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Comparative Analysis between the Japanese American and the Japanese Canadian Internment Documentaries

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Abstract

During the Second World War, the internment of people of Japanese descent occurred in the U.S.A. and Canada simultaneously. Each country produced a documentary film about the internment. Although these documentaries were superficially similar, the two countries' political and cultural difference were reflected in them. In this study, a combined qualitative and quantitative analysis was conducted for the two films for a systematic comparative assessment. Consequently, substantial differences were observed in the two films on several respects. First, the number of "Frontal view of the internees" shots in the Canadian film exceeded those of Americans where people looked away from the camera and face the other direction. This phenomenon may be considered as a reflection of the cultural difference such as a family-like-co-existence and a symbolic assimilation. Second, when people of Japanese descent and Caucasian are in the same frame, they face opposite directions in the American film. However, the Japanese Canadians and Caucasians in the Canadian film face the same direction and are placed in an equivalent position on the screen. Third, based on the outliers, i.e., characteristic shots of the films, descriptions of Japanese and Western culture coexist in the Canadian film. In contrast, the U. S. documentary has only Western ones. In general, a reflection of the American way of assimilation and the Canadian co-existence in the content of the two war-time propaganda documentaries is observed. This study confirmed by combined qualitative and quantitative analysis the political and cultural differences of the two countries as reflected in their documentaries, which appeared similar on the surface. Although this study focused on documentaries produced during the Second World War, the method used here may be applied to the analysis of other video contents and contribute to future research in film-video media studies.

1. Introduction

1.1 Research Topic

This comparative cross-national study examines two documentary films on Japanese internment in North America.

From the end of the nineteenth century, Japanese people immigrated to the U.S.A. and Canada primarily as railroad workers. Many of them settled mainly as agricultural workers or commercial fishers.

After a surprise attack at Pearl Harbor by the Japanese air force on December 7, 1941, people of Japanese descent were interned in the two North American countries almost simultaneously. In the U.S.A., on February 19, 1942, the relocation of Japanese Americans began. Five days later, on February 24, 1942, that of Japanese Canadians commenced (Daniels, 1981). In the U.S.A., "just over 125,000" people of Japanese descent were sent to relocation centers. In Canada, "fewer than 25,000" Japanese Canadians were evacuated and sent to internment camps and farms (Daniels, 1982).

Takeya Mizuno pointed out that Japanese radio broadcast insisted that the American policy of assimilation was hypocritical.

The May 1 broadcast, for example, noted that the race-specific policy conflicted with the nation's long-cherished "melting pot" concept of diversity. (Mizuno, 2013, p. 97)

Although the internees were provided basic amenities, the camps are sometimes referred to as concentration camps.

As the war drew to a close, the governments needed to manage domestic and international anxieties around the potential symmetry between North American internment and the Nazi concentration camps, which sparked the human rights question (Gittings, 2002; Pendakis & Wilson, 2018). The internment camps were gradually vacated, and attempts were made to assimilate the residents into the general population.

During the Second World War, governments around the world produced propaganda films to incite nationalistic fervor toward their ideologies, thus the politicizing of documentary was a world phenomenon (Barnouw, 1993). As Jowett and O'Donnell stated, "Propaganda itself, as a form of communication, is influenced by the technological devices for sending messages that are available in a given time" (Jowett & O'Donnell, 2012, p. 15), movies were the latest and most powerful tool for propaganda at the time.

Thus, documentary films about the internment were produced in both countries. In the U.S.A., *A Challenge to Democracy* was released in 1944 while in Canada, *Of Japanese Descent* was released in 1945. The U.S. and Canadian films are approximately 18 and 21 minutes long, respectively.

Their title shots are shown in Figures 1 and 2.

Figure 1: U.S. title   Figure 2: Canadian title

Both films were produced to provide justification for the Japanese internment and promoting assimilation to their own citizens and to the rest of the world (Gittings, 2002; Hayashi, 2004).

Most of the films recording the internment of Japanese descent is fragmentary news footage, however these two documentaries are the official records put together by the authorities. Both can be said to be representative of the Japanese internment documentary films.

Both were created in almost the same way in two countries for the same event at the same time. In fact, these two films are quite similar. The purpose of production, theme, topics and objects of these films have close parallels. Both being genuine propaganda films, the sufferings of the internees are not shown.

They also have formative similarity. Neither film include interviews of the Japanese internees. Instead, they have narrations and background music. The narrations emphasize the legitimacy of the internment and portray that it was different from the Nazi treatment of the Jews.

With the above points considered, both films recording the internment in North America i.e. *A Challenge to Democracy* (hereinafter, referred to as *Challenge*) and *Of Japanese Descent* (hereinafter, referred to as *Descent*) were under the control of authorities and "the type of propaganda of public information as one of the most powerful forms of directive statesmanship" as Gittings points out regarding the latter (Gittings, 2002, p. 72). Therefore, the intention of the authorities was reflected strongly at the time of shooting and editing.

The cultural difference between the two countries should be reflected to some extent in these two films. If it is possible to clarify how the difference is expressed by image media, it will be meaningful to contribute to international comparative research through video content.

1.2 Literature Review

To the best of our knowledge, no studies have compared American footage with Canadian one. However, comparative studies on the immigration policies of the two countries and such studies on the Japanese internment in both countries have been conducted. There are also several methods for comparative research on visual content in general. This study refers to these three in order.

1.2.1 Comparative studies on the immigration policies between the U.S.A. with Canada

Thomas E. Kierans stated that Canadians have long used the language of metaphor to describe their society as a "mosaic" and the United States as a "melting pot" to distinguish the two North American countries. Furthermore, Canadians think of themselves as being more tolerant of racial minorities and more respectful of cultural differences than their southern neighbors (Kierans, 1994).

In other words, while American melting pot is a symbol of its national conformity or assimilation, Canadian mosaic is that of ethnic coexistence or plurality.

In 1994, Jeffrey G. Reitz and Raymond Breton reviewed the exhaustive amount of the available public opinion and concluded that there was an illusion of difference between the United States and Canada. According to them, there are certain important beliefs about Canada as follows.

One of these beliefs is that minority groups in Canada are encouraged to maintain their distinctive cultures, whereas minority groups in the United States are under pressure to abandon their traditional cultures and "melt" into the broader society. In short, Canadians show tolerance for diversity and even encourage it.

Consequently, minority groups in Canada more freely participate in traditional cultural practices, and maintain ethnic community institutions and activities, than do minority groups in the United States. (Reitz & Breton, 1994, p. 5)

Milton Gordon describes the term "melting pot" as follows.

"the melting pot theories had envisaged the disappearance of the immigrants' group as a communal identity and the absorption of the later arrivals to America and their children, as individuals, into the existing 'American' social structure." (Gordon, 1964, p. 132)

Regarding the term "cultural pluralisms," Gordon describes it as "the acceptance of cultural differences both religiously and in terms of ethnic and cultural groups." (Gordon, 1964, p. 17)

These above concepts, metaphors and beliefs may also be reflected in the two films, although their visual representation is not clear.

1.2.2 Comparative studies on the Japanese interment in the U.S.A and Canada

Regarding the internment itself, a few comparative studies between the internment of Japanese Americans and that of Japanese Canadians have been conducted.

Roger Daniels stated that although the experience of Japanese Americans and Japanese Canadians was both quite similar, there were important differences and most of those depend much more on institutional differences between the two countries (Daniels 1981), and points out that "Despite basic similarities in the approaches of the two North American democracies there were policy differences in the ways that each

treated its Japanese. In one minor respect, at least, Canadian policy was less racist." (p. 185)

Daniels specifically pointed out differences in the degree of involvement of Japanese descent on the battlefield.

The U.S. Army and its political leadership, [...] was providing in the 100th Battalion and the 442nd Regimental Combat Team, a public means by which Japanese Americans could demonstrate their loyalty. Only a handful of Japanese Canadians were allowed to perform military service in World War II. (Daniels, 1981, p. 193)

Blake Morgan Young also compared the treatment of Japanese descent in North American countries and illustrated some of the differences between the two.

