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## Original article

# Longitudinal study of religiosity and mental health of adolescents with psychiatric problems. The TRAILS study



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## ABSTRACT

**Purpose:** This study used longitudinal data to examine the influence of the religiosity of pre-adolescents with psychiatric problems on the course of mental health during adolescence.

**Methods:** In the TRAILS clinical cohort of 543 pre-adolescents (10–12 years), mental health problems were assessed using self-report at baseline, T2 (12–14 years), T3 (14–17 years), and T4 (17–21 years). The Youth Self Report (YSR) was used at baseline, T2, and T3, and the Adult Self Report (ASR) was used at T4. Religiosity was assessed at baseline using self-report and information from mothers and fathers, resulting in three categorical religiosity variables and six SOCON (Social Cultural Developments Questionnaire) religiosity scales that assess religiosity in greater detail. Repeated measure ANOVA analyses were performed for each independent religiosity variable with internalizing and externalizing problem behavior as dependent variables, gender as a factor and time (T1, T2, T3 and T4) as within factor. Results were adjusted for marital status of parents and socioeconomic status and corrected for multiple testing.

**Results:** There were main effects of the self-report SOCON scale “Humanistic beliefs” and gender and gender “by Humanistic beliefs” interaction effect on internalizing problems. Follow-up tests revealed that among females “high” scores on “Humanistic beliefs” were associated with increased internalizing problems.

**Conclusions:** There were hardly any associations between religiosity and mental health in a clinical cohort of pre-adolescents up to adolescence. The exception being that among females strong humanistic beliefs were associated with internalizing problems. Implications of these findings are discussed.

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## 1. Introduction

The transition from pre-adolescence to young adulthood is a crucial period in a person's life and has a major influence on future health and well-being [1]. The TRacking Adolescents' Individual Lives Survey (TRAILS), a large prospective cohort study, was designed to chart the development of mental health problems as

youngsters pass from pre-adolescence to young adulthood and to examine risk and resilience factors [2]. Religiosity<sup>1</sup> is recognized as one of the many factors that may influence a person's mental health [1,3]. In the transition from pre-adolescence to young adulthood, religiosity can be conceptualized as a way of giving meaning to life and of coping with the environment [4]. In healthy religious development, the proportion of internalized religious beliefs increases along with the development of an authentic personality, with the subsequent integration of religion<sup>1</sup> in the person's life and vice versa [5,6]. However, relatively few longitudinal studies have

**Abbreviations:** TRAILS, TRacking Adolescents' Individual Lives Survey; YSR, Youth Self Report; ASR, Adult Self Report.

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<sup>1</sup> The terms “religion” and “religiosity” are used interchangeably.

investigated the relationship between religiosity and mental health in the period from pre-adolescence to young adulthood [7,8]. Research on religiosity is complicated by the existence of various dimensions of religiosity and different definitions of religiosity [3].

Most studies (72%) from the past 30 years (which are mostly Northern-American studies) found religious involvement to be modestly associated with better mental health and fewer mental disorders and with better physical health and longer survival [9–11], with a mean correlation of 0.10 across all conditions [12]. These studies further suggest that the correlation between religiosity and mental health becomes stronger when religiosity is measured using so-called proximal domains, which measure internalized religiosity (about meaning, support and coping) [12], rather than with the so-called distal domains, which are characterized by behavioral measurements only (such as affiliation and frequency of attendance at services) [11].

In this study, we investigated possible influences of religiosity assessed by pre-adolescents and their parent(s) on the course of mental health over adolescence.

