

Article

Measurement of Individual Differences in State Empathy and Examination of a Model in Japanese University Students

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Abstract: The typical state empathy research used perspective-taking instructions and examined the effect of instructions on empathy-related variables. Empathy-arousing processes were generally not measured. The effect of perspective-taking instructions has been questioned recently. Observers could imagine targets' feelings without such instructions. This study evoked empathy in Japanese undergraduates ($N = 157$) without instructional procedure, and based on participants' responses to questionnaires, measured individual differences between antecedent, process, and intrapersonal outcome variables of state empathy, referring to the organizational model and theories of empathy-arousing processes. The purpose of this study was to measure these variables, examine the causal relationship between them using path analysis, and clarify how empathy occurs. In this way, we could suggest through which processes and antecedent factors intrapersonal empathic outcomes are produced. It is probably the first attempt to clarify how empathy occurs using a social psychological study framework and questionnaire method. This research was originally conducted in 2011 based on two similar studies not published internationally, when only some of the variables were used in our analyses. Afterwards, we constructed another analysis method, reanalyzed the data in 2019 and further reanalyzed in 2023 to obtain the final version of the results. Limitations and scientific and practical implications were discussed.

Keywords: empathy; state empathy; organizational model; measurement; process variables; path model; affective reactions; adjective checklist



Citation: Tobari, M.; Oshio, A. Measurement of Individual Differences in State Empathy and Examination of a Model in Japanese University Students. *Psych* **2023**, *5*, 928–947. <https://doi.org/10.3390/psych5030061>

Academic Editor: Alexander Robitzsch

Received: 29 May 2023

Revised: 21 August 2023

Accepted: 29 August 2023

Published: 4 September 2023



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1. Introduction

Empathy research has often been conducted using trait empathy measures. However, some researchers evoked empathy in participants using particular stimuli and measured some components of empathy-related constructs. This type of research can be called state empathy research. Researchers typically examined the effects of perspective-taking instructions or some conditions (e.g., similarity) on empathic responses (e.g., Batson et al., 1997 [1]; Hodges and Wixwat, 2022 [2]; Batson et al., 2005 [3]) or the relationship between empathy and prosocial behaviors (e.g., Lehmann et al., 2022 [4]; Gamble et al., 2023 [5]).

Perspective-taking instruction procedures have been used particularly often. Perspective-taking instructions are considered to promote the perspective-taking process, but some people might imagine another's feelings without such instructions. Empathic responses are considered to be produced through multiple processes (Hoffman, 1984 [6]; Davis, 1994 [7]). Perspective-taking or role-taking (imagining how others feel) can be regarded as an example of empathy-arousing processes. If it is possible to measure empathy-arousing processes, by measuring these processes as well as empathic responses, researchers could examine the relationship between them.

An overwhelming majority of state empathy research has not measured empathy-arousing processes. However, Tobari (2005) [8] and Tobari et al. (2010) [9] evoked

empathy in participants with film stimuli, and referring to the organizational model that Davis (1994) [7] proposed and Hoffman's [6] theory of empathic arousal, measured empathy-arousing processes as well as empathic responses. These studies were not published internationally.

Davis (1994) [7] distinguished processes and outcomes in empathy-related constructs. Outcomes were divided into intrapersonal and interpersonal outcomes. The organizational model includes four constructs: antecedents, processes, intrapersonal outcomes and interpersonal outcomes. Applying the constructs of the organizational model, Tobarí [8] and Toabi et al. [9] measured processes and intrapersonal outcomes and examined the relationship between them.

The present research was originally conducted in 2011 based on these two studies [8,9] using the same stimuli and almost the same measures. We added some process variables and antecedent variables and measured the individual differences between those variables using a questionnaire. We did not use the instructional procedure. At first, we used only some of these variables in our analyses. However, afterwards, we noticed the potentiality of this research, constructed another analysis method, reanalyzed the data in 2019, and further updated our analyses in 2023. We examined the relationship between the variables of the above three constructs.

First, we briefly explain (1.1) the history of the concept of empathy, (1.2) the organizational model, and (1.3) state empathy research to which we referred. Then, we explain (1.4) the present study, refer to (1.5) the current state empathy research, and again describe (1.6) the purpose of this study.

1.1. The History of the Concept of Empathy

The origin of the empathy concept is German aesthetic term *Einfühlung*. German philosopher and psychologist Lipps [10] used this term to refer to the process through which people come to know and experience others' feelings. Titchener [11] translated it into the term "empathy" and introduced it into American psychological societies. However, there had been already another similar term—sympathy. For more than fifty years, the terms of empathy and sympathy were used in psychology side by side. Although the term empathy had originally included the meaning of affective reactions [10,11], its cognitive component (i.e., imagining or understanding others' mind or feelings) was generally more emphasized (e.g., Dymond [12]). However, perhaps the similarities between the two concepts of empathy and sympathy or attention to the affective components or arousal process of empathy seemed to cause some changes in the usage of the empathy concept occasionally.

Since the 1960s, there have appeared views that conceived of empathy as an observer's affective reaction to an observed experience of another person. Stotland [13] defined empathy as "an observer's reacting emotionally because he perceives that another is experiencing or is about to experience an emotion." As other contemporary theorists and researchers of social and developmental psychology (e.g., Feshbach and Roe [14]; Hoffman [15]) also tended to define empathy in similar manners, since then, in these fields of psychology, empathy has been generally defined as an observer's vicarious affective responses to another's emotional experience.

The theorists who defined empathy as such also tended to recognize the role of cognition in the processes through which affective responses were produced in an observer. Hoffman [6,16] emphasized the processes through which empathy was aroused in the observer and described several modes of empathic arousal. Thus, the concepts of empathy can be said to include not only affective and cognitive components but also processes and outcomes (responses).

1.2. The Organizational Model

The comprehensive view of empathy that assumes that the concept of empathy has several components was named the multidimensional view of empathy [7,17]. Based on this view, Davis [17] developed a multidimensional trait empathy scale (Interpersonal Reactivity

Index: IRI), and moreover, proposed an organizational model [7]. This model conceives of a typical empathy episode in which a person observed another person (target) experiencing some affect, after which some affective, cognitive, and/or behavioral responses occur on the part of the observer.

This episode seemed to be related to four constructs: antecedents, processes, intrapersonal outcomes and interpersonal outcomes. Antecedents refer to personal or situational potential factors that could influence an empathic episode. Processes refer to the mechanism through which empathic responses are produced. Intrapersonal outcomes refer to affective and cognitive responses (outcomes) produced in the observer that are not manifested in overt behavior. Affective outcomes were subdivided into parallel outcomes (reproductions of the target's feelings in an observer) and reactive outcomes (e.g., empathic concern for needy or maltreated others). Cognitive (nonaffective) outcomes include accuracy of person perception. Interpersonal outcomes refer to behavioral responses directed toward the target (e.g., helping behavior) [7]. The organizational model illustrates the causal relationship between those constructs.