The practice in the US camps of having all occupants of each block take their meals in a common mess hall had a weakening effect on family ties, but in the Canadian camps meals were prepared and eaten in the individual housing units. (Young, 2004, p. 92)

While the involvement of Japanese Canadians in the war effort was negligible, and almost totally unreported by the press, Japanese Americans made a contribution that offered unchallengeable proof of their loyalty and was a major factor in their postwar acceptance by American society at large. (Young, 2004, p. 95)

Greg Robinson stated that "a study of the similarities and differences across the border provides a greater and more balanced perspective on any number of overall questions relating to the Japanese Americans" (Robinson, 2009, p. 6)

and pointed out the differences as follows.

Despite various self-justifying assertions by Prime Minister King and political leaders in Ottawa that their arbitrary wartime treatment of Japanese Canadians was designed to coordinate with Washington's, the two countries' policies were quite distinct from the start. The WRA (War Relocation Authority of the U.S. government) provided housing and education for camp inmates, sponsored camp newspapers, and supported leisure activities and cooperatives. Japanese Canadians did not receive such assistance and had to rely on religious and nonprofit groups for aid or use their own funds. Furthermore, their large-scale official confiscation and forced sale of properties of Japanese Canadians had no parallel south of the border, while there were no battalions of Nisei soldiers in Canada to demonstrate their loyalty of the group. (Robinson, 2009, p. 286)

All three mentioned here pointed out the degree of participation in military service as a significant difference between the Japanese American and Japanese Canadian internees. Apparently, this point is reflected in the films, though it is not clear how it was expressed and what its significance is.

1.2.3 Comparative analysis methods for visual content.

Although no comparative studies have been conducted on the two films, several analysis methods to compare visual content can be applied to compare them.

In 2012, Jasmine Alinder compared photographs taken by Toyo Miyatake and Bill Manbo at Heartmountain internment camp. She

pointed out that while Miyatake 's object looked away from the camera, Manbo's object was looking straight at the camera. According to Alinder, Miyatake's image brings a symbolic impression and Manbo's image has a character as a portrait photograph.

Manbo takes a much more straightforward approach, setting up the shot to emphasize frontality through the position of the fence and his son. His son's expression and gaze straight back at the camera create an image that is more of a portrait than a metaphor. Miyatake's subjects look away from the lens as if they are unaware of the camera's presence and their gazes beyond the confines of camp function symbolically to communicate injustice. (Alinder, 2012, p. 97)

This kind of difference might be identified between the two internment documentaries as movie is composed from a series of still pictures.

There are several methods for comparative content analysis of movies,

Among them, one of the most authentic and basic method is the "Same frame" heuristic.

David Bordwell pointed out the presence of film critics' routine tactics, which he named the "Same frame" heuristic (Bordwell, 1989, p. 178). The heuristic is explained as "If two figures are shown in the same frame, a bond is established between them." This heuristic can be applied to analyze the relationship between the characters in the footage.

Recently, a new statistical method, named Cinemetrics, has been introduced to compare movies.

As early as in 1974, Barry Salt issued "Statistical Style Analysis of Motion Pictures" and advocated applying a quantitative approach. Although this

approach had been neglected for a long time, in the 21st century, as movies became available on the internet and able to be analyzed any time when necessary, the statistical analysis of visual media studies appeared one after another.

　In 2001, Salt applied his statistical theory to television drama analysis. In 2005, Yuri Tsivian developed the Cinemetrics project and established its website. In 2012, Mike Baxter published "Film statistics: some observation" in which he summarized and described various features of Cinemetrics.

According to Baxter, "the main purpose of quantification is to aid (objective) *comparison*" (Baxter, 2012, p. 19). Actually, Cinemetrics as a tool of quantitative analysis is extremely useful to distinguish the difference between two or more films in an objective manner.

Examples of comparative research with Cinemetrics are provided as follows.

In 2006, Warren Buckland published a book about Steven Spielberg. He compared the style of *Poltergeist* to that of Spielberg's and Tobe Hooper's other films using statistics to determine who directed the film. In 2012, Nick Redfern examined the impact of sound technology by examining the shot lengths in Hollywood cinema to compare 1920s silent films with early sound films and identified significant differences between them. In 2014, Jeremy Butler analyzed the editing rhythm of a television program. Butler compared the cutting rates of single-camera recorded shows to multiple cameras shows and found a significant difference between the two. In 2019, Taylor Arnold, Lauren Tilton, and Annie Berke examined the visual style in two sitcoms with a statistical approach and illustrated how formal elements served to differentiate the role of characters within each series.

Various kinds of data to compare films are available with Cinemetrics.

Average shot length (ASL) is frequently used to compare the cutting pace of films and distinguish the creator's tendency. If ASL of a film is lower than the other film, then the cutting pace of it is high, and the phenomenon will indicate the feasibility of creator's aim of cramming more content into the work than the lower cutting pace case.

Cinemetrics is also useful to extract systematically the characteristic shots which determine the specialty of the film. It focuses on the shots which are indicated as outliers in shot lengths distribution.

There is no disagreement among scholars on the importance of outliers i.e. extra-long take shots as the characteristic shots.

These long take shots could reasonably be referred to as "outliers" in this particular case, but to disregard their existence in an investigation is to shut your eyes to the very thing that makes this film special. (Salt, 2011)

Uncontentious outliers may be among the more interesting aspects of a film's "style." (Baxter, 2012)

Outlying shot lengths may be a significant element of a film's style: removing the opening shot from *Touch of Evil* (Orson Welles, 1958) or the tracking shot of the traffic scene from *Weekend* (Jean-Luc Godard, 1967) from our analysis would be to take away the most distinctive (and certainly the most famous) aspects of these films' style. (Redfern, 2012)

Considering these assertions above, outliers

can be a clue to identifying distinctive shots that make the film special. Regardless of whether the cutting pace is higher or lower, the outliers can be equally distinguishable to the film because they are statistically abnormal to the other average shots. Thus, they can make a strong impression on the audience who can memorize them as the characteristic shots.

Extra-long take shots as outliers in shot length distribution exist above the third quartile and can be calculated by multiplying the interquartile range.

So far, Cinemetrics has been mainly used for fictional content such as dramas and feature films, though it can also be applied to documentaries.

Documentaries tend to be considered pure non-fiction, as opposed to dramas and feature films that represent fiction. However, despite their apparent representation of reality, documentaries tend to have hidden intention.

Daniel Arijon defines, in his established classic writing "Grammar of the film language," three types of film forms, namely newsreel, documentary, and fiction. He states that in documentary "manipulation is necessary" and "facts have to be arranged to be shown at their best and an event is often repeated to be filmed several times. Repetition means staging" (Arijon, 1976, p. 13) and "documentaries have profited from a dual approach that blends unadulterated reality with carefully recomposed fiction" (Arijon, 1976, p. 14).

According to Arijon, as documentaries have traits of recomposed fiction that reflect the intentions of the creator, Cinemetrics can be applied to them like in dramas and feature films.

1.3 Research Purpose

From what has been examined so far, previous studies regard the United States and Canada as having differences in both their immigration policies and the treatment of internment of people of Japanese descent. These differences are apparently reflected in the documentaries produced in both countries on the theme of the Japanese internment, though superficially the two films appear to be similar.

Nonetheless, no comparative studies have been conducted on these documentaries, although photographs of the camps have been examined. In addition, studies that compare multiple video contents include those based on traditional content analysis methods and those based on new statistical methods, both of which are considered effective for comparative study of documentaries.

As a hypothesis, the differences between two countries should reflect in their films in visual form. Thus, the purpose of this study is to objectively clarify the differences inherent in two similar documentaries made during the war through combined analysis.

Elucidating this issue is significant as a visual media approach to comparative research on the internment of Japanese descent. It is also supposed that this will contribute to international comparative research on video content.

This study is intended to examine how the differences between the two countries are reflected in the video content as images and does not aim to criticize the policies of the two countries or the actual conditions of the camps.

2. Methods

This study uses three approaches described

above in a combined way, as it is better to use the traditional qualitative method and newly quantitative method in tandem rather than treat them as competing techniques.

In this study, the two documentaries will be analyzed in the following three steps.

