

Supplemental Material

Table S1. All variables included in univariable analysis of the association between completed CPR training and factors associated with completed CPR training

Predictor from TPB	Variable
Knowledge	Is CPR training of students mandatory before graduation from Middle school?
Background	Respondents (teachers)
	Sex
	Age
	Years working in a school
	Family member, friend or acquaintance with previous cardiac arrest
	Had thought about CPR training of students prior to this survey
	Had provided first-aid in life-threatening situation prior to this survey
	Had taken a first-aid course prior to this survey
	Had taken a first-aid course within the last 2 years
	School
	AED present
	Median number of students
	Distance (km) to nearest hospital
	Presence of a staff member who is very passionate about CPR training
	School leadership has reported CPR training is mandatory

		School leadership has reported CPR training should be mandatory
Teachers' attitudes towards CPR training of students		
Direct measure		CPR training should be mandatory
Indirect measures	Behavioral Beliefs	CPR training provides skills to perform CPR
		CPR training diminishes fear when facing emergency situations
		CPR training empowers students to take action in emergency situations
		CPR training makes students capable of saving lives
		CPR training encourages students to take more responsibility (care more) for others
		CPR training increases students' understanding of being a citizen
		CPR training of students will increase bystander CPR on the long-term
		Students find CPR training uncomfortable/scary
	Evaluation of behavioral beliefs	Is it important for you as a teacher, that students acquire skills to provide CPR?
		Is it important for you as a teacher, that students take action when facing emergency situations?
		Is it important for you as a teacher, that students are able to save lives?
		Is it important for you as a teacher, that more people perform CPR on the long-term?
	Measure of pressure teachers feel to train students in CPR	
Direct measure		To what degree is it expected from you, as a teacher at your school, that students are trained in CPR?
Indirect	Normative beliefs -	During the past 3 years, how many of graduating classes (Middle school) do you think have completed CPR training?

measures	Descriptive norm	How many Middle schools do you think have implemented CPR training?
	Normative beliefs - injunctive norms	The following groups think/express that students should be trained in CPR
		Students/the student council
		Parents/Parents' committee
		Teachers
		School leadership
		The teachers' union
		The county administration
		The ministry for Children and Education
	Motivation by comply	How much do the following groups generally influence your decisions as a teacher?
		Students/the student council
		Parents/Parents' committee
		Teachers
		School leadership
		Teachers' union
The county administration		
The Ministry for Children and Education		
Teachers' perceived ability to train students in CPR		

Direct measure		None
Indirect measures	Control beliefs	Is there a CPR training coordinator at your school?
		What expenses do you think are associated with acquiring CPR training material (f.ex. Manikins)?
		What expenses do you think are associated with training teachers to conduct CPR training of students?
		What expenses do you think are associated with hiring external instructors to conduct CPR training of students?
		How many periods do you think it is necessary to train students in CPR?
		At the moment, do you feel you have the skills to train students in CPR?
		At the moment, would you be interested in training students in CPR?
		CPR training fits well into the curriculum (f.ex. Biology or gym class)
		The school provides clear guidelines as to who is responsible for CPR training is conducted
		I think it is easy to acquire good CPR training material
		Perceived power
	The presence of a CPR training coordinator	
	The expenses associated with acquiring CPR training material (f.ex. Manikins)	
	The expenses associated with training teachers to conduct CPR training of students	
	The expenses associated with hiring external instructors to conduct CPR training of students	
	The time required to complete the training	

		Other teachers' skills to conduct CPR training
		Own skills to conduct CPR training
		CPR training fits well into the curriculum
		Clear guidelines as to who is responsible for CPR training is conducted
		Availability of CPR training material

Table S2. Construction of latent variables of teachers' attitudes towards CPR training, perceived pressure and perceived behavioral control to ensure student CPR training

Total score for teachers' attitudes towards CPR training of students= (1a x 1b) + (2a x 2b) + (3a x 3b) + (4a x 4b) + (5a x 5b) + (6a x 6b) + (7a x 7b) + (8a x 8b)	
Indirect measures of teachers' attitudes towards CPR training of students: behavioral beliefs	Evaluation of behavioral beliefs regarding CPR training of student
1a- CPR training provides skills to perform CPR	1b- Is it important for you as a teacher, that students acquire skills to provide CPR?
2a- CPR training diminishes fear when facing emergency situations	2b- score 5 for all
3a- CPR training empowers students to take action in emergency situations	3b- Is it important for you as a teacher, that students take action when facing emergency situations?
4a- CPR training makes students capable of saving lives	4b- Is it important for you as a teacher, that students are able to save lives?
5a- CPR training encourages students to take more responsibility (care more) for others	5b- score 5 for all
6a- CPR training increases students' understanding of being a citizen	6b- score 5 for all
7a- CPR training of students will increase bystander CPR on the long-term	7b- Is it important for you as a teacher, that more people perform CPR on the long-term?
8a- Students find CPR training uncomfortable/scary*	8b - score 5 for all*