Empathy that occurs in a certain situation is called state empathy, distinguished from trait empathy as a personality trait. Among the above four constructs, processes and intrapersonal outcomes are assumed to be main components of state empathy. Antecedents and interpersonal outcomes are generally not regarded as components of state empathy. Figure 1 shows theoretical relationships between antecedents, processes, intrapersonal outcomes, and state empathy.

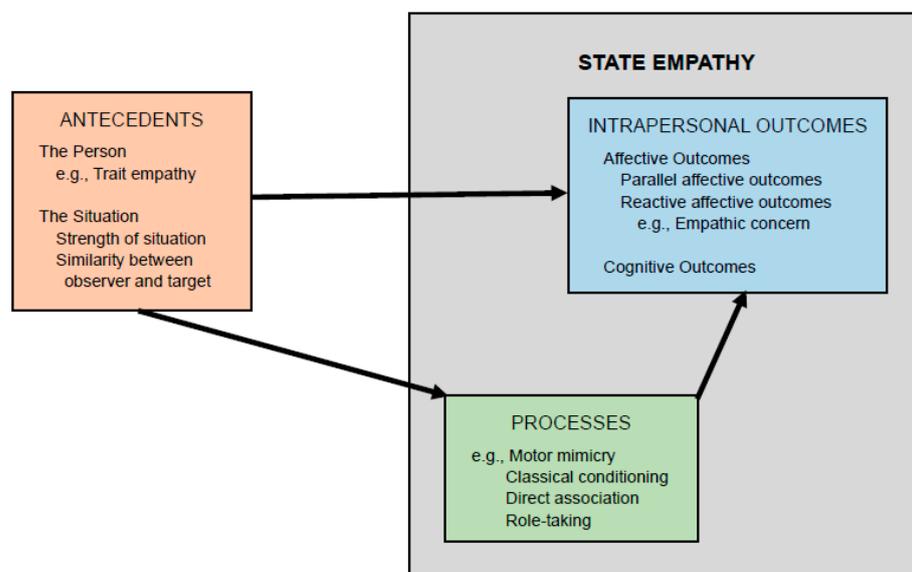


Figure 1. The relationships between antecedents, processes, intrapersonal outcomes, and state empathy. This model was created after the organizational model (in “Empathy: A social psychological approach,” Davis, 1994 [7], p. 13: Copyright © 1994, 1996 by Westview Press, Inc, A Division of HarperCollins Publishers, Inc., New York, NY, USA). This model shows its three constructs and several subconstructs. The antecedent factors and some processes included in the original model are also shown. Davis (2006) [18] slightly revised the organizational model. However, we use the original model [7], which we regarded as more useful for our purpose.

1.3. Previous Studies on State Empathy

A view of empathy as an observer's affective responses to an observed experience of another person brought about several experimental studies on state empathy. Representative studies were those of Feshbach and Roe [14], Stotland [13], and Batson et al. [19].

Feshbach and Roe [14] showed children slide stories and asked them to state how they themselves felt and how the protagonist felt. If the affective category and verbal responses

were consistent, empathy was scored. It could be assumed that the former question brought an affective outcome, and the latter brought emotion recognition (i.e., a cognitive outcome).

Stotland [13] had participants observe a demonstrator receiving heat treatment and expressing pain under three different instructional sets. Participants were instructed to imagine how they would feel if they were in the other's position, imagine how the other person would feel, or watch the other person's physical movement closely. As a result, instructional sets influenced observers' emotional reactions measured with two physiological measures.

Batson et al. [19] showed participants a person in a distressful situation and expressing pain. Participants were asked to indicate on an adjective checklist how much they were experiencing each emotion as a result of observing that person. Based on factor analysis of the data of emotional responses, a personal distress index (e.g., upset, distressed) and empathy (empathic concern) index (e.g., sympathetic, moved) were created.

Subsequently, some researchers (e.g., Davis et al. [20]; Eisenberg et al. [21]) conducted similar studies on state empathy. These researchers used film stimuli to evoke empathy in participants, often used instructional set procedure that was developed by Stotland [13], and measured participants' emotional responses with an adjective checklist, although adjectives used were not the same as Batson et al. [19] used.

Using the constructs of the organizational model, the previous state empathy studies [13,14,19–21] measured intrapersonal outcomes, particularly affective outcomes, but processes were not directly measured. Processes were often controlled by instructional sets. However, some observers might have imagined another person's feelings and empathized with that person without such instructions. If tools to measure empathy-arousing processes are created, the relationship between processes and intrapersonal outcomes could be examined using them.

Tobari (2005) [8] and Tobari et al. [9] attempted to create such tools. They evoked empathy in participants (the former using female undergraduates and graduates, and the latter junior high school male and female students) using film stimuli, and immediately after that asked them to complete a questionnaire. These researchers used the organizational model as the study framework and attempted to measure empathy-arousing processes as well as their affective responses and emotion recognition through their responses to this questionnaire. Consequently, one process scale (role-taking scale) and three intrapersonal outcome scales (parallel affective responding, other-oriented responding and understanding others' feelings scales) were established [9]. The methods of measuring parallel affective responding (emotion-sharing) and understanding others' feelings (emotion recognition) were based on the work of Feshbach and Roe [14] and Batson et al. [19]. These scales included the same adjectives (items). As the scores for the items of understanding others' feelings were rather high, the targets' feelings were judged to be easily recognized [9]. If participants felt these emotions represented by the adjectives included in the understanding of others' feelings scale, participants were regarded as experiencing the same emotions as the targets. As a result of a path analysis examining the relationship between these variables, more than half of the variance in other-oriented responding was explained by the variances in the other variables [9]. However, the variances in the other two intrapersonal outcome scales were only slightly explained by those of the used variables [9]. Tobari et al. [9] measured only one process variable. If process variables were added, it is expected that the explained variance scores of those intrapersonal outcomes could be increased.

1.4. The Present Study

As to empathy-arousing processes, Feshbach [22] wrote that affective empathy reaction is assumed to be a function of the following three factors: (1) the cognitive ability to discriminate affective cues in others, (2) the cognitive skills to assume the perspective and role of another person, and (3) emotional responsiveness. Among the variables Tobari et al. [9] measured, role-taking corresponded to (2) and parallel affective responding and other-oriented responding corresponded to (3), but (1) was not measured. When

we observe distressed others, we may also observe their facial expression, behaviors, or situation, which could be affective cues for us to understand their feelings or to feel the same emotions as others. Consequently, we added three items representing attention to affective cues (see Section 2.6 Measures).

Adding these process variables, we conducted our research similarly to Tobari [8] and Tobari et al. [9] in 2011. We evoked empathy in male and female undergraduates with the same film stimuli used in these studies. At first, we examined the relationship between process and intrapersonal outcome variables as the work of Tobari et al. [9]. We also measured trait empathy and situational factors, but we did not use them in the original analyses.