First, in accordance with Alinder's study, this study measures the number of "Frontal view of the internees" shots in which the internees were looking at the camera in each film to evaluate the symbolic or familiar nature in the footage. Although Alinder's method was intended for still pictures, it can be applied to each shot in movies as each movie is a conglomeration of still shots.

Second, based on the traditional way of analyzing, this study measures the number of the "Same frame" shots, that is, the number of shots recording the Japanese internees and Caucasian supervisors simultaneously in the same frame to evaluate the relationship between them.

As for indicators of "Same frame" shots and "Frontal view of the internees" shots, this study calculated their number per 500 shots following Salt (Salt, 1974, p. 15).

Third, this study adopts a quantitative approach i.e. Cinemetrics. After measuring fundamental descriptive statistics of the films such as length in seconds, the number of shots, this study calculates average shot length, range of shot lengths, standard deviation (S.D.) and interquartile range. A t-test compared the average shot lengths of the two films. Then, this study compares the formula of the films and extracts outliers as characteristic shots in each documentary.

The greater the length, the more impressive the shot. Therefore, this study extracts extreme outliers that lie more than 3.0 times the interquartile range above the third quartile.

The shots obtained as a result of the extraction may include subtitles and shots for simply introducing scenery. Since these shots are not deeply relevant to the content, they will not be treated as subjects in this study.

In addition, various previous studies and materials will be used supplementarily for consideration, when necessary.

3. Results

3.1 "Frontal view of the internees" shots

Table 1 shows the "Frontal view of the internees" shots appearing in the two films.

Table 1: "Frontal view of the internees" shots

	Challenge	*Descent*
Number of shots	2	93
Ditto / 500 shots	6	103

The number of "Frontal view of the internees" shots per 500 shots in *Descent* exceeded those of *Challenge* more than 17 times. The two films have shots in which people just glanced at the camera. The number of such shots is 2 in *Challenge* and 10 in *Descent*. Without those "just a glance" shots, there are no "Frontal view of the internees" shot in *Challenge*.

3.2 "Same frame" shots

Table 2 shows the "Same frame" shots appearing in the two films.

Table 2: "Same frame" shots

	Challenge	*Descent*
Number of Shots	18	7
Ditto / 500 shots	52	8

In contrast to the case of "Frontal view of the

internees" shots, the number of "Same frame" shots per 500 shots in *Challenge* scored 6.5 times higher than that in *Descent*.

3.3 Statistically characteristic shots

Table 3 shows fundamental descriptive statistics of the films.

Table 3: Fundamental descriptive statistics

	Challenge	Descent
Lengths	1064	1286
Number of shots	174	451
Average shot lengths	6.1	2.9
(*t*-Statistics 8.08 *p*<.000000)		
Minimum shot length	1	1
Maximum shot length	41	17
Range	40	16
Standard deviation (S.D.)	5.17	1.98
Lower (First) quartile	3.11	1.73
Higher (Third) quartile	7.26	3.05
Interquartile range	4.15	1.32

Time data are in seconds

Figures 3 and 4 show the box plots of the shot length dispersity of the two films.

Figure 3: Box Plot of the shot length dispersity of *Challenge*
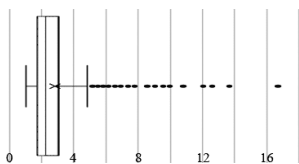

Figure 4: Box Plot of the shot length dispersity of *Descent*

The plots of the shot length dispersity indicate that some data further explode in the right direction in both figures. These data are outliers and represent characteristic shots of the films.

As shown in Table 3, the higher quartile of *Challenge* is 7.26, and the interquartile range is 4.15. Thus, the outliers as characteristic shots to be selected for *Challenge* are those that have a value of over 19.71 seconds of shot lengths approximately. Similarly, the data to be selected for *Descent* are those that have a value of over 7.01 seconds of shot lengths approximately. Tables 4 and 5 show these statistically singular and characteristic shots of the two films in descending order.

Table 4: Statistically characteristic shots (extreme outliers) in *Challenge*

Shot Description	Length (seconds)
Loyalty questionnaire document of internees	41
Caucasian supervisor paying wage to Japanese internees	32
Internment Camp barracks	23
Inside of a barrack	22

In Tables 4 and 5, both films have common explanatory shots such as the "pan of internment camp barracks" and the "image of globe" or ordinary landscape shots, such as a lake, pond, or tree. When these shots are excluded, the genuine characteristic shots of the films remain.

In *Challenge*, those are the "Loyalty questionnaire document of internees" (Figure 5) and "Caucasian supervisor paying a wage to Japanese internees" (Figure 6).

In *Descent*, those are the "Baseball game field with players" (Figure 7), "Two ladies performing Bon (Japanese summer festival) dance" (Figure

8), "Smiling faces of Japanese Canadian children" (Figure 9), and "Two ladies in kimonos performing Bon dance" (Figure 10).

Table 5: Statistically characteristic shots (extreme outliers) in *Descent*

Shot Description	Length (seconds)
Image of globe describing the spread of war to pacific	17
Baseball game field with players	14
Two ladies performing Bon (Japanese summer festival) dance	12
Landscape of a pond	11
Smiling faces of Japanese Canadian children	10
Landscape of a lake near the internment camp	10
Internment camp barracks	10
Interior of a sawmill	10
Bus arriving at the internment camp	9
Two ladies in kimonos performing Bon dance (up size)	9
A tall tree	9
Internees on the street of internment camp	8
Truck with log load in a log camp	8
A man welding a machine	8
Internment camp barracks	7
Internment camp barracks (different shot)	7
Two boys on the street of internment camp	7
Men relaxing under a tree	7
Men cutting a log	7

Figure 5: "Loyalty questionnaire document of internees" shot in *Challenge*

Figure 6: "Caucasian supervisor paying wage to Japanese internees" shot in *Challenge*

Figure 7: "Baseball game field with players" shot in *Descent*

Figure 8: "Two ladies performing Bon dance" shot in *Descent*

Figure 9: "Smiling faces of Japanese Canadian children" shot in *Descent*

Figure 10: "Two ladies in kimonos performing Bon dance" shot in *Descent*

4. Discussion

This study first considers the "Frontal view of the internees" shots in the films. As shown in Table 1, the abundance of "Frontal view of the internees" shots is a considerable feature of the Canadian film. In the dialogue between two patients in the tuberculosis ward, despite editing with the shot/reverse shot combination, both are facing the front. It is out of the dialogue axis like a movie by Yasujiro Ozu. In contrast, in the U.S. film, people look away from the camera and face

the other direction.

Figures 11 and 12 illustrate a typical contrast of the look in the "Frontal view of the internees" shots of the two films.

Figure 11:
Typical "Frontal view of the internees" shot in *Challenge*

Figure 12:
Typical "Frontal view of the internees" shot in *Descent*

While the children in the *Challenge* shot look away from the camera, those in *Descent* directly look at the camera or cinematographer. Therefore, the *Descent* shot resembles a commemorative picture showing people gathering for a memorial day.

This fact seems to correspond with what Alinder stated in her previous study. Alinder considered that the shot in which the internee is looking out of the screen gives a symbolic impression, while the shot in which the internee is looking straight back at the camera resembles a portrait image. From this point of view, the frontal views in the American documentary represents the ideal assimilation as a symbol somewhere far away, and those in the Canadian documentary expresses its tendency of co-existence in the family-photo-like composition.

This study now discusses the second issue of the result: the "Same frame" shots in the films. As shown in Table 2, the number of "Same frame" shots in *Challenge* records is 6.5 times more than those of *Descent*. If, as Bordwell quoted as a widely used heuristic statement, the shots in

which characters appear simultaneously indicate their unity, the U.S. film depicts the people united visibly much more than the Canadian one. This suggests that the former reflects the ideal policy of assimilation in its visual description more than the latter.

Nonetheless, as Bordwell noted (Bordwell 1989, p. 251), even if characters are in the same shot, one can deliberately say that they are united (by being in the same shot) or separated (by the space between them). Therefore, an elaborate analysis is needed here. Figures 13 and 14 show the typical "Same frame" shot of each film.

