Intervention based on Temporal Orientation to reduce alcohol consumption and enhance risk perception in adolescence
Intervención basada en la orientación temporal. Consumo de alcohol y percepción del riesgo en adolescentes

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Abstract

Alcohol consumption is a prevalent risky behaviour in adolescence. A way of prevention is to obtain information about the cognitive components involved, such as Temporal Perspective (TP), which refers to the tendency to be oriented towards the past, the present or the future. The aim of this study was to analyze the relationship between TP, risk perception and alcohol consumption (Study 1) and to determine whether an intervention programme based on emphasizing a Future orientation can reduce alcohol consumption and increase risk perception (Study 2). Seventy-five adolescents participated in the study. Results showed that a bias toward the Present can enhance the probability of incurring in risk behaviours, while a Future orientation might act as a protective factor. Half of the adolescents took part in the intervention programme, and their risk perception increased, suggesting that TP can be a tool to minimize the probability of incurring in risk behaviours.

Keywords: **Time Perspective; Alcohol Consumption; Adolescence; Risk Perception**

Resumen

Consumir alcohol es una conducta de riesgo frecuente en adolescentes. Una forma de prevención es obtener información sobre los componentes cognitivos involucrados, como la Perspectiva Temporal (PT), referida a la tendencia a orientarse hacia el pasado, el presente o el futuro. El objetivo del estudio fue analizar la relación entre PT, percepción de riesgo y consumo de alcohol (Estudio 1) y determinar si un programa de intervención basado en enfatizar una orientación Futura reduciría el consumo de alcohol y aumentaría la percepción de riesgo (Estudio 2). Setenta y cinco adolescentes participaron en el estudio. Los resultados mostraron que un sesgo hacia el presente aumentaría la probabilidad de incurrir en conductas de riesgo y una orientación futura actuaría como factor protector. La mitad de los adolescentes participó en la intervención y su percepción de riesgo aumentó, sugiriendo que la PT podría minimizar la probabilidad de incurrir en conductas de riesgo.

*Palabras clave: **Perspectiva temporal**; **Consumo de alcohol**; **Adolescencia**; **Percepción del riesgo***

Introduction

Adolescence is a critical period in which some teenagers may incur in actions that can be a risk for their health (Spear, 2000), which depends on multiple factors such as personality, family environment, or socioeconomic status. For instance, alcohol consumption raises the probability of engaging in sexual risk behaviours such as unprotected sex, which can lead to sexually transmitted diseases or unwanted pregnancy (Bonomo et al., 2001; Castilla, Barrio, Belza, & de la Fuente, 1999; Johnson & Stahl, 2004; Palen, Smith, Caldwell, Flisher, & Mpofu, 2006; Takakura, Wake, & Kobayashi, 2010). Alcohol consumption is also related with reckless driving (Asbridge, Poulin, & Donato, 2005) and can be seen as a first step toward consuming other substances. Besides the influence of alcohol on risk behaviour, its consumption has also been shown to have negative consequences in brain development in adolescents (Hiller-Sturmhöfel & Swartzwelder, 2004, see Squeglia, Jacobus, and Tapert, 2014, for a review).

Prevalence of drug consumption in Spain has reached very high rates, and alcohol is one of the most prevalent. The last survey about drugs conducted in students between 14 and 18 years old (ESTUDES, 2016/2017) shows that 75.6% of the participants have consumed alcohol in the last 12 months and that 67% admit having been drunk in the last 30 days. These data are consistent with prevalence in other European Union members (Melchior, Chastang, Goldberg, & Fombone, 2008). The comparison of these figures with those obtained in earlier surveys shows an increase in alcohol consumption among adolescents. This fact indicates that most prevention campaigns perhaps are not having enough impact in reducing such behaviour in adolescent population, or more specifically, that they do not target the relevant factors that could potentially impact on adolescents' behaviour. Thus, it is of interest to conduct research on the underlying aspects of decision making related to risk behaviours in order to understand why some adolescents engage in them while others do not. As Martin Fishbein and Marco Yzer (2003) suggest, it is necessary to further develop our knowledge on that topic as the success of prevention partly relies on the theoretical background.