Keeping close watch on the movement of empathy research in various fields of psychology, we noticed the potentiality of this research. We conducted a full review of this study, conceived of another analysis method, and updated our analyses in 2019 and 2023. We measured trait empathy, which could be regarded as a personal antecedent factor of the organizational model. We also measured commonality with the target and the seriousness of the situation. These variables could be regarded as situational factors in the organizational model. The former corresponds to the similarity between the observer and target, and the latter corresponds to the strength of the situation depicted in Figure 1. Moreover, we measured other process variables that had not been used in analyses. Hoffman [6] and Davis [7] referred to motor mimicry, classical conditioning, and direct association besides role-taking. Motor mimicry is a process explained by Lipps [10]. In this process, the observer automatically imitates the others' slight movements in their facial expression or posture, which creates kinesthetic cues to create the same feelings in the observer [6,7]. In classical conditioning, when one observed affective cues of others' experience and directly experienced the same affect, others' affective cues become conditioned stimuli that evoke the same feelings in the self [6,7]. Direct association means that when we observe another's emotional experience, emotional cues in the situation remind us of our own direct experience and evoke that emotion in us [6,7]. These processes could include a process of discrimination of affective cues, which could be partly measured by the added process variables representing attention to affective cues, although those processes are considered to occur almost unconsciously or automatically. Direct association could also include a process of remembering one's own experience. We measured variables representing an unconscious and automatic empathy-arousing process and remembering one's own experience. We added the former to the analyses in 2019 and the latter to the recent final analyses (see Section 2.6 Measures).

Thus, we measured the variables of antecedents, processes, and intrapersonal outcomes of the organizational model. The relationship between antecedents, processes, and intrapersonal outcomes seems to indicate how state empathy occurs, i.e., through which processes and antecedent factors intrapersonal empathic outcomes are produced. Assuming causal relationships between the measured variables, we examined the relationship between the variables using path analysis.

We did not measure interpersonal outcome variables, because we wanted to focus our attention on the intrapersonal processes and outcomes of empathy and their antecedents in this study.

1.5. Current Studies about State Empathy

At the beginning of the 21st century, neuroimaging research aiming to unveil the neural bases of empathy emerged. In these studies, the concept of empathy is generally considered to involve the following three facets: (1) experiencing emotions that match another individual's emotions (emotion-sharing); (2) imagining or knowing what the other is feeling (mentalizing); and (3) feelings of concern for other people (empathic concern, sympathy) (Decety and Svetlova [23]; Zaki and Ochsner [24]; Zaki [25]). This definition of empathy approximately corresponds to Hoffman's ([6], p. 103) definition: "the processes responsible for one's having a feeling more appropriate to another's situation

than to one's own situation." This study adopted these definitions, although they are narrower than Davis's definition [7,17], considering the reaction of one individual to the observed experiences of another, without excluding aversive or behavioral responses. Additionally, the variables that correspond to the above three facets were used in this study. Parallel affective responding corresponds to (1), understanding other's feelings; role-taking corresponds to (2); and other-oriented responding corresponds to (3). We measured parallel affective responding, understanding others' feelings, and other-oriented responding as intrapersonal outcome variables and role-taking as one of the process variables.

Many neuropsychological studies have recently been conducted to identify the neural bases of empathy (e.g., Singer et al. [26]; Zaki et al. [27,28]; Ochsner et al. [29]; Lamm et al. [30]; Morelli et al. [31]; Tobari [32]). These studies can also be regarded as state empathy research. These studies could be considered as attempts to clarify how empathy occurs at the level of brain networks.

In this field, a novel video-based laboratory task paradigm (EmpaTom), which is somewhat similar to the methods of the present study, was developed (Kanske et al., 2015 [33]). In this task, participants were presented with a short video clip in which a narrator told an allegedly autobiographical story. After viewing the video, participants indicated their current feelings, rated their compassion on continuous scales, and chose one of three options describing the narrator's mental state. These variables seem to correspond to parallel affective responding, other-oriented responding, and understanding others' feelings. This paradigm was used to clarify the neural bases of empathy (emotion-sharing) and the theory of mind (understanding others' feelings) (Kanske et al., 2015 [33]; Tholen et al., 2020 [34]). This paradigm was also used to examine a social psychological research question, i.e., the relationship between empathy, correct mental state inference, and prosociality (Lehmann et al., 2022 [4]). Lehmann et al. [4] found that a stronger experience of shared negative affect and correct mental state inference was associated with increased willingness to help the narrators in the video (prosocial decisions). They also found that feeling compassion led to an increase in prosocial decisions [4]. Compassion exhibited a stronger correlation with prosocial decisions than empathy (emotion-sharing) [4]. Singer and Klimecki [35] described the concept of compassion as "a feeling of concern for another person's suffering which is accompanied by the motivation to help." As the other-oriented responding scale that we used includes an item representing motivation to help the target, the connotations of this scale can be regarded as similar to those of compassion.

As mentioned above, previous studies about state empathy often used an instructional set procedure developed by Stotland [13]. This procedure has been called perspective-taking instructions, and is still used today. This procedure includes imagine-self, imagine-other, and remain-objective instructions in most cases. Generally, perspective-taking instructions are assumed to increase state empathic concern or prosocial behaviors (e.g., Batson and Shaw, 1991 [36]). However, the effect of perspective-taking has recently been questioned. McAuliffe et al. (2020) [37] conducted a series of meta-analytic tests in experiments, which examined the effects of perspective-taking (imagine-other or imagine-self) instructions, remain-objective instructions, or no instructions on participants' empathic concern for a distressed person. It was concluded that remain-objective instructions reduced empathic concern, but perspective-taking instructions did not significantly increase empathic concern [37]. Hodges and Wixwat (2022) [2] had participants read posts from targets describing their negative experiences under perspective-taking instructions (imagine how they feel) or no instructions and examined the effects of perspective-taking instructions on participants' empathic concern for those targets, self-emotions, and other emotions. These effects were found to be insignificant, but participants in the perspective-taking condition were more likely to behaviorally respond to the targets [2].

The process of imagine-self or imagine-other was referred to as role-taking in Hoffman's theory of empathy-arousing processes [6] and Davis's organizational model [7]. The latest state empathy research [2] also used a perspective-taking procedure. They asked participants to what extent they focused on imagining how the target felt for a manipulation

check, but they did not use this result for analysis. Tobarí et al. [9] and the present study used the organizational model [7] as the study framework and measured this process using the role-taking scale. As these studies did not use perspective-taking instructions, these studies could have measured the spontaneous role-taking process. The present study also measured empathy-arousing processes other than role-taking, referring to Hoffman's [6], Davis's [7] and Feshbach's [22] theories of empathy-arousing processes. We measured individual differences between these empathy-arousing-processes as well as antecedent and intrapersonal outcome variables, and examined the relationship between them.

Gamble et al. [5] examined the relationship between pandemic fatigue as a cognitive load, state empathic concern for people vulnerable to COVID-19, and prosocial behavior (support for public health measures) and found that empathic concern moderates the negative effect of pandemic fatigue on prosocial behavior.