Figure 13:
Typical "Same frame" shot in *Challenge*

Figure 14:
Typical "Same frame" shot in *Descent*

As shown in Figure 13, the shot of a guard and an interned mother holding a baby is a typical composition of the ruler and the ruled. In this shot, a giant image of a guard with a gun facing the right side occupies the foreground on the left side of the frame. In contrast, a small image of a mother and a baby walking slowly in the background is visible on the right side of the frame.

Also, in the American film, as in the payment scene shown in Figure 6 or the shopping scene at the Purchasing Department, the Caucasian and the Japanese are separated on either side of the counter. They are classified as rulers and ruled. In 13 shots among 18 "Same frame" shots (72%) in *Challenge*, the faces of Japanese Americans

and Caucasians face opposite directions. Even if they face the same direction, there is a strict differentiation between the Caucasian and the Japanese as the supervisor and the supervised, as in the scenes of classroom or workplace for example. These shots of *Challenge* can be regarded as corresponding to an internee's words as recorded by Mizuno in a temporary assembly center of Japanese descent in the U.S.A...

"a profound feeling is developing among the Japanese at Santa Anita that the Caucasians in camp suffered a definite superiority complex." (Mizuno, 2003, p. 102)

Meanwhile, in the Canadian film, in the construction planning scene, as shown in Figure 14, or the scenes at the front of the clinic building, the Japanese and the Caucasian face the same direction. Both appear to be colleagues. In 6 shots among 7 of the "Same frame" shots (86%) in *Descent*, the faces of the Japanese and Caucasian face the same direction, and they are in equivalent positions on the screen.

In *Challenge*, the Japanese and the Caucasian face opposite directions. However, in *Descent*, Japanese descent and Caucasian face the same direction. Here, the two films contrast visually. This difference is considered to be a visual reflection of how the American footage represents a hierarchy in assimilation, whereas the Canadian footage represents a parallel coexistence.

This study finally considers the third issue of the result indicated by statistical data.

Fundamental descriptive statistics (Table 3) revealed that the U.S. and Canadian internment documentaries were significantly different in numbers and ratios. They made clear contrasts in

items.

The average shot length for *Descent* is almost twice of that in *Challenge*. Comparing the dispersion, the data of *Challenge* scatters more sparsely than those of *Descent*. In contrast, the data of the latter squeezes more densely than those of the former. This means that *Descent* is cut more quickly than *Challenge*. In other words, the Canadian editor tried to cram about twice as much content into the film as the American one.

Now, this study considers the characteristic shots extracted as outliers from the descriptive statistics.

For the American film, the loyalty questionnaire document shot of *Challenge* and for the Canadian film, ladies performing Bon dance shot of *Descent* can be considered as representative of each documentary. This study discusses these two shots in comparison.

In the American documentary, the loyalty questionnaire document shot in *Challenge* has the longest duration (41 seconds). It is a close-up of a hand leafing through documents entitled the "leave clearance docket." During this shot, the narrator states that "only those evacuees whose statements and whose acts leave no question of their loyalty to the United States are permitted to leave." The docket should record the result of the loyalty questionnaire that sought information allowing the authority to decide whether an internee was loyal enough to be trusted outside of the camp (Muller, 2007, p. 32; Robinson, 2009, pp. 185-188). This shot symbolizes the American way of assimilation of internees just as Alinder notes that "the categories of American and Japanese were then aligned with the categories of loyal and disloyal" (Alinder, 2012, p. 91). This can be seen as reflecting the U.S. policy "a sometimes coercive policy of 'Americanization', that is,

Japanese assimilation to white American values" (Robinson, 2009, p. 185).

This shot is regarded as a nodal point of the film. It begins at 12 minutes and 21 seconds in the film that spans a total duration of 17 minutes and 43 seconds. It begins after 69.3% of the total duration of the film has elapsed. Until this shot, the film mostly depicts the interior of the camp with a few exceptions showing seasonal work on a nearby farm. After this shot, the film depicts the camp's outdoors, i.e. American society where ex-internees work in various places. The film then illustrates the training of the Japanese American soldiers with a voice-over: "The Americanism of the great majority of America's Japanese finds its highest expression in the thousands who are in the United States Army, almost half of them are in a Japanese American combat team…. Hundreds of them volunteered while they were in relocation centers…. They know what they're fighting against and they know what they're fighting for – their country and for the American ideals that are part of their upbringing – democracy, freedom, equality of opportunity regardless of race, creed, or ancestry." It functions as a gateway to the normal world, filtering out those who lack loyalty and accordingly cannot assimilate into American society. Military images exist only in the American film, which is consistent with what has been pointed out in previous research on Japanese internment.

In the Canadian documentary, the longest shot has two ladies in kimonos performing Bon dance, and in combination with the subsequent close-up shot of the ladies, spans for a duration of 21 seconds. It is the introductory shot for the Bon festival sequence lasting 82 seconds as a whole with the other 22 shots. It begins at 13 minutes and 12 seconds in the film which has a total duration of 21 minutes and 26. It begins after 61.6 % of the total duration of the film has elapsed.

Along with this Japanese cultural shot, *Descent* has a shot of baseball game players that lasts 14 seconds and is the second-longest shot in the film. It is in the middle of a baseball game sequence with 54 seconds of duration with other 20 shots. This indicates that both the Bon dance and the baseball game are highlight shots of the scenes in the point of their length.

This phenomenon, such as the coexistence of Japanese and Western cultures is a vital feature of *Descent*. This Canadian documentary has other Japanese traditional culture scenes such as Shogi (Japanese chess) and Japanese bath, along with Western activities such as boy scouts and football. These shots reflect the point Pendakis and Wilson noted as follows.

This called for a re-visioning, quite literally, of the Canadian national imaginary, one no longer exclusively grounded in the project of a pure white British ideal. Though clearly steeped in many of the racist, nativist ideals which characterized the pre-war period in Canada, "–*Of Japanese Descent*" is at the same instant one of the first attempts on the part of the state to openly transition the Canadian national imaginary towards a more diverse and tolerant multicultural ideal. (Pendakis & Wilson, 2018, p. 19)

In contrast, the U. S. documentary has only Western ones, such as boy scouts, football, and baseball. It has no Japanese cultural activity comparable to Bon dance; instead, it has a Westernized beauty contest winner parade scene. It is similar to what Mizuno noted for the newspaper in an assembly center of Japanese

American.

"news that could be associated with Japan or things Japanese, no matter how newsworthy it might be, was often ignored or played down. (…)

On the other hand, patriotism to the United States was played up." (Mizuno, 2003, p. 101)

Thus, Japanese and Western cultures coexist in the Canadian film, while Japanese culture is eliminated from the U.S. film. Here again, a contrasting difference which correspond to previous research on policies and camp lifestyles in the two documentaries is observed. The results of the fundamental descriptive statistics (Table 3) showed that Descent had a shorter ASL than Challenge, and that there were approximately twice as many shots per unit time in the former than the latter. This is considered to be a phenomenon that corresponds to the fact that while only Western culture is depicted in the American film, both Western and Japanese cultures are depicted in the Canadian film.

5. Conclusion

This study compared the documentaries about the internment of Japanese Canadians and Japanese Americans using combined analysis method and visually analyzed the differences between the two countries reflected in them.

Following the analysis, significant differences between the two films were observed.

First, the number of "Frontal view of the internees" shots in Descent exceeded those of Challenge more than 17 times. In the Canadian film, these shots of internees resemble family memorial pictures. In contrast, in the U.S. film, people look away from the camera and face the

other direction. These shots may be considered as symbolic of the American way of assimilation for internees.

Second, the number of "Same frame" shots in Challenge is 6.5 times higher than in Descent. This suggests that the former reflects the idealism of assimilation in its visual description more than the latter. Nevertheless, further analysis revealed that in Challenge, Japanese Americans and Caucasians face opposite directions while in Descent, Japanese Canadians and Caucasians face the same direction. These shots of Challenge place Japanese descent and Caucasian in the same frame but divide them as supervisor and supervised. In contrast, in Descent, the Japanese and the Caucasian face the same direction, and they co-exist in equivalent positions on the screen.