In this sense, several theories have been developed in order to explain why some adolescents incur in risk behaviours. These theories focus on risk perception (Slovic, 2000), on delay gratification (Daugherty & Brase, 2010) or on neurocognitive aspects (Spear, 2000). Temporality is a common element for explaining the participation in risk behaviour: Some of the reasons why adolescents engage in such activities are obtaining immediate benefits —Present—, and the fact that the negative consequences take place in the long term —Future— (Gough, Fry, Grogan, & Conner, 2009; Slovic, 2000). On the other hand, healthy behaviours are characterized by an immediate effort for the sake of a possible future gain (Crockett, Weinman, Hankins, & Marteau, 2009), and imply a predisposition toward the future that is necessary in order to engage in such activities and also to delay gratification (Daugherty & Brase, 2010). But what makes an individual more prone to emphasize long over short-term benefits?

The present study aims to address whether Temporal Perspective (TP), an individual differences variable related to an individual's temporal framework, underlies the predisposition to consider short or long-term benefits and negative consequences. TP is defined as a cognitive tendency of individuals to be oriented toward the past, the present or the future (Zimbardo & Boyd, 1999) and also refers to the temporal content of the cognitive structures that characterizes how individuals project, access, organize, and value what happens to and around them. It is a multidimensional construct that includes aspects such as extension, density, content, accessibility and valence. Valence is the affective evaluation that an individual makes about the different temporal *loci* (past, present, and future). For instance, past can be considered as a nice time period, full of good memories but it can also be judged as a period full of negatively evaluated experiences.

When the aim is to address which temporal dimension along with its affective valence has a higher predisposition in an individual, we refer to Temporal Orientation (TO) which is a more restricted concept than TP. One of the most widely used instruments to measure TO is the Philip Zimbardo and John Boyd's (1999) *Zimbardo Time Perspective Inventory* -ZTPI-. This instrument has been adapted to several

languages such as French (Apostolidis & Fieulaine, 2004), Italian (D'Alessio, Guarino, de Pascalis, & Zimbardo, 2003), and Spanish (Díaz-Morales, 2006), among others. The test has been used in many researches due to the fact that is the first instrument to measure TO with acceptable psychometric properties and that allows measuring the three temporal dimensions at the same time. ZTPI allows obtaining 5 factors: Past-Negative, Present-Hedonistic, Future, Past-Positive, and Present-Fatalistic which are theoretically independent, although they have been shown to be related. Each factor offers different information and they are related to other psychological constructs such as personality (Muro et al., 2015).

Studies that have used ZTPI have focused on determining to which extent each factor is related to different variables (see Zimbardo & Boyd, 1999, for a review). More specifically, the studies conducted on the relationships between ZTPI and risky and healthy behaviours have found consistent correlations. Results suggest that a Present TO is related with engaging in more risk behaviours while a Future TO correlates with performing less risky activities, thus acting as a protective factor (Martinez & Robles, 2001). For example, it has been shown that future-oriented individuals perform less risky driving actions (Zimbardo, Keough, & Boyd, 1997), consume less alcohol, tobacco and other drugs (Apostolidis, Fieulaine, Simonin, & Rolland, 2006; Henson, Carey, Carey, & Maisto, 2006; Keough, Zimbardo, & Boyd, 1999), have more positive attitudes towards condoms use (Agnew & Loving, 1998; Burns, & Dilon, 2005), and they perform more physical activity (Hall & Fong, 2003) than those oriented to the present. A study by Jane Beenstock, Jean Adams, and Martin White (2011) also showed a positive correlation between Future and hazardous alcohol consumption using the Consideration of Future Consequences Scale (CFCS), which is a different instrument that also measures TP (Strathman, Gleicher, Boninger, & Edward, 1994).

Moreover, TO has been broadly related with personality characteristics that make an individual more prone to engage in risky activities, such as sensation seeking (Keough et al., 1999; Muro et al., 2015; Zimbardo & Boyd, 1999), and also risk perception (Apostolidis et

al., 2006), a variable that is associated with risk acceptance (Slovic, 2000). In sum, the relationship between TO and risk behaviours has been widely confirmed.