Several state empathy measures have been developed. For example, Levett-Jones et al. [38] developed the Comprehensive State Empathy scale. Although this scale includes subscales that approximately correspond to the variables of the present study, this scale was used for purposes other than those of the present study (to measure the effects of point of view [38] or role-play patient simulation [39] on nursing students' empathy).

1.6. Purpose of this Study

We thought the organizational model [7] and theories of empathy-arousing processes that Hoffman [6,16], Davis [7], and Feshbach [22] explained are very important and useful theories, although they have scarcely been utilized or demonstratively examined. We attempted to measure processes and antecedent factors based on these theories. We also measured three intrapersonal outcome variables that correspond to three important facets of empathy proposed by some neuropsychologists [23,24].

In addition, we thought the causal relationship between antecedents, processes, and intrapersonal outcomes that the organizational model [7] illustrates indicates how state empathy occurs (see Figure 1). Path analysis is an analysis method that measures the strength of each assumed causal relationship between observed variables using a path diagram. With this method, we can examine the causal relationship between variables. Therefore, the purpose of this study was to measure individual differences between antecedent, process, and intrapersonal outcome variables, examine causal relationships between them using path analysis, and make clear through which processes and antecedent factors important intrapersonal outcomes (i.e., parallel affective responding, other-oriented responding and understanding others' feelings) are produced.

2. Materials and Methods

2.1. Preparation of Questionnaires

We prepared a trait empathy questionnaire and state empathy questionnaire in advance. The trait empathy questionnaire was a part of the questionnaire used for another study. The state empathy questionnaire was constructed after the questionnaire that Tobarí et al. [9] used, adding some of the questions and items mentioned above. We added some sentences in accordance with the guidelines of the Declaration of Helsinki and ethical guidelines for research with human subjects of the Waseda University Academic Research Review Committee.

2.2. Data Collection

This study was originally conducted in 2011 at Waseda University in accordance with the abovementioned ethical guidelines. The first author asked one of her coworkers of another study to collect data for this study. The information about informed consent was given in questionnaires. It was also explained orally. However, ethical review and approval were waived for this study, because at that time, we did not think of writing an article for an international journal with these data.

2.3. Participants

A total of 157 Japanese undergraduates (98 males, 59 females) participated in this study. They were students majoring in education or psychology aged eighteen and over. Mean age was 18.92 (SD = 1.29).

2.4. Stimulus

Parts of two programs of “Diary of junior high school pupils” produced by NHK (Japan Broadcasting Corporation) Nagoya Broadcasting Station and broadcast in 2000 were used as the film stimuli for this study. The protagonist of one film (“Transfer student Paulo: the latter part”) was a junior high school boy who had transferred from Brazil to Japan and was bullied by some of his classmates. The protagonist of the other film (“School is changing: Someone who listens to your true feelings”) was a junior high school girl filling the role of the class representative who was bullied by some of her classmates. These films include scenes of bullying, but they are not extremely violent. The 3–4 min segments expressing bullying in each film were used. We obtained permission to use these films for research from NHK, but these films are now not publicly available.

2.5. Procedure

First, participants completed a multidimensional empathy scale [40] in an education class. After a week, they were shown the first film in the same class. Immediately after viewing it, they were asked to complete a state empathy questionnaire. Then, participants were shown the second film, and immediately after that, they were asked to complete almost the same questionnaire. In Tobarı [8] and Tobarı et al. [9], the order of two films were controlled, but the effects of the order were generally insignificant, so that in this study, all participants viewed the film of a junior high school boy first, and next viewed the film of a junior high school girl.

To connect each participant’s trait empathy data with the same one’s state empathy data accurately, participants were asked to write their name and student number on each questionnaire. Information about these identifiers was not used for other purposes.

2.6. Measures

As a trait empathy measure, the multidimensional empathy scale [40], which consists of empathic concern, cognitive empathy, personal distress, and fantasy subscales, was used. These subscales resemble the four subscales of the IRI [17], but are slightly different. The empathic concern scale [40] includes items representing sharing sadness or joy with others, motivation to help sufferers, and empathic anger (feeling anger toward a person who maltreated others). The cognitive empathy scale [40] includes an item representing sensitive emotion cognition, in addition to the items representing perspective-taking or role-taking. Participants were asked to rate the extent to which each item is true of themselves on a 5-point scale. The multidimensional empathy scale was included in the trait empathy questionnaire.

The state empathy questionnaire included several questions: (1) how you are feeling now, (2) how much commonality you feel between yourself and the protagonist, (3) how you are feeling toward the protagonist of the film, (4) how you viewed the film, (5) how you think the protagonist felt, and (6) how serious you feel the situation of the protagonist is. For questions (1), (3), (4), (5), several items were listed. Participants were asked to rate the extent to which each item is true of themselves on a 5-point scale. Questions (1) and (5) were devised after the technique developed by Feshbach and Roe [14], who asked participants how they felt and how the protagonist felt.

The parallel affective responding scale [9] consists of six items representing participants’ feelings immediately after viewing each film. These items were included in the listed items for question (1). The other-oriented responding scale [9] consists of seven items representing participants’ feelings toward the protagonist of the film. These items were included in the listed items for question (3). The role-taking scale [9] consists of three items

indicating that observers viewed the film putting themselves in the protagonists' shoes. These items were included in the listed items for question (4). The following five items were added to the listed items for question (4): (a) I paid attention to the protagonist's facial expression, viewing the film; (b) I paid attention to the protagonist's behavior, viewing the film; (c) I paid attention to the protagonist's situation, viewing the film; (d) I was caught up in the protagonist's feelings; (e) I remembered my experience. Item (d) was referred to as "automatic process" hereafter. These items were also regarded as process variables. The understanding others' feelings scale [9] consists of six items representing how participants recognized the target's feelings. These items were included in the listed items for question (5). The six adjectives included in this scale were identical to the six adjectives included in the parallel affective responding scale. As the targets' feelings were considered to be rather easily recognized, the adjectives included in these two scales were regarded as approximately representing the target's feelings, and participants were judged to experience the same emotions as the target when they achieved rather high scores on the parallel affective responding scale.

An English version of the items of the scales is shown in the Appendix A. Translation of the items of the multidimensional empathy scale was revised by Cactus Communications Pvt. Ltd. (editage) in 2009.

Questions (2) and (6) were used to measure situational antecedent variables. Commonality was measured as the response to question (2). Participants were asked to rate the extent of commonality they felt between themselves and the protagonist on a 5-point scale. Seriousness was measured as the response to question (6). Participants were asked to rate the extent of the seriousness of the situation on a 6-point scale. The questionnaire also included the question that asked participants whether they had ever viewed the films.

The trait empathy questionnaire and state empathy questionnaire are shown in Supplement Materials: English version of Questionnaires. These questionnaires were originally written in Japanese. The first author translated them into English. Although the original trait empathy questionnaire also included items of other scales and the original state empathy questionnaire included more items, we show there the only items that we used in our analyses of this study.