Religiosity may influence the mental health of the pre-adolescent. Most cross-sectional studies report positive associations between religiosity and mental health (American [13–16], UK [17], Dutch [18]), associations that are generally stronger for older adolescents than for younger adolescents [14]. The two cross-sectional TRAILS studies of religiosity and mental health in 10- to 12-year-olds did not show religiosity of the pre-adolescent (reported by mother in the first study, self-report in the second study) to be associated with mental health [19,20]. In trying to understand the lack of an association between pre-adolescents and mental health in this study, two possible reasons are given. First, when pre-adolescents become young adults, they tend to be critical of their parents' religious standards. This process of internalizing their beliefs can be accompanied by a constructive phase of doubt or quest for certainty, which is termed the quest phase [21,22] and which can temporarily increase anxiety and conflict [23]. Second, as a consequence of living in an increasingly secularized society, being religious in a non-religious environment could result in distress, for example for being bullied [20]. Increased anxiety may possibly have temporarily neutralized the positive effect of religiosity [20]. Other studies have failed to detect an association between religiosity and mental health in adolescence [13–17], and the findings of studies reporting a positive association [9–12] may not be robust. Also, as boys show a slower moral maturation than girls, gender differences are reported in relation to religiosity and mental health problems [24].

The longitudinal data from TRAILS, covering the period from pre-adolescence to young adulthood, can be used to investigate the relationship between religiosity and mental health in this phase.

Parental religiosity can also influence the mental health of the pre-adolescent [19,20,25,26]. The TRAILS study found maternal religiosity to influence the mental health of her child in the general population cohort. Moreover, if there was parental disagreement about religion, passive religiosity of mother was associated with increased internalizing problem behavior in the pre-adolescent child [19]. In the clinical cohort of TRAILS, pre-adolescents of actively religious mothers had significant higher levels of internalizing problem behavior than pre-adolescents of non-religious mothers [20]. Another study showed that a greater participation of mothers in religious services was associated with better well-being and more social support from friends in pre-adolescents relative to the children of mothers with a lower level of participation in religious services [25]. Two other studies found parental religiosity to be linked to fewer externalizing and internalizing problems in children via transmission of religious beliefs to children, an effect which is stronger if the parents are actively religious and agree about religion [26–28]. Taking these

findings together, it can be expected that the religiosity of fathers and mothers influences the mental health of their pre-adolescent children as they develop into young adults.

This study used longitudinal TRAILS data to determine whether the religiosity of pre-adolescents, the religiosity of mothers and the religiosity of fathers predict mental health problems during the transition from pre-adolescence to late adolescence and young adulthood.

## 2. Methods

### 2.1. Study design

This study used data from an outpatient longitudinal clinic-referred cohort (further: clinical cohort) of Dutch adolescents, called TRacking Adolescents' Individual Lives Survey (TRAILS), with four assessments. The key objective of TRAILS is to chart and explain the development of, and risk factors for, mental health problems as children progress from pre-adolescence to young adulthood. Since the clinical cohort consists of pre-adolescents who had been referred to an outpatient clinic for child and adolescent psychiatry, the cohort can be considered at increased risk of mental health problems during pre-adolescence, adolescence, and young adulthood.

### 2.2. Data collection

The target sample was selected using the registers of the outpatient clinic of Accare, University and General Center for Child and Adolescent Psychiatry North-Netherlands, location Groningen. The TRAILS protocol was approved by the national ethics committee. Informed consent was obtained from all parents after the nature of the study had been fully explained to them. Exclusion criteria were mental retardation, serious physical illness or handicap, and no Dutch-speaking parent or parent surrogate available and it was not feasible to perform assessments in the parent's language. Responders and non-responders had a similar performance on psychopathology subscales and language scales [29]. Of the 543 enrolled cases, two were excluded because information about age was missing. Fig. 1 shows the flowchart for response and non-response over the four assessments. At baseline, non-participants were more likely to be boys, to come from a lower socioeconomic status (SES) background, and to have a relatively poor school performance. Since poor school performance has been related to more psychopathology [30] and less religiosity [31], the present study sample might underrepresent children with psychopathology and parents and children who are religious.

### 2.3. Measuring religiosity

We assessed religiosity with variables used in previous research (called: religiosity variables) [32,33], and with variables from the Social Cultural Developments questionnaire (SOCON), which has more in depth questions about religiosity, resulting in three religious scales (called: SOCON religiosity). The religiosity variables can be considered as more so-called distal measures of religiosity (such as affiliation and frequency of attendance at services) [16], whereas SOCON religiosity uses more proximal measures (about religious meaning, support, and coping) [12]. In this study, the word "church" is used to describe a place of worship, because the majority (60,4%) of the religious responders defined themselves as Christian.