One of the limitations of the studies that have used ZTPI in order to explore risk behaviours is that they are correlational in nature: A relationship can be observed but they fail to determine whether the manipulation of TO could be useful to prevent risk behaviours. Therefore, studies are needed in which TO is manipulated in order to determine to what extent it affects risk perception and the engagement in such activities. To our knowledge, only one study has designed an intervention based on TO modification with the aim of promoting a healthy behaviour — physical activity— (Hall & Fong, 2003). Their results showed that Future TO training led to an increase in physical activity and its maintenance for a longer period of time compared to a non-trained group of participants, which confirms the capacity of TO modification to promote healthy behaviours. But how about risk behaviours? Could TO have an impact on such activities as well? The aim of the present study is to determine whether there is a correlation between TO and alcohol consumption and risk perception (Study 1), and if this correlation is confirmed, the effects of Future TO training on the prevention of this risk behaviour will be explored (Study 2). By measuring the effect of a brief intervention on risk perception and alcohol consumption we expect to obtain causal knowledge about the potential of Future TO for preventing behaviours that affect health negatively.

Study 1

The aim of the first study was to replicate previous research that has consistently shown that there is a significant positive correlation between Present-Hedonistic and risky behaviours and a negative correlation between such activities and Future scores, but focusing only in alcohol consumption and the risks associated with it.

Methods

Participants

The initial sample consisted of 101 students from a semi-private school located in Saba-

dell, a city that belongs to Barcelona province in Catalonia, of which 26 were excluded because they did not complete the questionnaires. The final sample consisted of 75 students, 32.7% female and 41.6% male, ranging from 15 to 17 years (M=15.52, SD=0.63). The inclusion criteria were age and type of school (semi-private, thus, socioeconomic status was demarcated), and the schools were randomly selected from several schools of the province of Barcelona. The students participated voluntarily and anonymously during school hours and did not receive any credit or economic reward for their collaboration. The head teachers gave consent to participate in the study, and they informed the parents of the main objectives, and of the specific dates and times the study was going to be developed, so that they could choose whether their sons/daughters would attend or not.

Instruments

Two questionnaires were administered, the *Zimbardo Time Perspective Inventory* (ZTPI; Zimbardo & Boyd, 1999) in its Spanish version, and a questionnaire specifically created for the purposes of the research.

1. The Spanish version of the ZTPI (Díaz-Morales, 2006) was administered to assess TO. This version contains 56 items which are assessed on a 5-point scale ranging from 1 (very uncharacteristic) to 5 (very characteristic). The ZTPI consists of five factors: Past-Negative, Present-Hedonistic, Future, Past-Positive and Present-Fatalistic. 1) The *Past-Negative* scale (10 items): reflects a generally negative, aversive view of the past (i.e.: "Painful past experiences keep being replayed in my mind", "I've made mistakes in the past that I could undo") *Cronbach's alpha* is .80 and the corrected item-scale correlation coefficient ranges from .28 to .62. 2) The *Present-Hedonistic* scale (15 items) reflects a hedonistic, enjoyment and pleasure centered risk-taking attitude toward time and life (i.e. "I take risks to put excitement in my life", "I make decisions on the spur of the moment"). *Cronbach's alpha* is .79 and the corrected item-scale correlation coefficient ranges from .30 to .58. 3) The *Future* scale (13 items) reflects a general orientation toward the achievement of future goals and is characterized by planning and organizing (i.e. "I am able to resist temptations when I know that there is work to be done", "I believe that a person's day should be planned ahead each morning"). *Cronbach's alpha* is .70 and the corrected item-scale correlation coefficient ranges from .32 to .51. 4) The *Past-Positive* scale (9 items) reflects a warm, sentimental attitude toward the past (i.e. "It gives me pleasure to think about my past", "Happy memories of good times spring readily to mind"). *Cronbach's alpha* is .70 and the corrected item-scale correlation coefficient ranges from .22 to .50. 5) The *Present-Fatalistic* scale (9 items) measures a helpless and hopeless attitude toward the future and life, and a sense that the future is predestined and not influenced by present individual actions (i.e. "My life path is controlled by forces I cannot influence", "Since whatever will be will be, it doesn't really matter what I do"). *Cronbach's alpha* is .64 and the corrected item-scale correlation coefficient ranges from .22 to .48.

