Video-based pain education in schools: a study with adolescents

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Abstract

Objective: School-based educational programs have shown positive changes in health-related behaviors among adolescents. The aim of this study was to analyze the changes in pain-related knowledge among adolescents and in the use of positive responses to their peers' pain behaviors after watching a brief educational video. **Methods:** One hundred and thirty-five adolescents (mean age= 13.27; SD= 1.17) participated and provided demographic and pain-related information. They also responded to a pain-related knowledge questionnaire before (T1), after (T2) and one month after (T3) watching a brief pain educational video, and to a modified version of the Inventory of Parent/Caregiver Responses to the Children's Pain Experience at T1 and at T3. **Results**: There was a significant increase in pain knowledge for all participants between T1 and T2 (η^2_p=0.73) and between T1 and T3 (η^2_p=0.62). An increase in responses considered to be positive to peers' pain behaviors (i.e., the promotion of well-behaviors and coping responses) one month after watching the educational video was also found. Interestingly, these results were not associated with the chronic pain status of the participant. **Discussion:** The findings showed that a brief and inexpensive educational video-based intervention in schools helps to increase pain-related knowledge and change responses to students with chronic pain. This has the potential to prevent chronic pain and related disability among students, and decrease bullying-like behaviors towards students with chronic pain.

Key words: Adolescents; Chronic pain; Pain education; Video-based education

1. INTRODUCTION

Chronic pain in adolescents is a public health problem with enormous societal impact [1]. Prevalence rates are up to 38% [2] with 5% reporting severe related disability [3].

From a biopsychosocial perspective, chronic pain is the result of the dynamic integration of biological processes, psychological factors, and sociocultural factors [4]. Psychosocial variables, such as beliefs about pain or responses from others to pain behaviors, have been shown to be central to determining how adolescents adjust to and cope with chronic pain [5-8]. For example, Hatchette and colleagues [9] found that peers' attitudes to pain have a significant influence on how adolescents express, adjust to and cope with their own pain. As a group, the research supports the conclusion that responses thought to be negative (e.g., solicitous responses to pain behaviors) are associated with greater pain and dysfunction, whereas responses thought to be positive (e.g., promotion of well-behaviors and coping) are associated with better adjustment to pain and less dysfunction [10-12]. Even more importantly, having chronic pain has been associated with being the target of peer victimization (bullying), which is, in turn, associated with worse pain and associated symptoms such as disability or depression [13].

It has been found that health education is effective at increasing adjustment and function among individuals with chronic conditions, including pain [14-17]. Interestingly, studies have suggested that schools could be a suitable environment for implementing educational programs [18,19]. School-based educational

programs focused on chronic pain have proved to increase students' knowledge of pain, promote coping and behavior change, and increase function [17,18]. Most of these programs have used written materials and shown some positive effects (e.g., a reduction in pain episodes) [20,21] . However, they also have some limitations [29]. Most importantly, in their current forms, these programs are expensive and very time consuming as they are being implemented by external healthcare teams. Recently, Wager et al. [22] studied the effects of a brief pain educational movie with a sample of students in grades 5 to 7. They showed increased pain knowledge after watching the movie. Remarkably, students with chronic pain acquired more knowledge than students without. This study, however, only explored students' changes immediately after watching the movie. So it is not clear whether the newly acquired knowledge persisted or not. Therefore, additional work on the long-term effects is warranted.

Given the considerations above, the objectives of this study were (1) to identify whether a sample of 12-16 year-old students' pain-related knowledge changed after an 8-minute educational video and one month later, (2) to compare changes in pain-related knowledge between adolescents with and without chronic pain and (3) to identify changes in responses to peers' pain behaviors one month later. We hypothesized that students watching the video would significantly increase their pain-related knowledge and this increase would be maintained one month later. We also hypothesized that adolescents with chronic pain would increase their knowledge more than adolescents without chronic pain. Finally, we hypothesized that participants would demonstrate fewer reactions thought to be

negative (e.g., solicitous responses), and more reactions thought to be positive (e.g., reinforcement of well-behaviors) in response to their peers' pain behaviors one month after watching the video.