<p>Total score for how much pressure teachers feel to ensure students complete CPR training= (1a x 1b) + (2ax 2b) + (3a x 3b) + (4a x 4b) + (5a x 5b) + (6a x 6b) + (7a x 7b)</p>	
Indirect Measures of measures of pressure teachers feel to train students in CPR: subjective norms	Teachers' Motivation to comply
The following groups think/express that students should be trained in CPR	How much do the following groups generally influence your decisions as a teacher
1a- Students/the student council	1b- Students/the student council
2a- Parents/Parents' committee	2b-Parents/Parents' committee
3a-Teachers	3b-Teachers
4a- The school leadership	4b-The school leadership
5a-The teachers' union	5b-The teachers' union
6a- The county administration	6b-The county administration
7a -The ministry for Children and Education	7b-The Ministry for Children and Education
<p>Total score for Teachers' Perceived Behavioral Control over CPR Training of Students= (1a x 1b) + (2ax 2b) + (3a x 3b) + (4a x 4b) + (5a x 5b) + (6a x 6b) + (7a x 7b) + (8a x 8b) + (9a x 9b) + (10a x 10b)</p>	
Indirect measures of teachers' perceived behavioral control over CPR training of students: control beliefs	Perceived Power to Conduct CPR training of students

	In your opinion, how much do the following factors influence whether CPR training is conducted?
1a- Is there a CPR training coordinator at your school?*	1b- The presence of a CPR training coordinator.*
2a- What expenses do you think are associated with acquiring CPR training material (f.ex. Manikins)?	2b- The expenses associated with acquiring CPR training material (f.ex. Manikins).
3a- What expenses do you think are associated with training teachers to conduct CPR training of students?	3b- The expenses associated with training teachers to conduct CPR training of students.
4a- What expenses do you think are associated with hiring external instructors to conduct CPR training of students?	4b- The expenses associated with hiring external instructors to conduct CPR training of students.
5a- How many periods do you think are necessary to train students in CPR?	5b- The time required to complete the training.
6a- At the moment, do you feel you have the skills to train students in CPR?*	6b- score 5 for all*
7a- At the moment, would you be interested in training students in CPR?*	7b- Other teachers' skills to conduct CPR training.*
8a- CPR training fits well into the curriculum (f.ex. Biology or gym class).*	8b- CPR training fits well into the curriculum.*

9a-The school provides clear guidelines as to who is responsible for CPR training is conducted	9b-Clear guidelines as to who is responsible for CPR training is conducted
10a- I think it is easy to acquire good CPR training material.*	10b- Availability of CPR training material.*

*Indicates items which were excluded from the final logistic regression model for attitudes, subjective norms and perceived behavioral control due to a low correlation coefficient in scale validation.

In cases which the evaluation of a predictor variable was redundant (according to participants in the pilot test), scores were automatically set to 5.

Table S3. Definition of latent variables

Indirect measure	TPB Domain	Variable from questionnaire survey	Item	Definition of scale	
Indirect measures of teachers' attitudes towards CPR training of students	Behavioral beliefs	CPR training provides skills to perform CPR	A1	Definition of scale $ATT = \sum_{i=1}^8 X_i$ where X_i is item product $X_i = A_i \cdot (B_i - 3)$ $B_i = 5$ for $i = 2, 5, 6, 8$ Range of scale: $ATT \in [-80; 80]$	
		CPR training lessens fear when facing emergency situations	A2		
		CPR training empowers students to take action in emergency situations	A3		
		CPR training makes students capable of saving lives	A4		
		CPR training encourages students to take more responsibility (care more) for others	A5		
		CPR training increases students' understanding of being a citizen	A6		
		CPR training of students will increase bystander CPR on the long-term	A7		
		Students find CPR training uncomfortable/scary	A8		
	Evaluation of behavioral beliefs	Is it important for you as a teacher, that students acquire skills to provide CPR?			B1
			Is it important for you as a teacher, that students take action when facing emergency situations?		B3
			Is it important for you as a teacher, that students are able to save lives?		B4