2. The *ad-hoc* created questionnaire consisted of 18 questions and allowed to obtain information about participants' attitudes and risk perception associated with alcohol consumption. This questionnaire was created by the researchers focusing on the specific purposes of the present study. Although it was an *ad-hoc* questionnaire which has not been validated before, it was evaluated by 2 external judges from the Faculty of Psychology and most of the questions were adapted from the Alcohol Expectancy Questionnaire-Adolescent, Brief - AEQ-AB- (Stein et al., 2006). The questions were assessed on a 3-point Likert scale ranging from 0 to 3, and each answer was associated with one of these scores but they were randomly presented with the aim of avoiding a response tendency. The questionnaire had two blocks: 1) Attitudes toward alcohol: questions 2 to 8 assessed present consumption, age of consumption onset, frequency, quantity and type of alcoholic beverages. This block corresponded to the alcohol consumption variable. The total score was 21, for each question, 0 indicated no consumption and 3 high consumption level 2) Risks associated with alcohol: questions 9 to 14, assessed subjective risk perception related with alcohol consumption. The total score was 15, but in this case, for each question 0 indicated higher risk perception and 3, lower risk perception.

Design and Procedure

The design of the study was correlational. The criterion variables were alcohol consumption and risk perception measured by the *ad-hoc* questionnaire, and the predictor variable was TO. Age was controlled for, and so was socio-economic level by selecting only a semi-private school, as previous research has shown that this variable can also affect TO (Andrettaa, Worrell, Mello, Dixson, & Baik, 2012). The two questionnaires were administered in the classroom. The experimenter gave the instructions on how to respond and explained that the questionnaires were anonymous and that they should be as sincere as possible. The session lasted one hour.

Results and Discussion

The mean scores of the measures of each questionnaire and the correlations are shown in Table 1. The analysis showed a positive correlation between alcohol consumption and Present-Hedonistic (*r*=.38, *p*<.001), and a negative correlation between alcohol consumption and Future (*r*=-.41, *p*<.001). There was no significant correlation with any of the other TO dimensions. Regarding risk perception, there was a negative correlation between this variable and Future TO (*r*=-.36 *p*<.001). However, it must be taken into account that higher scores in the questionnaire indicated lower risk perception, so the significant correlation shows that higher scores in Future TO were associated with higher risk perception.

The main findings are consistent with the hypothesis that higher scores in Future TO are associated with higher risk perception and lower alcohol consumption. Regarding Present Hedonistic, this TO was related to higher alcohol consumption, but it did not correlate significantly with risk perception although there was trend to a lower risk perception. Our results suggest that Future TO is a powerful protective factor, especially because it is not only related to the behaviour itself but also to a cognitive variable such as the risks associated with it, consistent with previous research (i.e. Johnson, McCaul, & Klein, 2002; Slovic, 2000).

Study 2

Study 1 showed a significant correlation between Future TO and alcohol consumption and risk perception. Therefore, it can be assumed that an intervention programme based on enhancing this dimension could help adolescents to decrease their alcohol consumption and increase the associated risk perception. To our knowledge, only one study has explored how a Future based training can make the participants more prone to engage in a healthy behaviour (Hall & Fong, 2003). Thus, the aim of Study 2 was to assess the impact of an intervention programme performed in a group of adolescents, compared to a control (no intervention) group. The intervention sessions consisted of presenting and discussing the short and long term consequences of alcohol consumption so that Future TO was expected to increase and hence, to influence on the measures at the end of the intervention.

	M (SD)	1	2	3	4	5	6	7
1. Past -Negative	3.02 (.77)							
2. Present-Hedonistic	3.46 (.62)	.23*						
3. Future	3.15 (.48)	.03	-.29*					
4. Past-Positive	3.36 (.50)	-.03	.13	.19				
5. Present-Fatalistic	2.92 (.53)	.41**	.27*	-.20	-.03			
6. Alcohol Consumption	6.77 (4.96)	.05	.38**	-.41**	-.04	-03		
7. Risk Perception	2.73 (2.33)	-.01	.12	-.36**	-.16	.19	.36**	

Table 1. Means and Correlations between Temporal Orientation, alcohol consumption and risk perception

Methods

Participants

The sample consisted of 73 of the 75 students who completed the previous study. They were assigned to two groups: 34 formed the control group (36% males and 34% females, *M*=15.55 years, *SD*=.68) and 39 formed the experimental group (33.29% males and 41.18% females, *M*=15.44, *SD*=.61).

Instruments

Audiovisual materials were presented in a screen using PowerPoint software and video files during the intervention sessions, and the *ad-hoc* questionnaire was administered again at the end of the intervention.

