales & Escribano, 2013). Several researchers have reported that E-types obtain worse school performance (e.g. Beşoluk, Önder, & Deveci, 2011; Escribano, Díaz-Morales, Delgado, & Collado, 2012; Preckel et al., 2013; Randler & Frech, 2009) even though they tend to achieve higher scores on intelligence tests (Díaz-Morales & Escribano, 2015; Kanazawa & Perina, 2009; Roberts & Kyllonen, 1999).

Apart from the time at which they attend classes (Beşoluk, 2011; Beşoluk et al., 2011; Vollmer et al., 2013), thinking styles (Díaz-Morales & Escribano, 2013) or sleep patterns (Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010; Fallone, Acebo, Seifer, & Carskadon, 2005),

* Corresponding author.

E-mail addresses: escribano@psi.ucm.es (C. Escribano), juanfcodiaz@psi.ucm.es (J.F. Díaz-Morales).

another factor that may contribute to explain why E-types report lower academic performance may be the role of motivation and achievement goals (Arbabi, Vollmer, Dörfler, & Randler, 2015). Achievement goal theory supports the existence of purposes that guide students to engage with their school work in order to increase their own competence (*Learning Goals*) or not appear incompetent in front of others and/or oneself (*Performance Goals*) (Dweck, 1986; Inglés et al., 2009). Motivation and achievement goals contribute to explain learning and academic achievement (Steinmayr & Spinath, 2009) even in early adolescents after controlling for important predictors of achievement (Arbabi et al., 2015). Morningness is associated to less sleepiness, which in turn is associated to higher motivation to learn whereas eveningness seems to be associated to dysfunctional attitudes toward work. Insufficient motivation may promote learning difficulties and lower school performance (Roeser, Schlarb, & Kübler, 2013). According to Short, Gradisar, Lack, and Wright (2013) adolescents who reported poor sleep quality, reduced alertness and more evening orientation were more likely to report worse grades through the association with depressed mood. Moreover, E-types exhibited the lowest mood levels throughout the school day (Díaz-Morales, Escribano, & Jankowski, 2015).

Taking into account available data about lifestyle, personality traits, thinking styles, sleep patterns and school schedule, the aim of the present study was to investigate achievement goals which are accomplished in school and the way in which they are associated to self-reported grades considering chronotype in order to test the way in which achievement goals have an influence on school performance in different chronotypes. In this study, the association between achievement goals and academic performance will be tested per chronotype in order to avoid masking individual effects related to circadian preferences. As it is known, it was hypothesised that Learning and Performance Goals would be positively related to self-reported grades whereas Social Reinforcement Goals would be negatively related. Moreover, M-types would show higher Learning and Performance Goals oriented to learn and advance in their studies, whereas E-types would show more Social Reinforcement Goals referred to the interest in avoiding rejection from others since they would be less motivated to learn trying to increase their own competence.

2. Method

2.1. Participants

Participants in this study were 342 students aged 12–15 ($M = 13.23$, $SD = 0.95$) attending three high-schools of Madrid (Spain). 53.5% were girls. The board of directors authorized the study after obtaining the parents' consent. Participation was voluntary and anonymous.

2.2. Instruments

2.2.1. Morningness–eveningness

The *Morningness–Eveningness Scale for Children* (MESC, Carskadon, Vieira, & Acebo, 1993) has 10 items about the preferred timing of certain activities such as free time, tests, sleep timing, and so forth. Items have a response scale with four or five options and the total score ranges from 10 (eveningness) to 43 (morningness). Spanish version was used (Díaz-Morales, 2015) which showed a satisfactory internal consistency for the present sample (Cronbach's alpha) was $\alpha = 0.73$.

2.2.2. Achievement goals

2.2.2.1. Achievement Goal Tendencies Questionnaire (AGTQ, Hayamizu & Weiner, 1991). The AGTQ is a self-report measure which consists of 20 items to measure three academic goal tendencies: Learning Goals, Social Reinforcement Goals, and Performance Goals. Students rated each item on a 5-point Likert scale (1 = never; 5 = always).

Learning Goals scale consists of 8 items related to student interest in acquiring new knowledge and increasing their competence (e.g. "I study because I like knowing new things"). Social Reinforcement Goals scale consists of 6 items related to the interest of the students in obtaining approval and avoiding rejection from others (e.g. "I study because I don't want to be disliked by the teacher"). Performance Goals scale consists of 6 items which assess the interest in studying in order to achieve good results and advance in their studies (e.g. "I study because I want to get good grades"). AGTQ was initially created by Hayamizu, Ito, and Yoshizaki (1989) and designed to measure achievement goal tendencies in Japanese high school students. Later, a revised American version was developed by Hayamizu and Weiner (1991). In this study, the Spanish version was used (see Inglés et al., 2009). Reliability (Cronbach's alpha) for the present sample was: Learning Goals = 0.81, Social Reinforcement Goals = 0.77, and Performance Goals = 0.77.

2.2.3. School performance

Self-reported grades: students reported last year grades in common subjects for all grades of Compulsory Secondary Education (Spanish language, mathematics, English language and social sciences) and the mean of grades was calculated (GPA). Several studies have also used this method (see Wolfson & Carskadon, 2003). The Spanish grading system is coded from 0 (the worst) to 10 (the best), for this, the same scale (0 to 10) was used to self-reported grades.

2.3. Procedure and data analysis

All participants were tested in groups ranging in size from 20 to 25 students in school schedule and in their own classroom. Assessment took about 40 min.

Multivariate Analysis of Variance (MANOVA) was run in order to test age and sex differences in all variables and *Partial correlations* (age as covariate) to test the relationship among all variables. *MANCOVA* (controlling for age) was run to test differences in achievement goals according to chronotype (M-, N- and E-types). Finally, multiple regression analysis was run to detect the contribution of age, sex and achievement goals (Learning, Social Reinforcement and Performance Goals) to self-reported grades separately for each chronotype. Effect size was calculated using the following procedure [$f^2 = R^2 / (1 - R^2)$] (Cohen, 1992).

3. Results

3.1. Preliminary analysis: age and sex differences

Regarding age, MANOVA indicated differences in morningness/eveningness, $F(3,334) = 4.16$, $p < .01$, $\eta^2_p = .036$; self-reported grades, $F(3,334) = 20.53$, $p < .001$, $\eta^2_p = 0.156$; Learning Goals, $F(3,334) = 2.59$, $p < .05$, $\eta^2_p = 0.23$, and Performance Goals, $F(3,334) = 5.41$, $p < .001$, $\eta^2_p = 0.046$. Post-hoc comparisons indicated that pupils aged 15 showed the lowest Learning and Performance Goals, and reported lower morningness than pupils aged 12 or 13; self-reported grades decreased progressively with age. With respect to sex, girls reported higher grades than boys, $F(1,334) = 5.47$, $p < .05$, $\eta^2_p = 0.016$, whereas boys showed higher Social Reinforcement Goals than girls, $F(1,334) = 4.87$, $p < .05$, $\eta^2_p = 0.014$. No effects of sex * chronotype interaction were found (see Table 1).

3.2. Relationship among variables

Given that correlations separated by sex were similar, only data for total sample are reported. Since age effects were found in preliminary analyses, age was controlled as a covariate. Morningness was positively related to self-reported grades ($r = .11$, $p < .05$), Learning Goals ($r = .36$, $p < .001$), and Performance Goals ($r = .23$, $p < .001$); self-reported grades were positively related to Learning Goals ($r = .22$, $p < .001$),

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