Third, characteristic shots of the two films indicate their difference clearly. While the Canadian film has shots depicting the Western and Japanese cultures evenly, the American film has only those of the Western one. Such coexistence of ethnic cultures is a vital feature of the Canadian film and it is similar in crucial shots such as "Japanese Canadians play baseball" and "Japanese Canadian ladies perform Bon dance." These shots showing cultural plurality may be considered as metaphorical of Canadian society. On the other hand, a characteristic shot of the American film shows a questionnaire on loyalty to the United States, and this shot is followed by the process of assimilation into American society and participation in the military as its ultimate form.

In all cases, contrast between American idealism of assimilation and Canadian cultural diversity was observed in the two films. Both documentaries positively reframe the internment

of Japanese Americans and Canadians and re-integrate the Japanese into society, however the visual expressions of the two are different, reflecting the cultural differences between the two countries. Thus, the hypothesis that the differences exist in the films as a visual description was supported.

Through data analysis, this study verified that the statistical method like Cinemetrics was fairly efficient for analyzing documentaries when combined with traditional content analysis.

This study was intended to be exploratory only with American and Canadian internment documentary films. Therefore the footages from other countries were not covered. Despite these data limitations, the comparative method of this study may offer opportunities to examine the differential quality of other documentary films and contribute to assessing characteristics in numerous films and videos. Comparative research on documentaries and propaganda films made in countries other than the United States and Canada should be a future topic.

Acknowledgments

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The effects of psychological attitudes on voluntary cooperation against COVID-19: an analysis using a social dilemma framework

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Abstract

The COVID-19 Pandemic is a global problem, and to prevent the spread of the infections, it is crucial not only to develop vaccines and therapeutic medications but also to encourage people to change their behavior. Behavioral change to prevent the spread of infectious diseases has required people to give up many activities, especially pleasures outside the home. However, it is hoped that if most people behave cooperatively, individuals' selfish pursuit of pleasure will have little effect on the spread of infection. This conflict between benefits for individuals and those for the community as a whole can be considered a social dilemma. Clarifying the factors that define people's behavior during epidemics is essential for designing social systems after the COVID-19 Pandemic is declared over. Here, we analyze the determinants of people's behavior in the framework of a social dilemma by conducting a two-wave panel survey in 2020 and 2021. The results show that in the first wave, psychological attitudes that affect prosocial behavior, such as reciprocity, positively affect prosocial behavior. However, in the second wave, these effects disappear, and other factors define people's behavior. Continuous analysis of the factors determining people's behavior under drastically changing circumstances can provide information for planning measures to promote desirable behavioral changes.

1. Introduction

The COVID-19 Pandemic has significantly impacted humanity, causing over 200 million confirmed infections and over 4 million deaths worldwide as of October 2021. To overcome COVID-19, not only medical measures such as the development of vaccines but also behavioral changes and restructuring of people's lifestyles are required (Van Bavel et al., 2020). Some studies have analyzed behavioral change and hoarding behavior during the pandemic (Columbus, 2020; Lunn et al., 2020). In many countries, people's behavior has been forcibly restricted by legally enforceable lockdown policies. In Japan, however, the constitution does not allow for enforceable restrictions on people's movements or associations. Therefore, people were encouraged to change their behavior voluntarily. Although vaccination is progressing in many countries and behavioral restrictions are being relaxed, one significant public health issue is to clarify the factors that determine behavioral changes to prevent the spread of infections in the future.

To prevent infections, people have been encouraged to act less selfishly. For example, enjoying a meal at a restaurant or going to a concert is an essential part of people's welfare, but people have been told that they need to voluntarily give up these pleasures to control infections. In Japan, a state of emergency has been declared four times, but no enforceable restrictions were imposed on individuals, and only voluntary cooperation was requested of citizens. We need a framework for analyzing people's behavior in situations where benefits for individuals conflict with the benefits for society as a whole. This situation can be considered a social dilemma with the structure of the tragedy of the commons (Hardin, 1968).

The research questions of this paper are whether the psychological attitudes that have been shown to influence prosocial behavior in social dilemma situations have affected people's behavior during the COVID-19 Pandemic. Some studies answer this question affirmatively (Van Hulsen et al., 2020; Van Lange et al., 2021; Harring et al., 2021; Ling et al., 2020; Johnson et al., 2020). For example, a positive correlation has been found between prosociality and COVID-19 prevention behaviors (Jordan et al. 2020; Luttrell & Petty 2020; Pfattheicher et al. 2020; Fischer et al., 2021). However, few studies have analyzed in detail the impact of prosociality and related psychological attitudes on preventive behavior.

In theoretical studies of social dilemmas, two variables are often used as the individual's behavioral strategy: 1) the behavioral strategy of cooperation or non-cooperation and 2) the punishment strategy of whether to use punishment or not. The former behavioral strategy can be measured by whether people voluntarily refrain from or intend to avoid going out to prevent infection. The latter punishment strategy, however, is difficult to measure directly. This is because, in many cases, direct private punishment is prohibited in the real world, and punishment is carried out by public authorities (e.g., the police). Therefore, we adopt a punishment norm that considers "non-cooperators should be punished" as a punishment strategy.

In this study, we focus on three variables as psychological attitudes that influence COVID-19 prevention behaviors. It is well known that these variables have a positive correlation with prosocial behavior in social dilemmas. The first is

generalized reciprocity and generalized trust (Yamagishi and Yamagishi, 1994; Yamagishi and Kiyonari, 2000). Generalized reciprocity and generalized trust are typical variables that promote cooperative behavior in social dilemmas. Second is a belief in a just world (Lerner, 1980). The literature (Miller, 1977, Zuckerman, 1975) has reported a positive association between the belief in a just world strength and altruistic behavior. The belief in a just world is a cognitive bias in which one believes that the world is still fair when exposed to harsh or difficult situations, such as those faced by people throughout the world during the COVID-19 Pandemic. Thus, the belief in a just world is thought to influence people's behavior during the COVID-19 Pandemic. Third, we adopt justice sensitivity (Schmitt et al., 2010), which measures sensitivity to various types of injustice. For instance, it consists of sensitivity to unfair losses suffered by oneself and to unfair losses suffered by others. Because COVID-19 has had a non-homogeneous and unequal impact on people, sensitivity to this unequal impact should influence people's behavior. We analyze the impact of these three psychological attitudes on infection prevention behavior and punishment norms during the COVID-19 Pandemic. The factors comprising justice sensitivity have been shown to promote altruistic behavior (Fetchenhauer & Huang, 2004, Gollwitzer et al., 2009) and third-party punishment (Fetchenhauer & Huang, 2004), respectively.

Additionally, we must consider that the social climate surrounding COVID-19 continues to change rapidly and dynamically. In the early stages, it was important to focus on the conflict between individual and collective benefits, but during the vaccination campaign, new problems have emerged, such as the conflict between people's beliefs toward the vaccines. Specifically, the cumulative number of confirmed infections in Japan as of 1st April, 2020 was 2,502, which is 0.0020% of the Japanese population. At this point, the maximum number of reported infections per day was 268. However, as of 1st. Apr. 2021, the cumulative number of confirmed infections in Japan was 477,846, which is 0.3810% of the population. The maximum number of reported infections per day before the second-wave survey reached 7,957 on 8th Jan. 2021. As a situation changes so significantly, people's risk perception and determinants of behavior should be expected to change.

Here, we conducted two waves of panel surveys, one in April 2020 during the early stages of the COVID-19 Pandemic and the other a year later in April 2021, to investigate whether people's prosociality affects preventive behavior and whether this effect changed over time. Continuous analysis of the factors determining people's behavior under drastically changing circumstances can provide information for planning measures to promote desirable behavioral changes.