### 2.4. Religiosity variables

In TRAILS, one of the parents (mostly mother: 86%, further indicated as mother) was asked three descriptive questions about

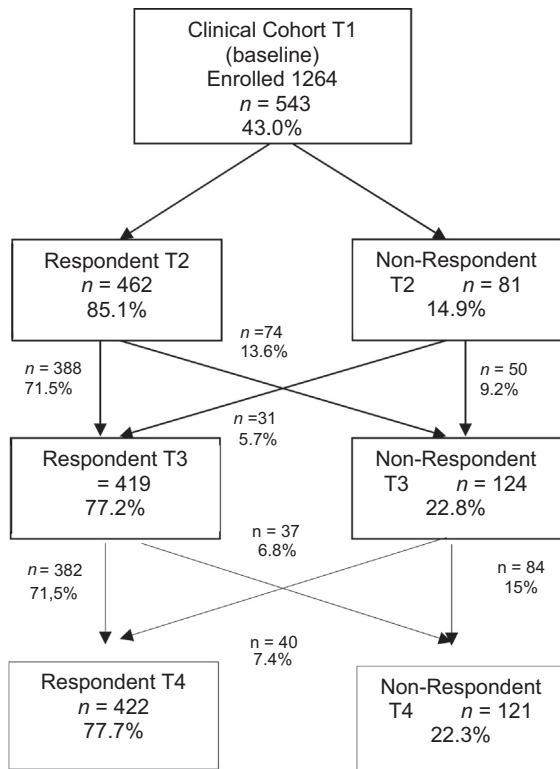


Fig. 1. Response and attrition of the TRAILS clinical cohort T1 (baseline)–T4.

religion for herself, her partner and for her TRAILS son or daughter: about being a religious person, being affiliated with a church or denomination, and about the frequency of church attendance. On the basis of this information, four three-item variables (no religiosity, passive religiosity, and active religiosity) were constructed: religiosity of the child, religiosity of the mother, and religiosity of the father (however, this was based on information from the mother, not self-report) [20]. Data were missing for some variables: religiosity of the mother ( $n = 2$ ), religiosity of the father ( $n = 94$ ) and religiosity of the pre-adolescent ( $n = 90$ ). Sensitivity analyses were performed, with missing values for pre-adolescent religiosity, religiosity father and religiosity mother, being replaced with active religious and non-religious scores. Analyses with these values did not change the direction of the results.

## 2.5. SOCON

The SOCON questionnaire is a Dutch sociological questionnaire that has been used in national and international research [32,33]. SOCON consists of structured questions about different

sociological subjects such as labor, education, politics, and religiosity. SOCON has a good reliability and validity [32,33]. It has 36 questions on religiosity for adults and nine questions were specifically designed for and asked to pre-adolescents. In TRAILS, mothers completed the questions for herself and her partner, and the pre-adolescents completed the SOCON questions by self-report. The questions covered “Christian religiosity”, “Humanistic beliefs”, and “Denial higher power” (Table 1), with several statements (items) scored from “entirely convinced” to “not convinced at all”. Pre-adolescents answered a selection of the items for adults. Items of the scale “Christian religiosity” were for example “For me, life only has meaning because of the existence of a God” or “If you believe in God you can bear a lot of pain during illness”. Items of the scale “Humanistic beliefs” were for example “Good and evil in the world are entirely the work of man”, “Life is merely an evolutionary process”, “For me, God is nothing else than a valuable human” and “God is not in heaven, but in the hearts of people”. The scale “Denial higher power” contained items such as “Death is the definite end of everything” and “Sorrow that people experience has no purpose at all”. Higher scores on the scale “Christian religiosity” mean higher religiosity, higher scores on “Humanistic beliefs” mean more humanistic thoughts and less religiosity, and higher scores on “Denial higher power” mean greater denial of a higher power (for example denial of God) and also less religiosity [32,33].