2. MATERIALS AND METHODS

2.1. Production of the educational videos

Five short videos were produced as part of an educational project led by the Chair in Pediatric Pain of the Universitat Rovira i Virgili (Spain). Each one gave a brief presentation about one very specific pain-related topic. They were intended to help young people understand what pain is, the factors that can influence the development of chronic pain and how it can be treated to prevent chronic pain and related disabilities. The first video ("*What is pain?")* provides basic information about pain and pain processing in the nervous system. The second ("*Gate control theory")* summarizes the essential information about Melzack and Wall's theory as it relates to pain processing and management. The third one ("*Types of pain")* presents information about acute and chronic pain, and the difference between them. The fourth (*"The impact of chronic pain on children and adolescents"*) provides information about the prevalence of chronic pain and the impact it has on young people and their families. The last one ("*The management of chronic pain in children and adolescents")* highlights the need for a multidisciplinary team to manage chronic pain and for patients to take an active role in the treatment. The video content was written by JM, director of the Chair. All information is presented in a child-oriented manner (i.e., using age-appropriate language and colors, and

animated cartoons) and is supported by dynamic cartoons. In this study, all 5 videos were presented together as one brief 8-minute piece.

[Insert Figure 1 about here.]

2.2. Variables and measures

Sociodemographic/Descriptive information

Participants were asked to give their age, sex and school grade.

Pain-related knowledge

For the purposes of this study, a questionnaire to measure pain-related knowledge of participants (i.e., a general and basic understanding of what pain is) was developed by consensus by a group of clinicians and researchers with wide experience on pediatric chronic pain. The questions were developed on the basis of the video script. However, the questionnaire did not use the same words as in the video script in order to avoid the effects of similarity and memory. The questionnaire contains 12 questions, and it was designed so that there were at least two questions on each of the 5 individual videos. A single-choice format with three response options and only one correct answer was used (see Table 1 for examples). It took about 10 minutes to complete the questionnaire (a copy of the questionnaire can be obtained from the corresponding author).

The feasibility of the questions was pilot-tested with a sample of 10 adolescents. These students (who did not participate in the main study) were asked to respond to the questions and say whether they were too easy, fair, difficult or incomprehensible. Following this test, we changed some of the wording in the

original questions to improve comprehensibility. Then, the new form was again presented to a different sample of 8 adolescents with the same objectives. In this second round, no additional changes were needed. The overall Cronbach's alpha for this questionnaire was 0.83. The questions were perceived as fair. Each correct answer is given 1 point. Therefore, scores can range from 0 to 12, with lower values indicating less knowledge.

Pain-related characteristics

Participants were asked if they had had any pain in the preceding 3 months. If they answered affirmatively, they were asked to provide information about the *pain location.* We used a pain mannequin (human figure) in which participants had to identify where they were experiencing pain. The mannequin is divided into 21 areas and has been successfully used by others for this purpose (von Baeyer et al., 2011). Participants also had to provide information about the pain *duration* in months. Furthermore, they were asked about the *frequency* of this problem using the following response options: daily, several times a week, once a week, once or twice a month, once or twice in the last three months. In this study, adolescents classified as having chronic pain were those who suffered from pain for at least three months and that was experienced continuously or recurrently (at least once a month). Participants who did not fit that criteria were classified as individuals without chronic pain.

Responses to peers' pain behaviors

For the present study, we measured responses to peer's pain behaviors with a modified version of the Inventory of Parent/Caregiver Responses to the Children's