		Is it important for you as a teacher, that more people perform CPR on the long-term?	B7	
Indirect measures of pressure teachers feel to train students in CPR	Normative beliefs - Descriptive norm	During the past 3 years, how many of graduating classes (Middle school) do you think have completed CPR training?	C1	Definition of scale $SND = \sum_{i=1}^2 C_i / 2$ Range of scale: $SND \in [0; 10]$
		How many Middle schools do you think have implemented CPR training?	C2	
	Normative beliefs - injunctive norms	The following groups think/express that students should be trained in CPR		
		Students/the student council	D1	Definition of scale $SNI = \sum_{i=1}^7 Y_i$ where Y_i is item product $Y_i = D_i \cdot (E_i - 3)$ Range of scale: $SNI \in [-70; 70]$
		Parents/Parents' committee	D2	
		Teachers	D3	
		The school leadership	D4	
		The teachers' union	D5	
		The county administration	D6	
		The ministry for Children and Education	D7	
		Motivation by comply	How much do the following groups generally influence your decisions as a teacher	
Students/the student council	E1			
Parents/Parents' committee	E2			

		Teachers	E3	
		The school leadership	E4	
		B40e The teachers' union	E5	
		The county administration	E6	
		The Ministry for Children and Education	E7	
Indirect measure of teachers' perceived ability to train students in CPR	Control beliefs	Is there a CPR training coordinator at your school?	F1	<p>Definition of scale</p> $PBC = \sum_{i=1}^{10} Z_i$ <p>where</p> $Z_i \text{ is item product}$ $Z_i = F_i \cdot (G_i - 3)$ $G_i = 5 \text{ for } i=7$ <p>Range of scale:</p> $PBC \in [-100; 100]$
		What expenses do you think are associated with acquiring CPR training material (f.ex. Manikins)?	F2	
		What expenses do you think are associated with training teachers to conduct CPR training of students?	F3	
		What expenses do you think are associated with hiring external instructors to conduct CPR training of students?	F4	
		How many hours do you think it is necessary to train students in CPR?	F5	
		At the moment, do you feel you have the skills to train students in CPR?	F6	
		At the moment, would you be interested in training students in CPR?	F7	
		CPR training fits well into the curriculum (f.ex. Biology or gym class)	F8	

		The school provides clear guidelines as to who is responsible for CPR training is conducted	F9
		B34c I think it is easy to acquire good CPR training material	F10
Perceived power	In your opinion, how much do the following factors influence whether CPR training is conducted?		
		The presence of a CPR training coordinator	G1
		The expenses associated with acquiring CPR training material (f.ex. Manikins)	G2
		The expenses associated with training teachers to conduct CPR training of students	G3
		The expenses associated with hiring external instructors to conduct CPR training of students	G4
		The time required to complete the training	G5
		Other teachers' skills to conduct CPR training	G6
		Own skills to conduct CPR training	G7
		CPR training fits well into the curriculum	G8
		Clear guidelines as to who is responsible for CPR training is conducted	G9
	Availability of CPR training material	G10	

Table S4. Descriptive analysis, univariable analysis and differential item functioning for CPR training and each latent variable

Latent variable	Measure	Item product code#	Homeroom class has received CPR training in 6th-9th grade						DIF [§]
			Total	Yes	No	OR [§]	95% CI	P value	
			N	Median (IQR)	Median (IQR)				
Teachers' attitudes towards CPR training of students									
Direct		Adir	624	5 (5; 5)	5 (5; 5)	3.12	1.52; 6.42	0.002	NA
Indirect		X1	620	4 (3; 8)	4 (3; 6)	1.09	1.03; 1.15	0.002	nonuniform DIF (0.037)
		X2	626	8 (6; 8)	8 (6; 8)	1.06	0.95; 1.18	0.29	no DIF
		X3	616	6 (4; 8)	4 (3; 8)	1.14	1.07; 1.21	<0.001	nonuniform DIF (0.048)
		X4	620	5 (3; 8)	4 (3; 8)	1.04	0.98; 1.10	0.21	no DIF
		X5	623	8 (6; 8)	8 (6; 8)	1.13	1.01; 1.27	0.034	no DIF