2.7. Statistical Analyses

The first author conducted original analyses in 2011, when antecedent variables were not used in our analyses. Afterward, the first author constructed another analysis method of these data in 2019, reanalyzed, and further reanalyzed the same data in 2023. Below are the results of the final version of analyses.

As all the participants answered that they had never viewed the films, we used whole data for analyses. This study used two films assumed to evoke similar emotions, but few differences were observed between correlations calculated separately. Thus, following Tobari et al. [8], we used the total scores of two films in our analyses. Data analyses were conducted using IBM SPSS (version 24). A path analysis was conducted using IBM SPSS Amos (version 24).

3. Results

3.1. Descriptive Statistics and Correlations between Study Variables

Table 1 shows Cronbach's alphas, means and standard deviations of study variables and zero-order correlations between them. As marked gender differences were not observed in correlations, male and female total data were used. T tests between genders are shown in Supplementary Materials Table S1. Except for a few variables (cognitive empathy, fantasy, commonality, and remember), female scores tended to be higher than male scores. As twenty-five participants who had completed the trait empathy scale were absent from the next class when others viewed the films and completed the state empathy questionnaire, the sample for the trait empathy data was smaller than those for the state empathy data.

Table 1. Descriptive statistics and correlations between study variables.

Variables (Number of Items)	Descriptive Statistics			Antecedents, Personal (Trait Empathy)				Antecedents Situational				Processes				Intrapersonal Outcomes		
	α	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Empathic concern (13)	0.82	3.74	0.61	1.00														
2. Cognitive empathy (5)	0.64	3.38	0.72	0.38 ***	1.00													
3. Personal distress (6)	0.75	2.89	0.80	0.12	−0.19 *	1.00												
4. Fantasy (6)	0.78	3.32	0.85	0.42 ***	0.23 **	0.12	1.00											
5. Commonality (1)		2.29	0.72	0.14	0.14	0.06	0.15	1.00										
6. Seriousness (1)		3.39	0.80	0.37 ***	0.19 *	0.21 *	0.30 **	0.12	1.00									
7. Facial expression (1)		2.97	1.12	0.44 ***	0.21 *	0.22 *	0.26 **	0.04	0.35 ***	1.00								
8. Behavior (1)		3.46	0.99	0.19 *	0.24 **	0.06	0.06	0.00	0.20 *	0.58 ***	1.00							
9. Situation (1)		3.91	0.85	0.10	0.24 **	0.07	0.16	0.08	0.23 **	0.39 ***	0.48 ***	1.00						
10. Remember (1)		2.47	1.11	0.16	0.13	0.08	0.20 *	0.50 ***	−0.06	0.05	0.10	0.01	1.00					
11. Automatic process (1)		2.39	1.05	0.34 ***	0.20 *	0.16	0.30 **	0.32 ***	0.38 ***	0.47 ***	0.25 **	0.26 **	0.16 *	1.00				
12. Role-taking (3)	0.81	3.19	0.91	0.36 ***	0.37 ***	0.04	0.30 ***	0.29 ***	0.28 ***	0.45 ***	0.37 ***	0.51 ***	0.35 ***	0.54 ***	1.00			
13. Parallel affective (6)	0.89	2.69	0.93	0.33 ***	0.22 *	0.12	0.28 **	0.30 ***	0.36 ***	0.30 ***	0.23 **	0.18 *	0.13	0.49 ***	0.42 ***	1.00		
14. Other-oriented (7)	0.91	3.40	0.85	0.58 ***	0.40 ***	0.15	0.37 ***	0.26 **	0.53 ***	0.41 ***	0.23 **	0.33 ***	0.12	0.59 ***	0.66 ***	0.62 ***	1.00	
15. Understanding (6)	0.81	4.51	0.48	0.36 ***	0.29 **	0.18*	0.26 **	0.08	0.33 ***	0.29 ***	0.21 **	0.34 ***	0.09	0.13	0.20 *	0.28 ***	0.31 ***	1.00

Note. Trait empathy variables: $N = 132$ (80 males, 52 females). State empathy variables: $N = 157$ (98 males, 59 females). The ranges of all variables were converted to 1–5. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

We regarded understanding others' feelings as the outcome of the cognitive process of knowing others' feelings. It was regarded as relatively easy to recognize the targets' feelings depicted in the films. Therefore, the scores for understanding others' feelings were high and likely to be regarded as ceiling effects, but some extent of variance was observed. We judged participants who achieved high scores on this scale to have sensed the target's feelings more diversely and more sensitively.

Correlations between personal distress and state empathy variables tended to be low, although many significant correlations were observed between the other trait empathy subscales and state empathy variables. Correlations among process variables were generally significant, but the correlations between remember and the items representing attention to affective cues were insignificant. Correlations between process and intrapersonal outcome variables were also generally significant, but the correlations between remember and intrapersonal outcome variables and the correlation between automatic process and understanding others' feelings were insignificant.

3.2. Path Analysis

We conducted path analysis to examine a path model indicating a causal relationship between the variables of antecedents, processes, and intrapersonal outcomes. As personal antecedent variables, we selected empathic concern and cognitive empathy, which can be regarded as representative trait empathy variables. Strictly speaking, commonality and seriousness are not pure situational variables, because these variables were measured with participants' ratings. Furthermore, seriousness was correlated with trait empathy variables, but we treated these as situational antecedent variables and included them in the model. At first, we included all process variables but omitted attention to behavior from subsequent analyses, because all the paths indicating its relationships with the variables other than attention to facial expression and attention to situation were insignificant. Thus, twelve variables were included in the model. According to Figure 1, the following hypotheses can be given.

1. Antecedent variables influence process variables as well as intrapersonal outcome variables, and process variables influence intrapersonal outcome variables.

Although the organizational model does not indicate the relationship between antecedent variables, process variables, or intrapersonal outcome variables, we assumed the following causal relationships between these variables.

2. Among the antecedent variables, empathic concern correlates with cognitive empathy and they influence rating for seriousness.
3. Among the process variables, attention to situation influences attention to facial expression and they influence the variable of remember. Though correlations between remember and attention to affective cues were insignificant, the path indicating these relations was examined according to the definition of direct association [6,7]. These three variables influence automatic process and role-taking. Automatic process influences role-taking.
4. Among the intrapersonal outcome variables, parallel affective responding influences other-oriented responding and understanding others' feelings. Understanding others' feelings influences other-oriented responding.

Assuming these causal relationships, we examined a path model that linked twelve variables using the total male and female data. Figure 2 shows a path model that retained paths whose significance probabilities of path coefficients were less than 0.05. Error variables were omitted. This model showed sufficient model fits (CMIN = 42.30, DF = 39, Probability = 0.33, CMIN/DF = 1.09, GFI = 0.96, AGFI = 0.92, CFI = 0.995, RMSEA = 0.023).