Pain Experience (IRPEDNA) [23]. The original version of IRPEDNA was designed to measure parent/caregiver's responses to children's pain episodes. All the items reflect an individual's possible actions and behaviors after observing a child's pain behaviors. The questionnaire has 38 items and 3 scales: (1) solicitousness (i.e., responses that show interest or concern after a pain behavior or action; an example of an item in this subscale is: "Try to make up for his/her suffering by paying him/her more attention"), (2) discouragement (i.e., showing disapproval or creating difficulties after displaying appropriate behaviors; an example of an item in this subscale is: "Think that it cannot really be so bad") and (3) promotion of well-behaviors and coping (i.e., approving and positively reinforcing suitable pain behaviors; an example of an item in this subscale is: "Tell him/her that you think everything will be all right"). Respondents are asked to answer how often they would engage in the behavior represented in the responses after their children's pain behaviors using a five-point response scale (0 = never; 1 = hardly ever; 2 = sometimes; 3 = often; 4 = always). Higher scores are indicative of using specific responses more frequently. The overall Cronbach's alpha for the original instrument was 0.89 and the reliability coefficients for the subscales ranged from 0.83 to 0.87. Scores on all three scales showed good criterion-related validity [23].

As mentioned, all the items (38) were reviewed and adapted for the purposes of the study. Seven were removed because they were related to parental behaviors and could not be adapted (e.g., *I stay at home to provide him or her the necessary care*, or *I put him or her to sleep early*). The remaining items (31) reflect actions and behaviors that peers might enact after observing pain behaviors (e.g. *I advise him*

or her to relax and breathe). The respondents were asked to answer how often they would enact each of the responses when a classmate was in pain for hours or days using the five-point response scale as in the original version. The overall Cronbach's alpha for the modified version of the questionnaire was 0.79, and the reliability coefficients for the subscales solicitousness, discouragement and promotion of well-behaviors and coping were 0.77, 0.79, and 0.81, respectively.

2.3. Procedure

Eight secondary schools from Tarragona (Catalonia, Spain) were selected for convenience and invited to participate in the study via email and telephone, and four replied expressing interest. An informative meeting was arranged with these four schools, and two of them finally agreed to participate with their students who were between 12 and 16 years old. A letter explaining the study was given to the potential participating adolescents and their parents/caregivers. A parent or caregiver had to provide consent to allow his or her child to participate. Adolescents who assented and whose parents agreed to participate completed the questionnaires during school time following the instructions provided by research staff, and watched the video.

First, after a short staff introduction, all participants completed the Pain-related Knowledge Questionnaire and the modified IRPEDNA (T1). They also answered demographic and pain-related questions. Second, immediately after watching the 8-minute pain educational video (T2) the students completed the Pain-related Knowledge Questionnaire a second time. They were not informed of this second assessment after the video to avoid attention or motivation bias to being

assessed. Third, one month later (T3), participants again answered the Pain-related Knowledge Questionnaire, the modified *IRPEDNA*, and pain-related questions. The study was approved by the Internal Review Board of the School of Education and Psychology of the Universitat Rovira i Virgili. Neither participants nor schools received compensation for participating.

2.4. Data analyses

To study potential improvements in pain-related knowledge after watching the videos, repeated measures analyses of variance (ANOVA) were implemented with scores on the Pain-related Knowledge Questionnaire as the dependent variable and time of measurement as the independent variable. A series of ANOVA analyses were conducted separately for the total and the individual pain-related knowledge scores of the 5 sections of the video. If significant differences in time of measurement emerged, post-hoc tests were performed using a Tukey Test to compare specific differences between T1 and T2, T1 and T3, and T2 and T3.

To determine whether the differences in pain-related knowledge scores (for the total and 5 individual sections of the video) were associated with the chronic pain status of the participants, additional analyses were conducted using a set of two-way repeated measures ANOVAs (T1, T2, and T3 as within-subject variables and chronic pain status as the between-subject variable). A Student's t-Test was also performed to determine whether participants with chronic pain started (T1) with more initial knowledge than participants without chronic pain.

Finally, another one-way repeated measures ANOVA was conducted to measure potential changes in the responses to peers' pain-related behaviors

between T1 and T3. In this analysis, the scores on the three IRPEDNA subscales (i.e., solicitousness, discouragement, and promotion of well-behaviors and coping) were the dependent variables.

Data analyses were implemented with SPSS® software 25.0.