## 2.6. Child mental health

The Youth Self Report (ages 11–18 years) (YSR) of the Achenbach System of Empirically Based Assessment (ASEBA) was used for the first three assessments [34]. This questionnaire contains 112 items regarding behavioral and emotional problems in the last six months, which are scored 0 (not true), 1 (somewhat or sometimes true), or 2 (very true or often true). Five syndrome scales (anxious/depressed, withdrawn/depressed, somatic complaints, aggressive behavior, and delinquent behavior) and the broadband scales internalizing and externalizing problem behavior can be computed [35,36]. Because by the time of the fourth assessment participants are eighteen years or older, the “Adult Self-Report” (ASR) was used, with identical syndrome scales, using the 102 items relevant for these syndrome scales [37].

## 2.7. Descriptives

The internal consistency of all SOCON scales was satisfactory (for the mothers Cronbach’s alpha [ $\alpha$ ] > 0.75, for pre-adolescents  $\alpha > 0.79$ ) [3]. All SOCON scales (for the mothers and for pre-adolescents) correlated significantly with each other (Pearson’s correlation coefficients ( $\rho$ ) > 0.26,  $P$ -values ( $ps$ ) < 0.011), except for the SOCON variable “Humanistic beliefs” of the pre-adolescent, which was not significantly correlated with the three SOCON scales

Table 1  
Correlations between SOCON scales.

	CRc	HBc	DHPc	CRp	HBp
<i>Pre-adolescent</i>					
Christian religiosity (CRc)					
Humanistic beliefs (HBc)	$\rho = 0.26^{**}$				
Denial higher power (DHPc)	$\rho = -0.54^{**}$	$\rho = 0.16^*$			
<i>Parent</i>					
Christian religiosity (CRp)	$\rho = 0.67^{**}$	$\rho = 0.04$	$\rho = -0.60^{**}$		
Humanistic beliefs (HBp)	$\rho = -0.50^{**}$	$\rho = 0.06$	$\rho = 0.52^{**}$	$\rho = -0.66^{**}$	
Denial higher power (DHPp)	$\rho = -0.47^{**}$	$\rho = 0.09$	$\rho = 0.40^{**}$	$\rho = -0.55^{**}$	$\rho = 0.49^{**}$

$\rho$ : Pearson’s correlation coefficients.

\*  $P < 0.05$ .

\*\*  $P < 0.005$ .

**Table 2**  
Descriptives of independent variables at baseline.

	<i>n</i>	(%)
<i>Gender</i>		
Boys	358	65.9
Girls	185	34.1
<i>SES</i>		
Low SES	134	24.8
Middle SES	272	50.3
High SES	135	25.0
<i>Divorce of parents</i>		
Yes	140	25.9
No	401	74.1
<i>Religiosity pre-adolescent</i>		
No religiosity	225	41.1
Passive religiosity	170	31.1
Active religiosity	58	10.6
Missing	94	17.2
<i>Religiosity mother</i>		
No religiosity	287	52.4
Passive religiosity	112	20.5
Active religiosity	142	26.0
Missing	6	1.1
<i>Religiosity father</i>		
No religiosity	273	49.9
Passive religiosity	72	13.2
Active religiosity	109	19.9
Missing	93	17.0
	Mean	±SD
<i>SOCON scales pre-adolescent</i>		
Christian religiosity	2.87	± 1.29
Humanistic beliefs	2.53	± 1.14
Denial higher power	2.65	± 1.11
<i>SOCON scales mother</i>		
Christian religiosity	2.56	± 1.09
Humanistic beliefs	2.74	± 0.77
Denial higher power	2.25	± 0.68

SD: standard deviation.