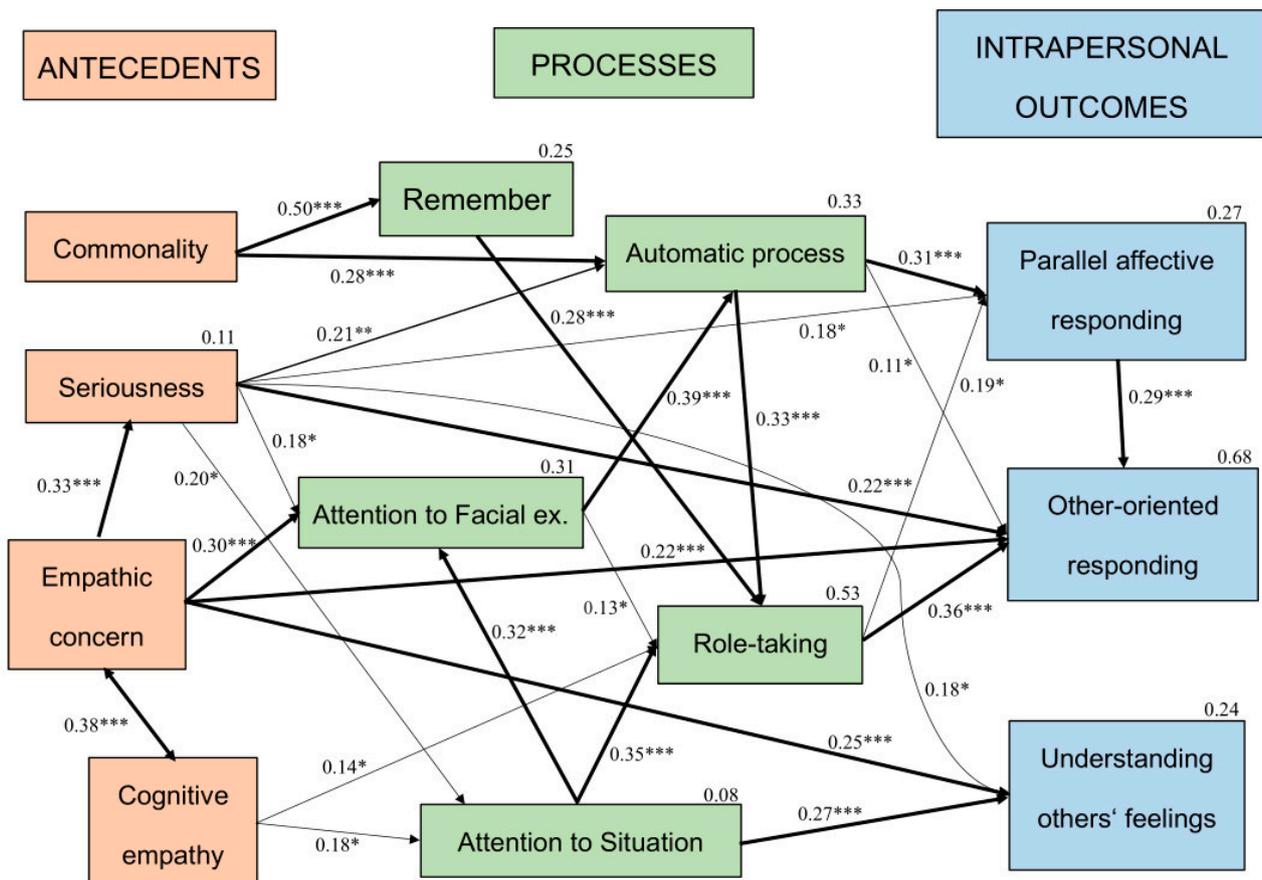


Figure 2. A path model linking twelve study variables. Note: $N = 157$. Missing values were substituted with mean values. Values in the figure indicate standardized coefficients or R^2 . Thickness of arrows was changed according to their significant probabilities. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Among antecedent variables, empathic concern significantly influenced seriousness, attention to facial expression, understanding others' feelings and other-oriented responding. Cognitive empathy significantly influenced attention to situation and role-taking. Commonality significantly influenced remember and automatic process. Seriousness significantly influenced automatic process, attention to situation, attention to facial expression, other-oriented responding, parallel affective responding, and understanding others' feelings. The paths linking remember and attention to affective cues were insignificant.

4. Discussion

Some state empathy research showed participants some stimuli depicting the target's distress under perspective-taking instructions, measured participants' emotional responses, and examined the effects of perspective-taking instructions on those responses. However, we thought that some observers would imagine the targets' feelings without such instructions. We also thought that if measurement of such processes is possible, by measuring the processes as well as empathic responses (outcomes) and antecedent factors, we could examine the relationship between them. However, an overwhelming majority of state empathy research did not measure processes. Tobari [8] and Tobari et al. [9] attempted to measure processes. Moreover, Tobari et al. [9] developed one process scale (role-taking scale) [9] and three intrapersonal outcome scales [9].

We showed undergraduate participants film stimuli depicting targets' distress. We did not use perspective-taking instructions. We prepared questionnaires that included the above scales [9] and additional antecedent and process variables. We asked them to

complete a questionnaire, and based on their responses, measured antecedent, process, and intrapersonal outcome variables.

We used the organizational model [7] as a framework for this study. This model originally included four constructs. Among them, processes and intrapersonal outcomes seemed to be the main components of state empathy. In addition, the causal relationship between antecedents, processes, and intrapersonal outcomes seemed to indicate how state empathy occurs (Figure 1). We measured the variables of antecedents, processes, and intrapersonal outcomes and examined the causal relationship between those variables using path analysis. Thereby, we attempted to make clear through which processes and antecedent factors important empathic intrapersonal outcomes were produced.

4.1. Measurement of Intrapersonal Outcome Variables

We measured parallel affective responding, other-oriented responding, and understanding others' feelings as intrapersonal outcome variables. These variables correspond to the three important facets of empathy proposed by some neuropsychologists [23–25]. Recent state empathy research also measured similar variables [2,4]. We measured parallel affective responding (emotion-sharing) and understanding others' feelings (emotion cognition) with an adjective checklist including the same six adjectives. Hodges et al. [2] had participants directly report their own emotions (self-emotions) and the emotions they felt for the target (other emotions) with the same indices to measure sadness and distress. This methodology of measuring seems to resemble ours. Self-emotions and other emotions are considered to correspond to parallel affective responding and understanding others' feelings, respectively.

Other-oriented responding was measured with the question that asked how they were feeling toward the protagonist of the film. The state empathic concern scale [2,5] and the compassion scale [4] are considered to approximately correspond to the other-oriented responding scale we used.

4.2. Measurement of Process Variables

Process variables were measured with the question asking how they viewed the film. Role-taking, attention to affective cues, and remember can be regarded as approximately conscious processes, but other processes, including motor mimicry, classical conditioning, and direct association, are considered to occur mostly unconsciously. Moreover, most classical conditioning seems to have occurred long before the research took place. Measuring such processes is particularly difficult. This study did not directly measure these processes, but these processes might have been partly measured by the automatic process. Automatic process is a scale consisting of only one item. It might be necessary to add items or create new items.