3. RESULTS

3.1. Participants

A total of 135 students participated in the study, most of whom were females (61%). The participants' age ranged from 12 to 16 years old with a mean age of 13.27 years (SD=1.17). Of these, 45 participants (33%) were first grade students, 37 (28%) second graders, 34 (25%) third graders and 19 (14%) fourth graders.

Most of the participants (89%) reported having had pain in the previous three months. Of the total sample, 33% were categorized as experiencing chronic pain. Of those students experiencing chronic pain, 64% were female and 36% were male. Pain in the lower limbs was the most frequently reported pain location (29%), followed by headache (26%), back pain (18%) and abdominal pain (12%). Most participants (71%) with chronic pain had pain in two or more locations, and they experienced pain very often, several times per week (43%) or even daily (27%).

3.2. Changes in pain-related knowledge

Pain-related knowledge was found to increase significantly when the total scores for the three assessment moments (T1, T2, T3) were compared: $F(_{1.74,\ 234.37})=232.99$, $p<0.05$, $\eta^2_p=0.64$. There was a significant increase between T1 (M=5.6, SD=2.17) and T2 (M=9.6, SD=2.18), $F(_{1,\ 144})= 389.43$, $p<0.05$, $\eta^2_p=0.73$ and between T1 (M=5.6, SD=2.17) and T3 (M=8.84, SD=2.36), $F(_{1,\ 134})=217.15$,

$p<0.05$, $\eta^2_p=0.62$. However, a statistically significant decrease was found between T2 (M=9.6, SD=2.18) and T3 (M=8.84, SD=2.36), $F(_{1, 134})=24.19$, $p<0.05$, $\eta^2_p=0.15$. Moreover, there were significant increases in pain-related knowledge in all 5 individual sections of the video (see Table 2).

At T2, the scores on the items for the section of the video *Types of pain* showed the largest increase in knowledge ($\eta^2_p=0.48$). One month later, at T3, the scores on the items for the sections *Types of pain* and *Impact of chronic pain* showed the largest knowledge gain ($\eta^2_p=0.36$) (see Table 2).

[Insert Table 2 about here.]

3.3. Differences in pain-related knowledge associated with chronic pain status

Participants with chronic pain did not show significantly greater total pain knowledge at baseline (M= 5.59, SD=2.12) than participants without chronic pain (M=5.52, SD=2.25; t(97)=0.64, p<0.05). In addition, there were no statistically significant differences in total pain knowledge gain associated with chronic pain status after watching the video: F(1,133)=0.72, $p>0.05$, $\eta^2_p=0.01$ (see Table 3 for additional information about each of the 5 sections of the video).

[Insert Table 3 about here.]

3.4. Responses to peers' pain behaviors

No significant changes were found one month after watching the educational video (T3) in solicitous responses (F(1,134)=0.36, $p>0.05$, $\eta^2_p=0.00$) or discouraging responses (F(1,133)=0.13, $p>0.05$, $\eta^2_p=0.01$). However, the promotion

of well-behaviors and coping responses increased significantly between T1 and T3, $F(1,134)=9.29$, $p<0.05$, $\eta^2_p=0.06$. No significant changes were found in any of the response scales (see Table 4) for adolescents with and without chronic pain.

[Insert Table 4 about here.]

4. DISCUSSION

The main aim of this study was to evaluate whether a short educational video could help to increase pain-related knowledge and promote change in the responses to peers' pain behaviors among adolescents. Some important significant findings emerged, and the results partially confirmed the hypothesis.

First, and most importantly, our data showed that after viewing a short educational video, participants in this study showed a significant increase in pain-related knowledge, and this increase was maintained one month later, although there was a small but significant decrease between T2 and T3. Therefore, the results confirmed our first hypothesis, and are consistent with data from studies on other non-video based pain educational programs [20,21,24]. However, our study shows an important advantage over previous studies as all these other educational programs used written materials and are more time-consuming (they can take from 60 minutes to one year to complete), and therefore more expensive, than our 8-minute educational video. A recent systematic review concluded that educational videos are more effective than written materials at increasing positive health behaviors and health-related knowledge [25]. However, the deterioration in the improvement of knowledge between T2 and T3 may indicate that additional strategies are needed to help maintain the gained knowledge long-term.