of the mother ( $p < 0.06$ ,  $p_s > 0.354$ ) (Table 1). Using ANOVA analyses, the categorical religiosity variables of pre-adolescent and father did not show a significant association with any SOCON variable ( $p_s > 0.082$ ). The categorical religiosity variable of mother showed significance in association with the SOCON scales from pre-adolescents and parents concerning “Christian religiosity” and “Denial Higher Power” ( $p_s < 0.034$ ), but not with SOCON scale “Humanistic beliefs” ( $P = 0.119$ ). Further, all religiosity variables were significantly associated with each other ( $p_s < 0.001$ ). Covariates marital status (i.e. divorce yes/no) and SES were added in analyses, while gender was added as a factor. SES was measured as the average of income level, educational level of both the father and the mother, and occupational level of each parent, using the International Standard Classification of Occupations. The lowest 25% of scores were considered as “low SES”, the highest 25% as “high SES”, and everything in between was labeled as “middle SES”. The internal consistency of these variables was satisfactory ( $\alpha = 0.84$ ) [38].

**Table 3**  
Descriptives dependent continuous variables at baseline, T2, T3 and T4.

	Baseline <sup>a</sup>		T2 <sup>a</sup>		T3 <sup>a</sup>		T4 <sup>b</sup>	
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD
Internalizing problem behavior	0.40	±0.24	0.38	±0.25	0.33	±0.25	0.35	±0.29
Externalizing problem behavior	0.32	±0.22	0.33	±0.21	0.37	±0.23	0.30	±0.24

SD: standard deviation.

<sup>a</sup> YSR.

<sup>b</sup> ASR.

## 2.8. Data analysis

In the TRAILS clinical cohort of 543 pre-adolescents (10–12 years), mental health problems were assessed using self-report at baseline, T2 (12–14 years), T3 (14–17 years), and T4 (17–21 years). Descriptive statistics were calculated in terms of frequency (and percent distribution) for categorical variables and mean (and standard deviation [ $\pm$  SD]). The YSR was used at baseline, T2, and T3, and the ASR was used at T4. Religiosity was assessed at baseline by self-report by pre-adolescents and their mothers, using the religiosity variables and the SOCONs Questionnaire, which goes into greater detail about religiosity. Each SOCON scale was categorized into “low”, “medium” and “high” scores, to be used in the repeated measure ANOVA analyses. Repeated measure ANOVA analyses were performed with respectively internalizing and externalizing problem behavior as dependent variables, time (T1, T2, T3 and T4) as within factor, while the three religiosity variables and the six SOCON scales were added as independent factor for every analysis. Planned pairwise comparisons were performed to discover significances between the different categories of each religiosity variable. Significance of pairwise comparisons is indicated with “\*” and is described in the text. To correct for the number of statistical tests (we run ten statistical models, six with the categorical religiosity variables and four with the SOCON variables), the Bonferroni method was used, resulting in an alpha set at 0.005, balancing between not being too strict and on the other hand taking the risk of a type II error seriously.

## 3. Results

### 3.1. Study population

Descriptives of the independent variables are given in Table 2. As shown in Table 3, the mean item value on internalizing problem behavior was  $0.40 \pm 0.24$  at baseline and at slightly lower at T2 ( $0.38 \pm 0.25$ ), T3 ( $0.33 \pm 0.25$ ) and T4 ( $0.35 \pm 0.29$ ). The mean item value on externalizing problem behavior was  $0.32 \pm 0.22$  at baseline and increased slightly at T 2 and T3. At T4, mean item value on externalizing problem behavior as lower than baseline ( $0.30 \pm 0.24$ ).

### 3.2. Internalizing problem behavior

In the analysis of the three models with categorical religiosity variables religiosity mother (Table 4), religiosity father and religiosity child, there were no main religiosity or religiosity by time interaction effect on internalizing problem behavior ( $p_s > 0.181$ ). Gender was significant as a factor ( $p_s < 0.001$ ), but not in connection with one of the categorical variables ( $p_s > 0.062$ ). Neither the covariates nor the pairwise comparisons showed any significance.

Concerning the model with SOCON scales based on pre-adolescents' self-report, significance was reached in main analysis concerning the second SOCON scale, “Humanistic beliefs”, and internalizing problem behavior ( $F(2,91) = 5.643$ ,  $P = 0.005$ ), but not at the first and third SOCON scale. The overall gender effect just

**Table 4**

Repeated measure in ANOVA, dependent is problem behavior over time, with the religiosity variables as predictors at T1.