		X6	621	8 (6; 8)	8 (6; 8)	1.14	1.02; 1.26	0.017	no DIF
		X7	612	8 (4; 8)	6 (4; 8)	1.05	0.99; 1.12	0.09	no DIF
		X8	621	8 (8; 10)	8 (6; 10)	1.27	1.15; 1.41	<0.001	no DIF
Pressure teachers feel to train students in CPR									
Direct	Subjective norm	Sdir	618	2 (2; 3)	2 (1; 2)	1.88	1.56; 2.27	<0.001	NA
Indirect	Descriptive norm	C1	636	2 (1.5; 4)	4 (4; 5)	0.32	0.26; 0.38	<0.001	NA
		C2	617	4 (3; 5)	5 (4; 5)	0.38	0.31; 0.47	<0.001	NA
Indirect	Injunctive norm	Y1	589	0 (-1; 2)	0 (-1; 0)	1.06	0.97; 1.16	0.21	no DIF
		Y2	589	0 (0; 2)	0 (0; 2)	0.98	0.90; 1.07	0.68	no DIF
		Y3	592	3 (0; 4)	2 (0; 3)	1.12	1.03; 1.21	0.005	no DIF
		Y4	593	3 (2; 4)	2 (2; 4)	1.08	1.00; 1.16	0.038	no DIF

		Y5	588	0 (-2; 0)	0 (-2; 0)	0.96	0.88; 1.05	0.39	no DIF
		Y6	592	0 (-2; 1)	0 (-1; 2)	0.91	0.84; 0.98	0.019	no DIF
		Y7	588	0 (0; 3)	0 (0; 2)	0.96	0.90; 1.03	0.25	

Indirect measure of teachers' perceived ability to train students in CPR

Indirect	Control beliefs	Z1	632	5 (1; 5)	5 (5; 10)	0.92	0.88; 0.96	<0.001	no DIF
		Z2	621	1 (0; 3)	2 (0; 4)	0.96	0.90; 1.02	0.16	no DIF
		Z3	623	1 (0; 4)	2 (0; 4)	0.98	0.93; 1.03	0.43	no DIF
		Z4	620	1 (0; 4)	2 (0; 4)	0.97	0.92; 1.02	0.28	no DIF
		Z5	629	0 (0; 3)	0 (0; 3)	0.96	0.91; 1.01	0.14	no DIF
		Z6	631	2 (0; 4)	2 (0; 3)	1.02	0.95; 1.10	0.58	no DIF
		Z7	641	6 (4; 8)	6 (4; 8)	1.03	0.95; 1.10	0.50	uniform DIF (0.020)

		Z8	630	0 (0; 5)	0 (0; 4)	0.97	0.93; 1.91	0.19	no DIF
		Z9	627	2 (0; 4)	2 (1; 4)	1.00	0.94; 1.07	0.96	no DIF
		Z10	630	4 (0; 5)	3 (0; 4)	1.07	1.02; 1.13	0.009	no DIF

Abbreviations: CI, confidence interval; CPR, cardiopulmonary resuscitation; DIF, differential item

functioning; IQR, interquartile range; NA, Not applicable; OR, odds ratio.

#See Table S3 for a definition of item product code.

\$OR is given for a change in item product of one unit, each item product range from -10 to 10

‡Differential Item Functioning (DIF) presented as no DIF, uniform DIF and nonuniform DIF (P value of test)

Table S5. Association between Domains in the Theory of Planned Behavior and Completed CPR training