To the best of our knowledge, only one study has focused on the efficacy of a brief pain educational movie with students [22]. The movie was 11 minutes long but the authors focused on the knowledge gained only immediately after pupils had watched it and not on the more long-term effects. In our study, we did a follow-up at 1 month and found that increases in pain-related knowledge remained and that the differences with pain knowledge at baseline were statistically significant.

Second, adolescents with chronic pain did not show a significantly greater chronic pain-related knowledge base than adolescents who did not have chronic pain. Neither did they show a significantly larger gain in pain knowledge than adolescents without chronic pain. This is contrary to the findings reported by Wager and colleagues [22] which showed that students with frequent pain benefitted more from the educational movie. Although this result is contrary to our hypothesis, it may actually reflect some key positive characteristics of the video, and therefore support its validity. That is, our video was created to engage interest regardless of whether the observer had chronic pain, and the data in this study supports this. If future studies confirm the validity of this finding, the potential value of this sort of videos will be endorsed as a strategy for educating nonclinical populations. Future studies could look at wider age ranges and translate the video into other languages to test for its transcultural validity.

Third, the hypothesis on the responses to peers' pain behaviors was partially supported. That is, no changes were found in the responses that were regarded as negative (i.e., solicitous and discouragement responses) [23,26]. Studies to ascertain if this type of negative responses do not change with a short-video based

education intervention (i.e., not only assessing attitudes and intentions, but measuring actual responses) are warranted.. Interestingly, however, our data showed a statistically significant increase in participants reacting with more positive behaviors such as the promotion of well-behaviors and coping one month after watching the video. It is possible that increasing pain knowledge enhances positive responses to peers' pain behaviors by helping to better understand what happens to those suffering from chronic pain. Remarkably, there were no differences between participants with and without chronic pain. Future long-term studies should investigate whether such a short video-based educational intervention leads not only to increases in knowledge but also to changes in behavior, and how these changes can influence adolescents adjusting to chronic pain and their own pain responses. It may also be possible that increasing knowledge about pain and changing attitudes to peers with pain will help decrease bullying, a highly prevalent problem in schools [9,13]. Assessing the effects of this sort of video on peer victimization behaviors will provide greater insight into whether this strategy has a beneficial effect in this area or if it needs to be enhanced by additional interventions.

This study has a number of limitations that must be considered when interpreting the results. First, a relatively small sample of adolescents from two schools participated in this study. However, the number of participants was appropriate for the analyses we had planned, and greater than the numbers reported in other studies of the same kind [22]. Second, the study sample was composed of school students that were healthy for the most part and willing to

participate in the study. Thus, we cannot determine the extent to which the study findings would generalize to other populations of students. Further research is needed in samples with other cultures, ages and diverse chronic pain conditions to help determine the reliability of the study findings. Furthermore, the existence of chronic pain was determined on the basis of the presence and frequency of the problem, not on severity (e.g., only students whose disabilities allowed them to attend to school were able to participate). Therefore, differences might have been detected between students with and without chronic pain if those with chronic pain had suffered high levels of disability. If future studies confirm that educational videos are better suited to highly disabled individuals, the videos could be coupled with additional strategies to increase their effectiveness with less disabled populations and used in school-based chronic pain educational programs. Therefore, future studies with both clinical and nonclinical samples, including randomized controlled trials, to confirm the validity of the results are warranted. Third, all data were based on self-report measures. In future studies, other methods should be used, such as direct observation of behavior. Finally, only short-term effects (i.e., one month after watching the video) were studied. Therefore, we do not know if the improvement in pain-related knowledge and the changes in the responses to peers' pain behavior are maintained over time. Long-term changes in pain-related knowledge and responses to peers' pain behaviors should be investigated in future studies. Research to determine how to help maintain the knowledge long-term is warranted. Interestingly, a recent study with a sample of seventh-grade students showed that two booster sessions after a pain

neuroscience education program helped to maintain positive behavioral changes at six-month follow-up [27]. In addition, it would be interesting to study if participants in these studies identify changes in pain-related knowledge and behavior as useful for them.