Predictor	Variable	Internalizing problem behavior				Externalizing problem behavior				
		F	df	Error df	P-value	F	df	Error df	P-value	
Mother	(Intercept)	126.225	1	289	<0.001	105.439	1	293	<0.001	
	Religiosity mother	1.620	2	289	0.200	1.192	2	293	0.305	
	Gender	28.407	1	289	<0.001	0.015	1	293	0.902	
	Gender*religiosity mother	0.141	1	289	0.869	0.454	2	293	0.636	
	Time	0.865	3	867	0.459	1.161	3	879	0.324	
	Time*religiosity mother	0.552	6	867	0.769	2.874	6	879	0.009	
Father	(Intercept)	108.686	1	289	<0.001	103.424	1	293	<0.001	
	Religiosity father	1.719	2	289	0.181	0.574	2	293	0.564	
	Gender	19.869	1	289	<0.001	0.887	1	293	0.347	
	Gender*religiosity father	1.014	2	289	0.364	0.996	2	293	0.371	
	Time	1.206	3	867	0.306	1.433	3	879	0.232	
	Time*religiosity father	2.284	6	867	0.034	2.418	6	879	0.025	
Pre-adolescent	(Intercept)	125.797	1	289	<0.001	106.454	1	293	<0.001	
	Religiosity pre-adolescent	1.492	2	289	0.227	1.633	2	293	0.197	
	Gender	32.182	2	289	<0.001	0.063	2	293	0.803	
	Gender*religiosity pre-adolescent	2.814	2	289	0.062	0.893	2	293	0.410	
	Time	1.083	3	867	0.355	1.213	3	879	0.304	
	Time*religiosity pre-adolescent	2.083	6	867	0.053	1.639	6	879	0.133	
SOCON pre-adolescent Step 1	(Intercept)	42.682	1	91	<0.001	41.998	1	93	<0.001	
	Sc1	1.304	2	91	0.276	0.600	2	93	0.551	
	Sc2	5.643	2	91	0.005	2.488	2	93	0.089	
	Sc3	3.279	2	91	0.042	2.524	2	93	0.086	
	Gender	7.431	1	91	0.008	0.114	1	93	0.735	
	Gender*Sc1	1.827	2	91	0.167	0.094	2	93	0.911	
	Gender*Sc2	5.961	2	91	0.004	0.808	2	93	0.449	
	Gender*Sc3	1.270	2	91	0.286	0.633	2	93	0.533	
	Time	5.561	3	273	0.001	1.540	3	279	0.204	
	Time*Sc1	2.054	6	273	0.059	0.990	6	279	0.433	
	Time*Sc2	2.260	6	273	0.038	1.591	6	279	0.150	
	Time*Sc3	0.918	6	273	0.482	1.288	6	279	0.263	
	Step 2	Sc2 females	8.873	2	22	0.001				
		Time females	1.782	3	66	0.159				
		Time*Sc2 females	1.731	6	66	0.128				
SOCON parent Step 1	Sc2 males	0.033	2	67	0.967					
	(Intercept)	60.130	1	228	<0.001	70.888	1	230	<0.001	
	Sp1	1.546	2	228	0.215	1.808	2	230	0.166	
	Sp2	1.087	2	228	0.339	0.405	2	230	0.668	
	Sp3	0.380	2	228	0.684	0.174	2	230	0.841	
	Gender	12.178	1	228	0.001	0.821	1	230	0.366	
	Gender*Sp1	1.378	2	228	0.254	0.558	2	230	0.573	
	Gender*Sp2	5.358	2	228	0.005	0.480	2	230	0.619	
	Gender*Sp3	0.552	2	228	0.576	0.741	2	230	0.478	
	Step 2	Sp2 females	2.764	2	72	0.070				
Sp2 males		2.400	2	154	0.094					