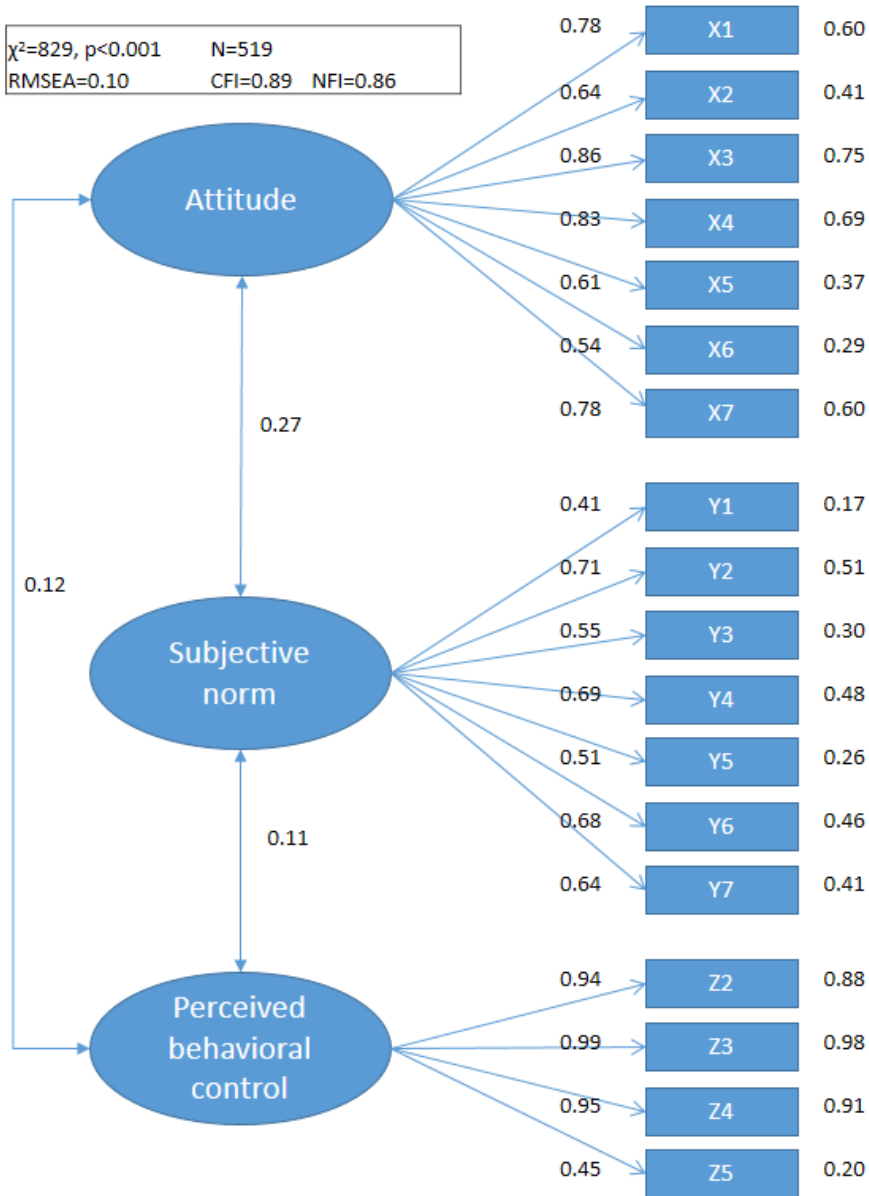
Domains in Survey of Teachers	TPB Domains	OR (95%CI)	P value	Chronbach's Alfa
Direct measure of teachers' attitudes towards CPR training of students	Attitude - direct measure	3.12 (1.52; 6.42)	0.002	-
Indirect measures of teachers' attitudes towards CPR training of students	Attitude - indirect measure	1.02 (1.01; 1.04)	<0.001	0.89
Direct measure of pressure teachers feel to train students in CPR	Subjective norm - direct measure	1.88 (1.56; 2.27)	<0.001	-
Indirect measures of pressure teachers feel to train students in CPR	Subjective norm - descriptive norm - indirect measure	5.24 (3.96; 6.95)	<0.001	0.79
	Subjective norm - injunctive norm - indirect measure	1.01 (0.99; 1.02)	0.56	
Indirect measure of teachers' perceived ability to train students in CPR	Perceived behavioral control	0.99 (0.98; 1.00)	0.22	0.89

Abbreviations: CI, confidence interval; CPR, cardiopulmonary resuscitation; TPB, Theory of Planned Behavior; OR, odds ratio.

Table S6. Characteristics of Non-Respondents

Characteristic	Teachers (n=1381)			School Leadership members (n=1240)		
	Respondents (n=665)	Non-respondents (n=716)	p value	Respondents (n=611)	Non-respondents (n=629)	p value
Region, % (n)			0.020			0.88
Copenhagen and Capital Region of Denmark	50.1 (202)	49.9 (201)		50.6 (175)	49.4 (171)	
Zealand	37.1 (72)	62.9 (122)		48.0 (98)	52.0 (106)	
Southern Region	48.2 (144)	51.8 (155)		51.1 (138)	48.9 (132)	
Central Region	51.5 (173)	48.5 (163)		47.5 (135)	52.5 (149)	
Northern Region	50.3 (75)	49.7 (74)		47.8 (65)	52.2 (71)	
Number of 9th grade students in the school, median (25th, 75th)	58 (40, 76)	55 (39, 73)	0.13	41 (22, 59)	46 (31, 63)	<0.001
Number of 9th grade classes in the school, median (25th, 75th)	3 (2, 4)	3 (2, 4)	0.87	2 (1, 3)	2 (2,3)	0.004
Type of school			0.027			<0.001
Private schools, % (n)	41.7 (100)	58.3 (140)		59.8 (205)	40.2 (138)	
Public schools, % (n)	49.5 (565)	50.5 (576)		45.3 (406)	54.7 (491)	

Figure S1. Confirmatory Factor Analysis



The coefficient associated with the two-headed arrow is the correlation between the latent variables. The coefficient associated with arrows leading from the latent variables to the item products show the factor loadings for each item product. The coefficients to the right of the item products are the percent of the variance for the item product that could be explained by the latent variable.