Despite the study's limitations, the findings provide new important information on the value of a brief 8-minute pain educational video for increasing pain-related knowledge in adolescents and observing changes in responses to peers' pain behaviors. These findings show that a brief, low-burden and inexpensive video-based educational intervention can improve adolescents' pain-related knowledge and increase positive responses to their peers' pain behaviors. It can potentially contribute to the secondary prevention of chronic pain and related disability and a decrease in bullying-like behaviors towards students with chronic pain. Should these results be replicated, the 8-minute educational video developed by the Chair in Pediatric Pain of the Universitat Rovira i Virgili would be shown to be a useful addition to a program for educating adolescents about chronic pain. It is also a strategy that could easily be implemented (even online) by schools or community centers to improve students' health literacy (in terms of chronic pain), much in the same way as other widely implemented education programs on other chronic health problems, like asthma [28] HIV [15] or diabetes [29].

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Table 1. Examples of questions

EXAMPLE QUESTION	VIDEO SECTION	RESPONSE OPTIONS
*Where is **nociceptive** information processed and interpreted?*	What is pain?	a) In your muscles b) In your brain * c) In your skin
Which of the following factors can help to reduce the problems caused by chronic pain?	Gate control theory	a) Rest b) Moderate physical activity * c) Focus attention on pain
Maria is playing football and during the game she twists her ankle. She tries to keep playing, but every time she puts weight on her foot she feels intense pain. What kind of pain does Maria experience?	Types of pain	a) Chronic pain b) Acute pain * c) Recurrent pain
What statement about chronic pain is right?	The impact of chronic pain	a) Chronic pain does not affect children or adolescents, it is an adult problem. b) Chronic pain also occurs in children and adolescents, but it is uncommon (between 2-3% of the child and youth population). c) Chronic pain also occurs in children and adolescents and is a fairly frequent problem (between 20-30%)*
What would be the best option to treat chronic pain in young people?	The management of chronic pain	a) It should be treated by the pediatrician. He/She is the one who knows us best and will know how to treat the pain. b) A multidisciplinary team with different health professionals like physicians, physiotherapists, nurses and psychologists. * c) Health professionals from a single specialty. Involving other professionals would not add any benefits. It just confuses patients and wastes their time.

Examples of questions that were developed on the basis of the video script. A single-choice format with three response options and only one correct answer was used.

** Correct answer*

Table 2. Pain-related knowledge changes between T1 and T2, T1 and T3, and T2 and T3 (n= 135; df= 1.134)

	T1-T2			T1-T3			T2-T3		
	F	*p*	η^2_p	F	p	η^2_p	F	*p*	η^2_p
Total pain knowledge	389.43	0.00	0.73	217.15	0.00	0.62	24.19	0.00	0.15
What is pain	97.43	0.00	0.40	38.90	0.00	0.2	17.21	0.00	0.11
Gate control theory	110.84	0.00	0.43	63.82	0.00	0.32	3.42	0.00	0.025
Types of pain	133.37	0.00	0.48	75.33	0.00	0.36	6.98	0.09	0.049
The impact of chronic pain	102.05	0.00	0.41	76.71	0.00	0.36	5.40	0.02	0.39
The management of chronic pain	86.87	0.00	0.38	56.01	0.00	0.30	3.01	0.00	0.22

Table that shows changes in pain related-knowledge.
n= number of subjects; F= the F-value ; df=degrees of freedom; p=statistical significance; η^2_p= eta squared