missed significance at the corrected  $P$ -value of 0.005 ( $F(2,91) = 3.279$ ,  $P = 0.008$ ). Further, there was a gender by “Humanistic beliefs” interaction effect on internalizing problem behavior. ( $F(2,91) = 5.961$ ,  $P = 0.004$ ). Follow-up tests showed a main effect on “high” scores associated with internalizing problem behavior, compared to “medium” (mean item difference 0.165,  $P = 0.008$ ) and “low” scores (mean item difference 0.293,  $P = 0.004$ ) on the SOCON scale “Humanistic beliefs”, with higher scores on internalizing problem behavior in case of a “high”. Higher scores mean more humanistic beliefs, measured by two statements that were answered by pre-adolescents, namely: “To me God is nothing else than the valuable in the human being” and “God is not up there somewhere, but only in the hearts of people” [2]. Further, no statistically significant two-way interaction between the SOCON scales from pre-adolescents and time was found. The covariates divorce of parents and SES were not significant. Analyzing separately for females and males revealed significance for females, but not for males (resp.  $F(2,22) = 8.873$ ,  $P = 0.001$  and  $F(2,67) = 0.033$ ,  $P = 0.967$ ). In females, pairwise comparisons were significant, with higher internalizing problem behavior in case of high scores on the second SOCON scale, compared to respectively medium and low scores (mean item differences respectively 0.293 and 0.323,  $P = 0.004$  and  $P = 0.005$ ).

Concerning the model with SOCON scales from mothers, there was no significance in main analyses concerning the three SOCON scales. Gender was significant ( $F(1,288) = 12.178$ ,  $P = 0.001$ ), and showed in interaction with the SOCON scales significance on the second SOCON scale ( $F(2,228) = 5.358$ ,  $P = 0.005$ ). Further, no statistically significant two-way interaction between the SOCON scales from mothers and time was found. The covariates divorce of parents and SES were not significant. Testing separately for females and males did reveal a trend significance for females, but no significance for males (respectively  $F(2,72) = 2.764$ ,  $P = 0.070$ ,  $F(2,154) = 2.400$ ,  $P = 0.094$ ). Pairwise comparisons in females were not significant.

### 3.3. Externalizing problem behavior

Concerning the three models with categorical religiosity variables religiosity mother (Table 4), religiosity father and religiosity child, there were no main effect between these categorical variables and externalizing problem behavior ( $ps > 0.197$ ). Also gender was not significant as a factor and in interaction with each of these categorical variables ( $ps > 0.347$ ). Further, no statistically significant two-way interaction between the SOCON scales from mothers and time was found. The covariates divorce of parents and SES were not significant.

Concerning the two models with the SOCON scales from respectively pre-adolescents and mothers, there were no main effects for the SOCON scales (resp.  $p_s > 0.551$  and  $p_s > 0.166$ ). Neither gender as a factor was significant (resp.  $F(1,93) = 0.114$ ,  $P = 0.735$  and  $F(1,230) = 0.821$ ,  $P = 0.366$ ), nor gender in interaction with the SOCON scales for respectively pre-adolescents and mothers (resp.  $p_s > 0.150$  and  $p_s > 0.478$ ). Further, no statistically significant two-way interaction between the SOCON scales from mothers and time was found. The covariates divorce of parents and SES were not significant.