Design and Procedure

A quasi-experimental pre-post with control group design was used. The dependent variables were alcohol consumption and risk perception scores. The independent variable was an intervention that was designed with the aim of enhancing Future TO.

The control group did not engage in any intervention programme, instead they performed regular academic activities. The experimental group received three sessions of 40 minutes each, once every 3 weeks. In each session, a slideshow presentation along with videos was shown and small discussion groups were created. The general topics were the comparison of short and long term effects of alcohol consumption and how this behaviour could influence their lives.

In the first session, a slideshow presentation and four short videos about reckless driving and how it affects reaction time, and also about alcohol addiction were shown. The second session also consisted of a slideshow and a video presentation about the short and long-term negative consequences of alcohol consumption on human health focusing on physiological aspects such as intoxication and comma. Finally, the third session consisted of six short videos about short and long-term negative consequences of alcohol consumption on brain functions, such as memory loss or the fetal alcohol syndrome. Each session included a group discussion where students were asked questions about the topics covered, so that they could relate them with their own experiences, values, perception, and knowledge about alcohol consumption and its risks. Another activity required participants to generate a list of immediate and delayed costs and benefits of alcohol consumption. The activity was designed to sensitize students to the notion that the negative consequences of drinking alcohol greatly outweigh the benefits when taking a long-term perspective, thus the Future TO was indirectly enhanced.

Results and Discussion

First of all, it has to be noted that no significant differences were found between the experimental and the control group in any of the two measures (alcohol consumption and risk perception) before intervention ($F(1,71)=2.585$, $p=.112$ and $F(1,71)=.98$, $p=.756$, respectively). They did not show significant differences in Future TO scores either, $F(1,71)=.88$, $p=.768$ and $F(1,71)=3.525$, $p=.756$. Mean scores for each measure as a function of group (control and experimental) and time (pre-post) are shown in Table 2.

The scores of the three variables (consumption, risk perception, and Future TO) were subjected to a 2x2 mixed ANOVA. The analysis showed a significant interaction between

	Pre-Intervention			Post-Intervention		
	Alcohol Consumption	**Risk Perception**	**Future TO**	**Alcohol Consumption**	**Risk Perception**	**Future TO***
Control	6.03 (4.47)	2.74 (2.05)	3.16 (.50)	5.41 (4.70)	2.94 (2.19)	3.28 (.65)
Experimental	7.77 (4.73)	2.59 (1.93)	3.14 (.53)	7.46 (4.65)	1.33 (1.36)	3.09 (.54)

*Note that there were only valid data for 12 participants of the control group, and 30 of the experimental group of this measure, so it is not comparable with the pre-intervention values presented on this table.

Table 2. Mean scores for each measure as a function of group (control/experimental) and time (pre/post)

time (pre-post) and group (control and experimental) only for the risk perception measure $F(1, 71)= 8.645$, $p=.004$, partial $\eta^2 = .11$. Simple effects analysis revealed that the interaction was due to a significant decrease in risk perception scores in the experimental group between pre (M=2.59 SD=1.93) and post intervention, (M=1.33 SD=1.36), indicating an increase in risk perception in this group. As the two groups did not show differences in any of the studied variables before intervention, the effects found can be attributed to the intervention programme with confidence.

The ANOVA on Future TO had to be conducted only on a small part of the total sample, as due to many missing values, only valid data from 12 participants of the control group, and 30 of the experimental group, could be analysed. This analysis showed a significant interaction between time (pre-post) and group (control and experimental) $F(1, 40)= 8.847$, $p=.005$, revealing an increase in the Future scores in the control group between pre (M=2.94 SD=.66) and post intervention, (M=3.28 SD=.65). However, the interpretation of this result should be taken with caution due to data loss.

Results partially confirm our initial hypothesis as the intervention programme increased risk perception but it did not influence alcohol consumption levels. However, because of the limited length of the intervention, this pattern could be explained by the fact that behavioural changes may occur in the long term, needing more time to show up, while cognitive changes develop earlier.