Table 3. Pain-related knowledge scores over time and main effects

		T1		*T2*		*T3*		*Main effect*			
	n	M	SD	M	SD	M	SD	F	df	*p*	η^2_p
Total pain knowledge[a]	135	5.59	2.12	9.58	2.16	8.84	2.36	232.99	1.74,234.37	0.00	0.64
Chronic pain	44	5.52	2.25	9.93	2.11	9.16	2.08	0.72	1,133	0.40	0.01
No chronic pain	91	5.64	2.14	9.44	2.21	8.69	2.48				
What is pain[b]	135	1.27	0.78	1.86	0.37	1.67	0.61	52.76	1.77,237.39	0.00	0.28
Chronic pain	44	1.32	0.74	1.93	0.25	1.75	0.49	1.43	1,133	0.23	0.01
No chronic pain	91	1.24	0.81	1.82	0.41	1.63	0.66				
Gate control theory[c]	135	0.93	0.67	1.67	0.59	1.56	0.62	62.46	1.87,250.40	0.00	0.32
Chronic pain	44	0.82	0.69	1.68	0.56	1.57	0.64	0.33	1.133	0.57	0.00
No chronic pain	91	0.99	0.69	1.66	0.60	1.55	0.64				
Types of pain[jd]	135	1.63	0.99	2.63	1.15	2.39	1.26	77.03	1.88,252.49	0.00	0.37
Chronic pain	44	1.54	1.13	2.77	1.20	2.55	1.11	2.61	1,133	0.11	0.02
No chronic pain	91	1.27	0.91	2.56	1.28	2.31	1.13				
The impact of chronic pain[e]	135	1.03	0.72	1.77	0.50	1.66	0.55	70.77	1.61,245.37	0.00	0.35
Chronic pain	44	0.93	0.73	1.82	0.45	1.68	0.56	0.04	1,133	0.85	0.00
No chronic pain	91	1.08	0.72	1.75	0.53	1.65	0.55				
The management of chronic pain[f]	135	1.02	0.74	1.69	0.54	1.59	0.66	54.45	1.79,240.66	0.00	0.29
Chronic pain	44	0.91	0.74	1.73	0.54	1.66	0.61	0.02	1,133	0.96	0.00
No chronic pain	91	1.08	0.73	1.67	0.54	1.56	0.69				

Table about differences in pain-related knowledge associated with chronic pain status.

*Note: [a]Range 0-12; [b]Range 0-2, [c]Range 0-2; [d]Range 0-4; [e]Range 0-2; [f]Range 0-2.

n= number of subjects; M= mean; SD= standard deviation; F= the F-value ; df=degrees of freedom; p=statistical significance; η^2_p= eta squared

Table 4. Changes in responses to peers' pain behaviors over time (between T1 and T3) and to chronic pain status

		T1			*T3*			*Main effect*			
	n	M	SD	Range	M	SD	Range	F	df	*p*	η^2_p
Solicitousness	135	2.21	0.71	0-3.60	2.26	0.77	0.30-4	0.36	1,134	0.55	0.00
Chronic pain	44	2.22	0.65	0-3.50	2.20	0.67	0.30-3.30	0.01	1,133	0.95	0.00
No chronic pain	91	2.21	0.69	0-3.60	2.28	0.82	0.40-4				
Discouragement	135	0.77	0.57	0-3.20	0.78	0.63	0-3.70	0.13	1,133	0.72	0.01
Chronic pain	44	0.74	0.44	0-2	0.77	0.59	0-2.30	0.06	1.133	0.79	0.00
No chronic pain	91	0.87	0.57	0-3.20	0.78	0.64	0-3.70				
Promotion of well-behavior and coping	135	2.66	0.70	0.27-4.55	2.86	0.72	0.36-4.09	9.29	1,134	0.00	0.06
Chronic pain	44	2.72	0.73	0.27-4.55	2.84	0.58	1.36-3.91	0.01	1,133	0.93	0.00
No chronic pain	91	2.63	0.73	0.55-3.82	2.90	0.79	0.36-4.09				

This table shows changes in responses to peers' pain behaviors over time and to chronic pain status

n= number of subjects; M= mean; SD= standard deviation; F= the F-value ; df=degrees of freedom; p=statistical significance; η^2_p*= eta squared*