#### 4. Discussion

This study used longitudinal TRAILS data to determine whether the religiosity of pre-adolescents, the religiosity of mothers and the religiosity of fathers predict mental health problems during the transition from pre-adolescence to late adolescence and young adulthood. Cross-sectional studies report a mental health benefit of religion in adolescents [13,14]. This longitudinal study showed that the second SOCON scale from pre-adolescents, with statements about humanistic beliefs was associated with increased internalizing problem behavior in females who scored “high” or “medium” on this SOCON scale, compared to “low” scores. This effect was not found in relation to the first and the third SOCON scale from pre-adolescents. Also, this effect was not found in males. Further, this association was not found in the SOCON scales from mothers. None of the categorical religiosity variables showed significance. The SOCON scale “Humanistic beliefs” from pre-adolescents is based on two statements, namely: “To me God is nothing else than the valuable in the human being” and “God is not up there somewhere, but only in the hearts of people”. High and medium scores point towards a higher degree of agreement with these statements, and were associated in this study with higher internalizing problem behavior as compared to lower scores on these statements. One could say that humanistic beliefs are Christian beliefs but without God. Seen in this way, higher self-reported humanistic beliefs, associated with higher self-reported internalizing problem behavior in female pre-adolescents could be a sign of reflection on and feeling responsibility towards life, in denial of a God outside themselves. This basal attitude was found to be associated with increased internalizing problem behavior. The fact that this study found a result on female pre-adolescents and not on male pre-adolescents, may be a result of a slower moral maturation of boys, compared to girls [24].

This may explain the persistence of this correlation, lasting from pre-adolescence up to young adulthood, instead of the expected decrease in time in case the quest phase would apply.

Not finding major significances on the categorical religiosity variables and the SOCON scales “Christian religiosity, could have other reasons as well. As the clinic-referred cohort can be defined as a cohort of pre-adolescents with an elevated risk for mental health problems, not finding significant associations with religiosity could be due to other psychosocial and environmental problems that exist in this group of (pre-)adolescents and that, together with genetic liability, override any more subtle effects of religiosity. Also, not finding major significances on the categorical religiosity variables and the SOCON scales “Christian religiosity” in (pre-)adolescents differs from results in Northern-American studies, reporting positive associations between religiosity and mental health in pre-adolescence [13–15]. This could be due to the fact that these (pre-)adolescents live in the Netherlands, a country known for an increasingly secularized society. This may cause some distress as a consequence of being special, i.e. being religious [16], compared to the other youth, which may dilute and diminish the associations between religiosity and mental health.

This study is unique with regard to the age of the participants and its longitudinal nature. Another strength is that we used the validated SOCON scales that asked more in depth questions on religiosity. Further, the categorical religiosity variables for pre-adolescents and father were not associated with the SOCON scales, while the categorical religiosity for mother was only associated with “Christian religiosity” and “Denial higher power”, and not with “Humanistic beliefs”. Although the categorical religiosity variable of mother showed a significant association with two out of three SOCON scales, the fact that religiosity of pre-adolescents and fathers was not associated with any of the SOCON scales may indicate that these two categories of instruments measure partly a different aspects of religiosity. The religiosity variables were composed of three questions, with two questions asking about religious behavior (being a member of a church or denominations and frequency of church visits), the so-called distal measurement of religiosity [11]. The questions of the SOCON probe about religious content and impact on daily life, which can be seen as more proximal or measures of religiosity. Proximal religious variables have been found to have a stronger association with mental health measures than distal religious variables [11], however, we did not find any significance concerning the categorical religiosity variables nor on the SOCON scales measuring religiosity. Note that we applied stringent corrections for multiple testing by using the Bonferroni method.

This study has some limitations. Given that our research is part of a cohort that covers different types of predictors and outcomes, we could only use a global construct for religion. TRAILS is being run in the three northern provinces of the Netherlands. As a consequence of regional differences in religiosity in the Netherlands, it may be difficult to generalize these findings to other areas and other countries. In conclusion, we found hardly any associations between religiosity and mental health in pre-adolescents, measured over time, which is in line with earlier TRAILS studies, and points towards a minor role of religiosity in the association with mental health in adolescence.

#### Implications and contribution

Clinicians should be aware of the relevance of religiosity for personal and family functioning. In a clinic-referred sample in the three Northern provinces of the Netherlands female pre-adolescents had increased internalizing problem behavior in case of “high” scores on “Humanistic beliefs” compared to “medium” and “low” scores. This may be a sign of reflection on and feeling responsibility towards life, in denial of a God outside themselves. This basal attitude was found to be accompanied with increased internalizing problem behavior. Overall, religiosity was not associated with mental health problems in pre-adolescents up to adolescence, in a clinical cohort.

#### Disclosure of interest

The authors declare that they have no competing interest.

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