General Discussion

The aim of the study was to explore the relation between TO and alcohol consumption and risk perception, and also to determine whether an intervention programme that emphasized Future TO would influence on these aspects. Our main findings support the initial hypotheses based on previous studies that predict a positive correlation between Present Hedonistic and incurring in a risky behaviour, and a protective effect of a Future TO. Moreover, Study 2 suggests that an intervention carried out in an adolescent sample can raise the risk perception associated with a risky behaviour although it does not seem to modify it directly, at least in the short term.

Results of Study 1 are consistent with existing literature that shows that being oriented to the Future enhances the probability of performing less risky behaviours, while being oriented to the present shows the opposite pattern (Henson et al., 2006; Zimbardo et al., 1997). On the other hand, future-oriented individuals are more prone to engage in healthy behaviours (Agnew & Loving, 1998; Apostolidis et al., 2006; Beenstock et al., 2011; Burns, & Dilon, 2005; Hall & Fong, 2003; Henson et al., 2006; Keough et al., 1999).

All these findings can be interpreted in terms of how individuals value the short and long term consequences and outcomes of their actions. It has been shown that present-oriented individuals are driven by beliefs or cognitive patterns that outweigh the immediate positive outcomes over the negative long-term consequences. In contrast, future-oriented individuals emphasize the long-term positive outcomes of their present actions, as appreciating the risk associated with a specific behaviour involves appreciating the nature and severity of the consequences as well as the probabilities of those consequences (Slovic, 2000). In the same line, Janel Alberts and Genevieve Fridlund Dunton (2008) found that present-oriented individuals were less prone to engage in proactive attempts to manage illness than future-oriented individuals when threat was lower, and they only used reactive strategies when the threat was higher, suggesting that when individuals are oriented to the present little effort is invested to prevent negative future outcomes.

James Daugherty and Gary Brase (2010), argue that in order to achieve healthy outcomes one must be able to forego immediate pleasurable activities in favour of greater future rewards, which overlaps with the definition of Future TO. This is why a future-oriented individual is able to postpone receiving an immediate reward in order to gain benefits in the future, which has a direct application in healthy behaviours, as most of the impacts of such behaviours only become apparent in the future. For example, drinking alcohol lowers behavioural inhibition thus increasing fun but its chronic consumption can lead to several diseases. Although these conclusions apply to adults, and most of the adolescents are not future-oriented, it has been suggested that gaining control over risk taking, which is re-

lated to delaying gratification, can be learned, and that the possible deficits shown by adolescents in controlling risk taking may be due to a lack of experience from engaging in risky behaviours and not only due to insufficient brain maduration (Romer, Duckworth, Sznitman, & Park, 2010).

These arguments justify the implantation of intervention programmes such as the one that was carried out in Study 2. Our results showed that the experimental group obtained higher values in risk perception after intervention, suggesting that participating in a training programme that focuses on the negative future consequences of consuming alcohol and enhances Future TO can modify the risks associated with this behaviour, as participants may be motivated to engage in efforts to prevent negative outcomes. A reduction of alcohol consumption was also expected, however we failed to observe it. This could be due to the fact that a behavioural change takes more time to emerge compared to a cognitive change. In the same line, we failed to find significant differences in Future TO scores between groups before and after the intervention. However, this must be due to two reasons: first, the high number of missing values did not make the comparison reliable, and secondly, perhaps changes in temporal perspective take much more time to express or the instrument may not be sensitive enough to reflect subtle changes in thinking patterns in the short term. As the post-intervention measure was only taken once, future research should explore this issue by performing a longitudinal study in order to evaluate the impact of such programme in the long term. This would allow determining whether the cognitive changes observed in risk perception levels after intervention in the experimental group also leads to a decrease in alcohol consumption, and also observing differences in temporal orientation, that could help us confirm that the impact in performance is directly related to a change in how participants value the future.

The findings provide encouraging evidence that adding a temporal variable to existing educational programmes can enhance their efficacy in terms of reducing the participation in risky behaviours in adolescents. Only one previous study successfully managed to implement such a programme in order to pro-

mote health (Hall & Fong, 2003), and the present investigation suggests that it can also be the case for risky behaviours. Even though Peter Hall and Geoffrey Fong's study was conducted in young adults (of an average of 21 years), we believe that education and experience can play a role in increasing self control and thus reducing risk taking in adolescents, as suggested by previous research (Romer et al, 2010). Thus, Future TO enhancement based programmes are potentially relevant and readily implemented tools to take into account in educational intervention programmes.

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