The factors that determine people's behavior are not the only ones related to social dilemmas. Other related factors also need to be controlled. On the one hand, prosocial behavior in preventing the spread of infections is not necessarily altruistically motivated. The self-centered motive of preventing oneself and one's family members from being infected should also naturally promote infection prevention behavior (Harper et al. 2020; Wise et al., 2020). On the other hand, the behavior of others strongly influences people's behavior (Asch, 1951). Information from the mass media and social media is the primary way by which

people infer the social atmosphere and the behavior of the majority. Therefore, it is necessary to consider the influence of media exposure on people's risk perception and estimation of the behavior of others. The relationship between COVID-19 prevention behaviors and the media has also been researched (Liu et al., 2020; Liu et al., 2021; Chemli et al., 2020;). In today's society, the influence of not only mass media but also social media is expanding, so the influence of social media on COVID-19 prevention behaviors should also be considered (Huynh, L., 2020; Yu, M. et al., 2021; Allington et al., 2021). It is also essential to consider what effect each of the two types of media will have (Piltch-Loeb et al., 2021). Even after controlling for these factors, it is necessary to examine whether the factors that promote prosocial behavior in social dilemma environments still affect determinants of behavior.

This study has conducted during the first-wave survey on 3rd Apr. 2020 and the second-wave panel survey from 13th to 24th Apr. 2021 to analyze the changes in the determinants of people's behavior over time. In both two periods, no state of emergency declaration was in place, so there were minimal restrictions on daily life. However, after both surveys, a state of emergency was declared. In other words, these surveys were conducted when there were minimal restrictions on behavior, but the number of reported infections was increasing.

2. Methods

We conducted the first-wave survey on 3rd Apr. 2020 (38.3% female; mean age 46.5) among 2,000 monitors registered with Yahoo! Crowd Sourcing, a major crowdsourcing platform in Japan. The second-wave survey was conducted from 13th to 24th Apr. 2021 and received 987 valid responses (33.4% female; mean age 49.0). Comparing the participants who responded to both Wave 1 and Wave 2 and those who attrited in Wave 2 revealed differences in age (mean = 47.95 for the former, mean = 45.05 for the latter, p<.001). There were no significant differences in gender and the psychological attitudes used in the following analysis.

2-1. Dependent variables

We set the behaviors and norms for dependent variables as follows. First, for behavior, we used the responses to the two items "I went out for fun" and "I went out for dinner" on the weekend of 28th and 29th March 2020, the week before the first-wave survey, and set up a dummy variable in which those who did either of the two items were designated as "not-cooperation" and those who did neither of the two items were designated as "cooperation." Then, in the second-wave survey, we set a dummy variable using the same manipulation for the weekend of 10th and 11th Apr. 2021.

For behavioral intentions, we adopted two items using a 5-point scale: "Assuming the current situation continues, will you refrain from going out this weekend?" and "If the current situation continues, how much do you plan to refrain from going out on weekends in the next month?" The score of behavioral intention was obtained by the simple addition of two items.

Previous studies have revealed that punishment and beliefs about punishment positively affect the promotion of cooperation (Fehr and Gächter, 2002; Yamamoto and Suzuki, 2018). In this study, we measured punishment norms because, in the real world, institutional punishments (Sigmund *et*

al., 2010) such as a police are used for non-cooperative behavior, and direct observation of peer punishment behavior is not suitable. Therefore, as a punishment norm, in response to the question, "How do you feel about people who go out on unnecessary and not urgent errands?", we asked three questions on a five-point scale: "The public should condemn them," "They should be punished with a fine," and "They should be allowed to do so because of their individual circumstances" (reversal item). The score of punishment norm was obtained by the simple addition of the three items.

2-2. Independent variables

We have adopted a representative set of well-known psychological attitudes that affect prosocial behavior. The first is generalized reciprocity and generalized trust (Yamagishi and Yamagishi, 1994; Yamagishi and Kiyonari, 2000). It is known that people with high levels of these two are more likely to engage in prosocial behavior. To measure generalized trust, subjects were asked to rate two items: "Most people are trustworthy" and "Most people trust others." A subject's score on generalized trust was obtained by the simple addition of the two items' scores. Two statements on a questionnaire were used to measure the subjects' level of reciprocity. Their overall score was obtained by the simple addition of the scores of the responses to the two statements. The two items used to calculate reciprocity were: "When someone helps me, I also help someone else," and "I believe that good things eventually come back to me when I am kind to others."

Second, we have focused on a belief in a just world, which is a cognitive bias that leads people to believe that the world is fair (Lerner, 1980).

Concretely, it is the psychological tendency to believe that positive outcomes such as future success and rewards will result from prosocial behaviors such as effort and helping others. Alternatively, antisocial behavior such as corruption and negligence will result in future failure and punishment. There is a positive correlation between the belief in a just world and altruistic behavior (Miller, 1977; Zuckerman, 1975). The belief in a just world is composed of two sub-concepts: belief in ultimate justice (BUJ) and belief in immanent justice (BIJ). BUJ is the belief that present misfortune or bad luck will be compensated for positively in the future, while BIJ is the belief that present injustice or wrongdoing will be rewarded negatively in the future. Recently, a relationship between mental health and a belief in a just world has been shown (Wang et al., 2021). We adopted the eight items developed by Murayama and Miura (2015) for the belief in a just world.

Third, we adopt justice sensitivity (Schmitt et al., 2010). The justice sensitivity scale has been used to examine cooperative and non-cooperative behavior in the real world as well as in the laboratory. There are four sub-concepts of justice sensitivity: victim, observer, beneficiary, and perpetrator. Their respective meanings are as follows: susceptibility to loss from an unfair event, susceptibility to knowing about an unfair event as a third party, susceptibility to passively benefiting from an unfair event, and susceptibility to actively causing an unfair event. For a scale, we adopted the shortened version (8 items) created by the Japanese version of the Justice Sensitivity Scale (Jessica Tham, et al., 2019). In addition to the above factors, many other variables influence prosocial behavior and punishment norms, but in this study, we focused on the three factors

mentioned above, which are well known as determinants of prosocial behavior.

Finally, we introduce the influence of media exposure. It is natural to think that not only psychological attitudes but also information from the surrounding environment impact people's behavior. In particular, the COVID-19 Pandemic has been one of the most important news items worldwide since the beginning of 2020. We asked how much information about COVID-19 people had seen or heard in the media, dividing these two types of media into mass media and social media. In the context of public health, it has been pointed out that the third-person effect is a factor in determining people's behavior (Lee and Park, 2016). The third-person effect refers to the tendency for people to perceive mass media messages as having a more significant impact on others than on themselves (Davison, 1983).

On the one hand, for mass media exposure, subjects were asked how much information about COVID-19 they had seen or heard in each of the following media: newspapers, television, news websites operated by newspapers, and Yahoo! News. The simple addition of the results was used. On the other hand, subjects were asked the degree of exposure to social media services such as Facebook, Twitter, LINE, and YouTube for social media exposure.

For the third-person effect, subjects responded to two items: "How much do you think the average citizen's opinion about refraining from going out is influenced by the media and their surroundings?" and "How much of your own opinion is influenced by the media?" The former minus the latter was adopted as a variable. This variable becomes larger the more the subject thinks that others are more influenced than themselves by the media.

3. Results

In the first step of the analysis, we have checked the independent variables. Factor analysis of two items each for generalized reciprocity and generalized trust revealed a one-factor structure (α=.72 and α=.83, respectively), and the simple summary of the two was adopted as the variable. For belief in a just world, a two-factor structure, the same as that in previous studies (Murayama and Miura, 2015), was confirmed, and BUJ (α=.93) and BIJ (α=.91) were extracted. Since previous research on justice sensitivity (Jessica Tham, et al., 2019) has argued that the validity of the short version is generally robust, and since the purpose of this study was not to examine the validity of the scale, the simple addition of two items from each of the four proposed factors was adopted as the variable. The alpha coefficients of victim, observer, beneficiary, and perpetrator are α=.61, α=.77, α=.75, and α=.77, respectively.

The distribution of the dependent variable "behavior" is shown in Table 1. As a result of the exact binomial test for the values of the first and second waves, the cooperative behavior of the first wave was significantly higher (p=0.04). Thus, cooperative behavior decreased between the two waves. The distribution of the dependent variable "behavioral intention" is shown in Figure 1. The results of the one-factor ANOVA show that the intention to go out has also increased (F(1,986)=63.08, p=.00, η2=.06), indicating that people's behavioral inhibition has attenuated over the past year. Finally, the distribution of punishment norms is shown in Figure 2. Punishment norms also decreased in the second wave (F(1,986)=112.66, p=.00, η2=1.03).