Although sometimes a distinction was drawn between self-focused role-taking and other-focused role-taking, Hoffman ([16], p. 58) suggested that the two types of role-taking could be co-occurring parallel processes. The role-taking scale we used in this study included both items, representing each type of role-taking (see Appendix A). As the correlation between these two variables was as high as 0.58 ($p < 0.001$), it was suggested that the two types of role-taking often co-occurred.

4.3. Measurement of Situational Antecedent Variables

Participants were asked to rate the extent of commonality they felt between themselves and the protagonist and the extent of the seriousness of the situation. Situational variables were measured with these ratings.

Although the correlations between commonality and personal antecedent variables were insignificant, seriousness was significantly influenced by empathic concern. Although seriousness was suggested to have a significant influence on various components of state empathy, these relations were only tentatively shown. For example, seriousness was suggested to influence attention to situation, but attention to situation could also influence

the rating of seriousness. It is likely that a reexamination of the order of the questions or the methodology used to measure situational variables is necessary.

4.4. *The Relationship between Antecedents, Processes, and Intrapersonal Outcomes*

According to Figure 2, parallel affective responding was significantly influenced by automatic process, role-taking, and seriousness. The first influence was the strongest. Therefore, parallel affective responding was suggested to be produced mainly by an automatic process, but occasionally by role-taking. Parallel affective responding that occurs through an automatic process might be regarded as emotional contagion, and that which occurs through role-taking would be regarded as emotion-sharing. It is difficult to distinguish between these two affective responses. It is probable that emotion-sharing often includes emotion contagion. It was also suggested that parallel affective responding is likely to occur when the situation is recognized as serious.

Other-oriented responding was influenced by a lot of variables. The strongest influence was exerted by role-taking and the second-strongest was exerted by parallel affective responding. Other-oriented responding was suggested to occur mainly through role-taking, but occasionally be evoked by parallel affective responding. Attention to facial expression and attention to situation did not directly influence parallel affective responding or other-oriented responding. Attention to facial expression was suggested to mainly influence parallel affective responding indirectly through the automatic process. Attention to situation was suggested to indirectly influence other-oriented responding through role-taking.

The only process that significantly influenced understanding others' feelings was attention to situation. If the target's feelings were not easy to understand, role-taking might have been used. Understanding others' feelings was also significantly influenced by empathic concern. It was suggested that people with high empathic concern tendencies are likely to understand others' feelings more diversely and sensitively.

Remember was assumed to be related to direct association and be evoked by affective cues. However, the process of remember was suggested to be evoked mainly by awareness of commonality. Remember was suggested to indirectly influence other-oriented responding and parallel affective responding through role-taking. It would be necessary to examine whether these results can be reproduced.

4.5. *Stimuli*

We used parts of television programs depicting bullying that was not too violent among junior high school students as film stimuli for this study. These stimuli could be regarded as naturalistically representing scenes that are likely to evoke empathy.

The measures of state empathy were constructed based on the stimuli we used in this study, so it is not clear that these measures will be appropriate and sufficient measures whatever stimuli are used. Moreover, the films we used in this study are now not publicly available. If stimuli that could evoke similar emotions were used and the emotions and situations were not difficult to understand, almost the same measures could be used, and similar results could probably be obtained. However, if stimuli that evoke different emotions were used, it would be necessary to change the scale items to match them to the contents of the stimuli.

Recent state empathy research used various types of stimuli to evoke empathy in participants. Morelli et al. [31] used sentences and photos depicting various emotional scenes. Lehmann et al. [4] used video clips in which a narrator told an autobiographical story, and Hodges et al. [2] had participants read posts from targets describing their negative experiences. News pictures or newspaper articles could be also used, although ethical considerations are necessary.

4.6. Limitations of This Study

A special sampling method was not used in this study. We referred to the work of Tobari et al. [9], which targeted Japanese junior high school male and female students. We targeted male and female university students in this study. Participants were students majoring in education or psychology. They might be more empathic or intelligent than average people of the same age, but we think that they were not extraordinarily empathic. Moreover, this study and that of Tobari et al. [9] used the same stimuli and common variables with different populations (undergraduates vs. junior high school students). As the two studies showed similar relationships between variables, some degree of generalizability seems to exist. However, it is necessary to examine whether similar results can be obtained in a more deliberately sampled population. It is also necessary to examine whether similar findings can be obtained in different populations, e.g., people with other nationalities or other cultural backgrounds, adults, elderly people, or people with special attributes (e.g., depressive tendencies, aggressive tendencies). The results could be influenced by participants' attributes or cultural backgrounds.

The sample size of this study was 157. According to Suzukawa and Toyoda [41], in correlation analyses, to achieve power = 0.8 (the criterion proposed by Cohen [42]), the necessary sample size is 85 when $|\rho|$ is 0.3 (medium effect size; ρ = parent correlation), and 783 and 194 when $|\rho|$ is 0.1 (small effect size) or 0.2, respectively. The sample size of this study can be considered sufficient for the variables with a medium effect size, but insufficient for the variables with a small or smaller than medium effect size. It is necessary to examine whether similar results can be obtained with a larger number of participants.

4.7. Findings of Neuropsychological Empathy Research

Neuropsychological empathy research has demonstrated the brain regions that are activated when one perceives others in pain and experiences pain oneself, either overlappingly or differently [26,29,30]. Perceiving both self-pain and others' pain activates the anterior insula (AI) and anterior cingulate cortex (ACC), and perceiving others' pain activates more systems specifically associated with decoding and learning about internal or external cues (Ochsner et al. [29]). Moreover, the dorsal medial prefrontal cortex (DMPFC), which is involved in the mentalizing network, showed greater connectivity to AI and ACC activity when perceiving others' pain than when perceiving self-pain (Zaki et al. [27]). In research using pictures of body parts in painful situations as stimuli, AI, ACC, and the areas generally referred to as the mirror neuron system were activated (Lamm et al. [30]). Morelli et al. [31], who examined brain areas activated when participants viewed multiple photos depicting others experiencing various feelings with or without contextual information, concluded that: (1) AI and ACC are involved in affective congruence (i.e., emotion-sharing), (2) the mirror neuron system and mentalizing system represent two pathways to sharing others' emotions, and (3) if some information about the context is given, the mentalizing system is engaged to understand others' emotional experience.

Both the above neuropsychological research and our social psychological research attempted to clarify how empathy occurs. Although not all of our findings were validated by neuropsychological findings, some degree of correspondence was observed. Systems specifically associated with decoding and learning about internal or external cues [29] may be related to attention to facial expression or attention to situation. The mirror neuron system [30] may be partly related to the automatic process. Findings obtained in different fields of psychology with different methodologies could contribute to and enrich the total knowledge regarding this topic.

According to Singer and Klimecki [35], the compassion brain network differs from networks implicated in empathy for pain. Although empathy training using stimuli depicting others' distress led to an increase in the activation of the AI and ACC, as well as an increase in self-reported negative affect, subsequent compassion training led to an increase in the brain network, including the medial orbitofrontal cortex and ventral striatum, decreased negative affect and increased positive affect. It would be worth examining the

relationship between compassion and other-oriented affective responding, and the latter's neural basis.