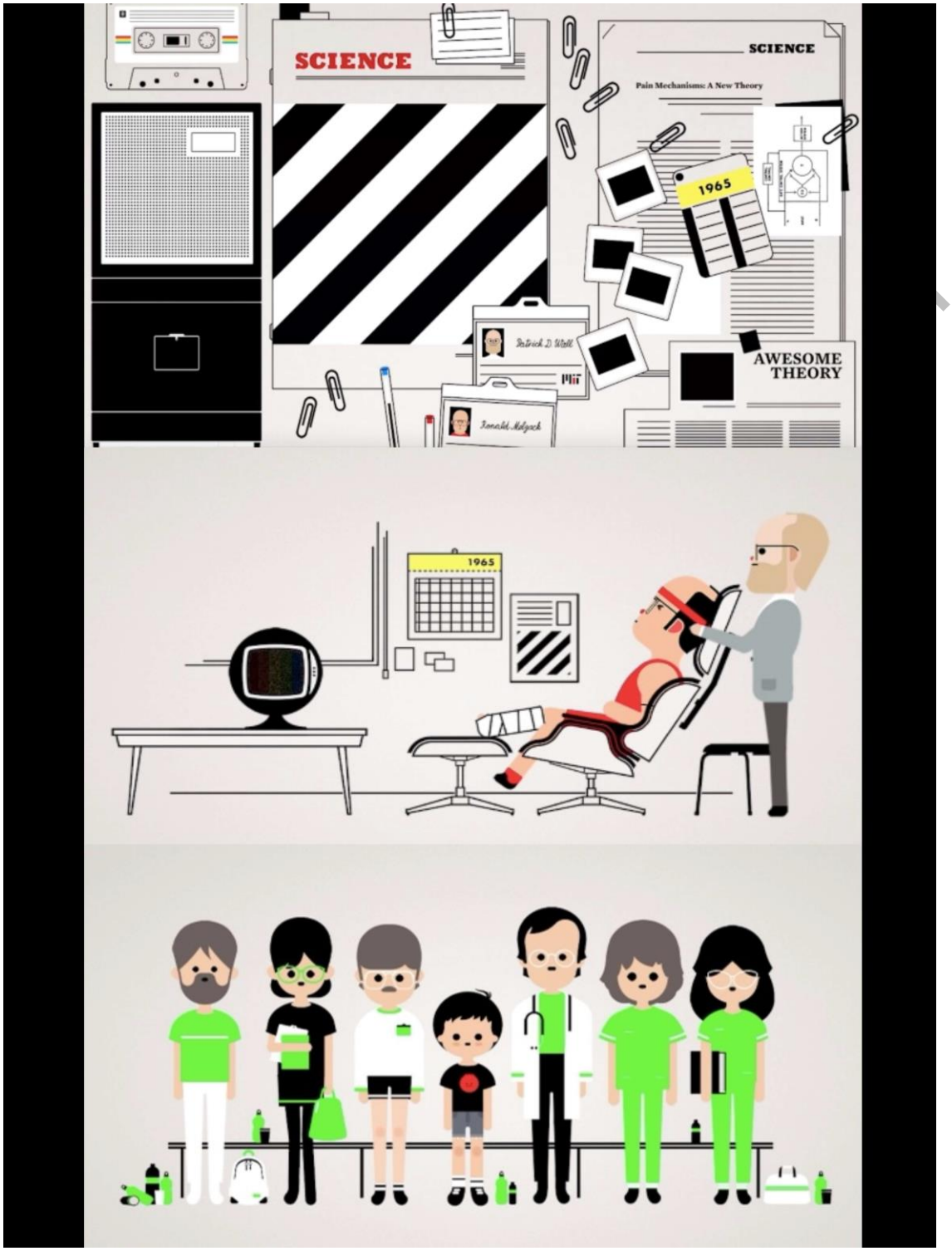

Figure 1. Provides captures from the videos. First, an image related to the gate-control theory when published in *Science*. Next, an image showing Drs. Melzack and Wall in their lab. Finally, a boy with chronic pain and the team of professionals involved in his treatment.