What factors determined behavior, behavioral

Table 1. Results of first-wave and second-wave behaviors (number of people)

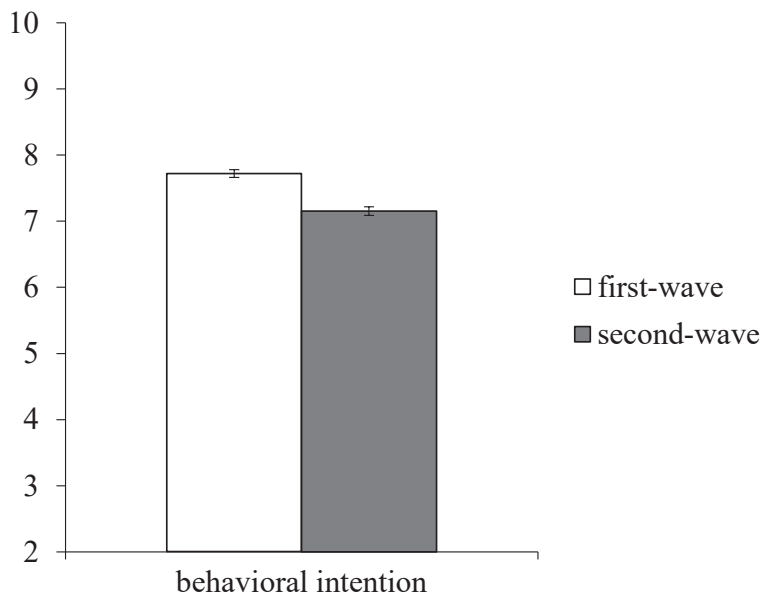|		First-wave		
		Cooperation	Not-cooperation	Total
Second-wave	Cooperation (staying home)	641	72	713
	Not-cooperation (went out)	152	122	274
	Total	793	194	987

Figure 1. Results of ANOVA (behavioral intentions). The vertical axis shows simple addition of behavioral intention items. Minimum value is two; maximum is ten. The error bars show standard errors.

intention, and punishment norm? Moreover, did the determinants change over the year? We conducted multiple regression analysis using the first and second waves of data to answer these questions. Since the change in psychological attitudes is considered slight, we adopted the data from the first wave for psychological attitudes (trust, reciprocity, a belief in a just world, and justice sensitivity). Models 1 and 2 have the first- and second-wave responses as the dependent variables, respectively. We can observe the determinants of the dependent variable in each period. In Model 3, the second-wave data were used as the dependent variable, and the first wave data were used as the control variable. This model enables us to observe changes over one year. COVID-19 does not threaten everyone equally. For example, the elderly and those with underlying diseases will be more likely to take proactive preventive
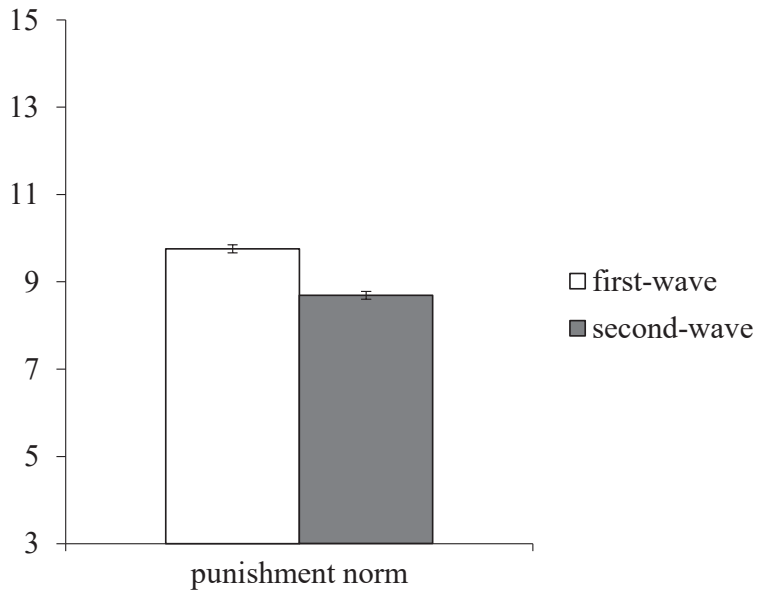
Figure 2. Results of ANOVA (punishment norm). The vertical axis shows simple addition of punishment norm items. Minimum value is three; maximum is fifteen. The error bars show standard errors.

actions for self-protection. The subjective infection risk might have a significant impact on people's behavior. Therefore, we introduced the subjective risk of infection as a control variable.

Table 2 reports odd ratios (ORs) from logistic regressions with behavior as the dependent variable. First, women tend to go out less than men. Reciprocity had a positive effect only during the first wave, and BUJ consistently had a negative effect. Furthermore, BUJ has a transformative effect on curtailment: it is the belief that present misery will be compensated for in the future. Therefore, it can be considered that the more people believe that they are currently forced to endure hardship, the more they perceive that they are justified in going out. The BIJ, on the other hand, has a positive effect on discouraging going out in the second wave and also has the effect of making people more

inhibited from going out than the first wave. Since, BIJ is the belief that one will be sanctioned in the future for one's present wrongful behavior, people avoided going out as reported cases were rising because they perceived it as antisocial behavior. As for justice sensitivity, "perpetrator sensitivity" consistently had a positive effect. The perception of not wanting to be a perpetrator who infects others through one's own going out inhibits one from going out. Naturally, the perception of one's own risk has a positive effect on inhibiting going out. However, media contact did not affect behavioral change.

Next, we analyze "behavioral intention." Table 3 reports β from ordinary least squares regressions (OLS). For behavior, the tendency to not go out was stronger among women. In addition, older people intended not to go out. The same as behavior, reciprocity had a positive effect

Table 2. Effects of psychological attitudes and media exposure on behaviors by logistic regressions.

		Model 1	Model 2	Model 3
		ORs		
	Behavior in the first-wave (dummy variable: cooperation=1)			7.103 ***
Control variables	Age	1.008	1.015 *	1.014
	Gender (female=1)	2.037 ***	1.462 **	1.177
	Subjective infection risk	1.157 ***	1.223 ***	1.240 ***
Trust and reciprocity	Generalized trust	1.063	1.075	1.061
	Reciprocity	1.148 **	1.011	0.961
Belief in a just world	BUJ	0.929 ***	0.934 ***	0.947 **
	BIJ	1.014	1.065 **	1.071 **
Justice sensitivity	Victim	0.93	0.909 **	0.920 *
	Observer	0.889 **	1.091 *	1.152 **
	Beneficiary	0.983	0.96	0.955
	Perpetrator	1.132 **	1.122 ***	1.086 *
Media exposure	Mass media exposure	0.987	0.987	0.994
	Social media exposure	0.994	0.989	0.989
	Third-person effect	0.962	1.006	0.96
	Constant	0.834	0.171 ***	0.041 ***
	Pseudo R^2	0.07	0.06	0.162
	Log likelihood	-454.81	-547.78	-488.52

only in the first wave. However, the effect of a belief in a just world was weaker than the effect on behavior; BIJ was not statistically significant, although BUJ tended to have a negative effect. As for fairness sensitivity, beneficiary sensitivity strengthened the intention to reduce going out. Perception of one's own infection risk also strengthened the intention to go out. Exposure to mass media increased the perception of infection risk and reinforced people's intention not to go out. The third-person effect also has a negative effect. This result means that people who think that others are more influenced by the media than themselves tended to intend to go out.

Table 3. Effects of psychological attitudes and media exposure on behavioral intentions by OLS.