4.8. Scientific and Practical Implications

In typical state empathy research, empathy-arousing processes were often controlled by perspective-taking instructions and the effects of such instructions on empathic responses were examined. Although processes have been regarded as important in the concept of empathy [6,16], studies directly measuring empathy-arousing processes are very rare. Using the organizational model [7] as a framework for study, Tobari [8] and Tobari et al. [9] attempted to measure these processes, and developed process and intrapersonal outcome measures [9]. The present study used these measures and added some process and antecedent variables, referring to the organizational model [7] and theories of empathy-arousing processes [6,7,22]. The relationship between the antecedents, processes, and intrapersonal outcomes of the organizational model are considered to indicate how state empathy occurs. We evoked empathy in participants, measured individual differences between antecedents, process and intrapersonal outcome variables, and examined the causal relationship between them using path analysis. In this way, we could suggest through which processes and antecedent factors intrapersonal affective and cognitive empathic outcomes are produced. This is probably the first attempt to clarify how empathy occurs using a social psychological study framework and questionnaire method. The findings, ideas, and methodologies of this study are considered the scientific implications of this study.

The practical implications of this study are that state empathy measures or the methodology of this study could be utilized in neuropsychological research or research in other fields of psychology. In neuropsychological research, trait empathy scales or affective and cognitive outcome measures have been often utilized. However, usually, process measures are not used. Process measures would be particularly useful, because it is assumed that neuropsychological research is generally concerned with the mechanism through which empathy is produced or expressed, and empathy-arousing processes are considered essential components of this mechanism. The measures of intrapersonal outcome variables are also considered useful in these studies. Moreover, the type of stimuli that we used in this study could also be utilized in neuropsychological research.

In social psychology, behavioral outcomes (e.g., prosocial behaviors) have often been utilized and emphasized [2,4,5]. The present study did not use behavioral outcome variables, because our primary concerns were the intrapersonal processes and mechanisms of empathy and their antecedents. However, by adding behavioral outcome variables to the variables used in this study, it would be possible to examine which component of state empathy most contributes to behavioral outcomes. This will probably be a future research direction. The addition of different reactions or different personality or situational antecedents would also be possible.

The present study focused on empathy for distressed people. Some empathy research focused on empathy for animals (e.g., Peñaherrera-Aguirre et al., 2023 [43]). The methodology of the present study could partly be utilized in such research. However, the idea or methodology of this study could not be utilized in all kinds of empathy research. For example, Blaskova et al. [44] suggested that open and effective communication, which seems to include empathy, tends to promote positive motivation in the organization. Perhaps, such a type of empathy could not be studied only using the organizational model as the study framework. Another theorization might be required in that case.

5. Conclusions

This study measured individual differences between the antecedents, processes, and intrapersonal outcomes of state empathy, using the organizational model [7] as the study framework. By measuring antecedent and process variables as well as important facets of empathy as intrapersonal outcome variables and examining the causal relationship between

them using path analysis, we could suggest through which processes and antecedent factors important intrapersonal empathic outcomes are produced.

Empathy has been regarded as an important trait that could provide the basis for human relationships, the understanding of others, and mutual understanding [45]. We hope this study can contribute to the future progression of empathy research.

Supplementary Materials: The following Supplementary Materials are available at <https://www.mdpi.com/article/10.3390/psych5030061/s1>. English version of Questionnaires; Table S1: *t*-tests comparing male and female scores of study variables.

Author Contributions: Conceptualization, M.T.; methodology, M.T.; formal analysis, M.T.; data curation, M.T.; writing, M.T.; supervision, A.O. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was conducted according to the guidelines of the Declaration of Helsinki and the ethical guidelines for research with human subjects of Waseda University Academic Research Ethical Review Committee, but ethical review and approval were waived for this study, because this research was originally conducted in 2011, when we used only some of the variables in our analyses and did not think of writing an article for an international journal with these data. It was only recently that we reanalyzed the data to obtain the results shown in this paper.

Informed Consent Statement: The information about informed consent was given in questionnaires. It was also explained orally.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: The data were collected by Tomoko Oyama. All authors genuinely appreciate her cooperation. We also appreciate two anonymous reviewers' helpful comments.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. English Version of the Items of the Scales

Table A1. English version of the items of multidimensional empathy scale [40].

Empathic concern scale 13 items

When I see someone facing difficulties, I feel like helping them.

When I see someone depressed, I feel like encouraging them.

When I see someone being teased, I feel bad for them.

When I see someone seized with panic because of extreme anxiety, I feel like doing something for them.

When I see someone teasing others, I feel angry.

When I see someone being treated indifferently, I feel very angry.

I feel concerned for those who are ignored by others.

When I listen to the story of people who have had a sad experience, I feel brokenhearted.

I feel like doing something for physically challenged or elderly people.

When I see people overwhelmed by disaster on the news, I feel sympathetic toward them.

When I know that one of my friends has had a happy experience, I feel happy too.

Sometimes I don't feel very sorry for other people when they are having problems. (R)

Sometimes I feel nothing even if someone close to me feels sad. (R)

Cognitive empathy scale 5 items

I sometimes try to understand my friends better by imagining how things look from their perspectives.

Before criticizing somebody, I try to imagine how I would feel if I were in their place.

When I am upset with someone, I usually try to put myself in their shoes for a while.

When I see someone in anger, I try to understand why they have got angry.

I tend to be sensitive toward others' feelings. For example, I can perceive their uneasiness.

Table A1. *Cont.*

Personal distress scale 6 items

I lose control during emergencies.

When I see someone weeping, I feel troubled as I do not know how to reach out to them.

When I see someone who badly needs help in an emergency, I go to pieces.

I sometimes feel helpless when I am in the middle of a very emotional situation.

When I see someone falling and getting injured badly, I feel like escaping from the situation.

When I see injured people expressing their pain, I feel sick.

Fantasy scale 6 items

When I read a novel, I can identify with the characters.

When I watch a drama or movie, I often feel like becoming one of the characters.

After watching TV or a movie, I have felt as though I were one of the characters.

While reading a book, I consider the feelings of the protagonist.

While reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.

I like to identify with the protagonists of television games.

Note: (R) The scores of these items must be reversed.

Table A2. English version of the items of state empathy scales [9].

Role-taking scale [9] 3 items

I saw the film, imagining how I felt if I were the protagonist.

I saw the film, imagining how the protagonist felt.

I tried to put myself into the protagonist's shoes.

Parallel affective responding scale and understanding others' feelings scale [9]

Each scale consists of following 6 items.

Sad. Distressed. Uneasy. Lonely.

Lonesome. Helpless.

Other-oriented responding scale [9] 7 items

I want to understand them.

I feel concern for them.

I want to help them.

I want to listen to them.

I feel sorry for them.

I sympathize them.

I am very interested in them.

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