		Model 1	Model 2	Model 3
			β	
	Behavioral intention in the first-wave			0.290***
Control variables	Age	0.086***	0.064*	0.037
	Gender (female=1)	0.062**	0.042	0.016
	Subjective infection risk	0.303***	0.268***	0.239***
Trust and reciprocity	Generalized trust	0.008	0.002	0.005
	Reciprocity	0.077**	0.070*	0.043
Belief in a just world	BUJ	-0.046	-0.084**	-0.072*
	BIJ	0.026	0.022	0.012
Justice sensitivity	Victim	-0.048	-0.057	-0.04
	Observer	0.044	0.043	0.031
	Beneficiary	-0.087**	0.058	0.079**
	Perpetrator	0.024	0.016	0.005
Media exposure	Mass media exposure	0.057*	0.076**	0.058*
	Social media exposure	0.073**	0.057*	0.036
	Third-person effect	-0.085***	-0.102***	-0.088***
	R^2	0.158	0.139	0.217
	adj. R^2	0.146	0.127	0.205

Finally, we analyze the determinants of punishment norms. Table 4 also reports β from ordinary least squares regressions (OLS). Gender and age had no significant effect. As in the previous analyses, reciprocity has a positive effect only in the first wave. As for the belief in a just world, BUJ has a negative effect, and BIJ has a positive effect. In addition, both have an effect in the direction of reinforcing the tendency. This result means that those who believe that their current misfortune will eventually be positively rewarded will avoid punishing others, while those who believe that their current injustice will eventually be negatively sanctioned will be more willing to punish others. Victim sensitivity had a positive effect on the punishment norm. Perception of one's own infection risk had a consistently strong positive effect on punishment

Table 4. Effects of psychological attitudes and media exposure on punishment norms by OLS.

		Model 1	Model 2	Model 3
			β	
	Punishment norm in the first-wave			0.343***
Control variables	Age	0.02	0.05	0.04
	Gender (female=1)	-0.008	-0.022	-0.028
	Subjective infection risk	0.285***	0.212***	0.188***
Trust and reciprocity	Generalized trust	0.019	-0.024	-0.024
	Reciprocity	0.097**	-0.019	-0.057
Belief in a just world	BUJ	-0.106***	-0.119***	-0.086**
	BIJ	0.04	0.129***	0.113***
Justice sensitivity	Victim	0.132***	0.127***	0.085**
	Observer	-0.090**	-0.076*	-0.043
	Beneficiary	0.023	0.071*	0.057
	Perpetrator	-0.008	-0.044	-0.048
Media exposure	Mass media exposure	0.013	-0.007	-0.013
	Social media exposure	0.073**	0.028	0.002
	Third-person effect	-0.099***	-0.091***	-0.078***
	R^2	0.133	0.0982	0.21
	adj. R^2	0.12	0.0853	0.198

norm. Media exposure did not have a significant effect. The third-person effect has a negative effect. This means that people who believe that others are more influenced by the media than themselves have weaker norms for punishing others.

4. Summary

In this paper, we analyzed changes in the determinants of behavior and norms during a pandemic by surveying the same subjects at two time points: early in the COVID-19 Pandemic and one year later. In particular, this paper considers restraint from going out as prosocial behavior and attempts to analyze it within the framework

of a social dilemma.

Generalized trust and reciprocity have been known to have positive effects on prosocial behavior in many studies. However, in the present study, reciprocity had positive effects on prosocial behavior, intention of prosocial behavior, and punishment norms, in the first wave, but these effects disappeared in the second wave. On the other hand, psychological attitudes toward fairness, such as the belief in a just world and justice sensitivity, consistently had an effect on people's behavior and norms. As for the belief in a just world, BIJ has a positive effect on prosocial behavior and punishment norms. The belief in a just world has led to blaming the victim (Correia et al., 2007), and the results of this study also suggest a risk of unfairly blaming infected people. Regarding justice sensitivity, the results are consistent with the intuition that the higher someone's perpetrator sensitivity, the less likely they are to go out, and the higher someone's victim sensitivity, the higher the punishment norm.

These results indicate that altruistic attitudes such as reciprocity influenced people's behavior in the early stage of the pandemic, but that influence of altruism changed as the pandemic continued. On the other hand, attitudes regarding fairness consistently affected people's behavior, behavioral intentions, and punishment norms. In particular, BUJ has consistently had a negative effect on cooperative behavior and punishment norms. BUJ is the belief that "present misfortunes should eventually be rewarded." The result suggests that people who believe they have been inconvenienced enough will refrain from voluntary cooperation. In addition, victim sensitivity has a consistently positive effect on the punishment norm. Victim sensitivity is

"sensitivity to one's own loss." These findings suggest that emphasizing prosociality and altruism effectively encourages voluntary cooperation in the early stages of the pandemic but that policies emphasizing fairness are necessary after the infections have become widespread. By continuously researching the factors that define people's behavior, it is possible to obtain a comprehensive picture of the social atmosphere surrounding a pandemic. This analysis can guide in developing policies that promote prosocial behavior.

As for media exposure and third-person effects, the effects are limited. Since this survey simply measured the amount of exposure through voluntary responses, more quantitative analysis, such as analyzing actual media consumption history, will be necessary in the future. Influential factors for COVID-19 prevention behavior are not only social dilemmas but also personality. Some researchers have focused on the effects of personalities on behavior during the COVID-19 Pandemic (Qian & Yahara, 2020; Nowak et al. 2020; Makhanova & Shepherd, 2020). In the future, our research will need to explore a wide range of factors. That exploration is planned for the third wave of panel studies.

Notes

1) The all data of this study are stored in an OSF data package titled 'Data of The effects of psychological attitudes and media exposure on voluntary cooperation against COVID-19' (Yamamoto, 2022), which can be accessed at the below link. https://doi.org/10.17605/OSF.IO/P7F3C

2) All experiments were approved by the ethics committee of Rissho University, application number 02-01 and 03-02.

3) The authors acknowledge Grants-in-Aid for

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Literacy is necessary to understand Fact-Checking: An empirical research using survey experiments

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Abstract

Regarding the impact of fact-checking, extensive research has been conducted on the correlation between fact-checking and individuals' political beliefs, but this issue is difficult to address by policy. This study investigates the relationship between the effectiveness of fact-checking and literacy, as well as the relationship between the effectiveness of fact-checking and the types of media used to disseminate this information. These variables can be addressed through policy measures. We conducted the survey via the internet. Participants were tasked with making true or false judgments about real instances of misinformation before and after fact-checking. The results highlighted the significance of information literacy in achieving accurate perceptions through fact-checking. Secondly, in the case of COVID-19-related misinformation, fact-checking proved more effective on government websites than on social media. Thirdly, many individuals incorrectly identified misinformation as true even after fact-checking. These findings underscore the risk of indiscriminately disseminating fact-check results on social media, as doing so could potentially have the opposite effect if the recipients lack the requisite literacy.

1. Introduction

This study aims to foster the practice of fact-checking. Specifically, we identify the relationship between fact-checking and literacy of information, as well as effective media for broadcasting fact-checking. These matters can be addressed through policy measures, and their implications for society are significant. This study is not intended to recommend that the government actively intervene in fact-checking. The policy responses proposed in this study are primarily intended for implementation by media organizations, platform companies, and non-profit organizations.

Fact-checking refers to the process of examining the accuracy of information, news, or statements circulating in society, documenting that process in articles, and sharing accurate information with people. This is an essential initiative in today's society as it is inundated with misinformation. The issue of misinformation gained prominence during the 2016 U.S. presidential election. Misinformation supporting Trump was shared a total of 30 million times, while misinformation supporting Clinton was shared a total of 8 million times (Allcott and Gentzkow, 2017). Amid the COVID-19 pandemic, the World Health Organization (WHO) declared misinformation an "infodemic," a problem requiring attention comparable to the infectious diseases themselves.

Japan grapples with a plethora of misinformation. For instance, during the 2020 U.S. presidential election, misinformation suggesting that Mr. Biden was rigging the election pervaded Japan. Moreover, countering misinformation has evolved into an increasingly critical issue amid the pandemic. According to a survey conducted by the Ministry of Internal Affairs and Communications, approximately 72% of respondents reported exposure to COVID-19-related misinformation (Ministry of Internal Affairs and Communications, 2020). A separate survey carried out in Japan in 2020 showed that 28.2% of participants reported encountering political misinformation, while 45.2% had been exposed to COVID-19-related misinformation (Yamaguchi et al., 2020). As indicated, misinformation presents a pressing concern in both political and COVID-19 contexts.

Since the launch of the Fact Check Initiative Japan (FIJ) in 2017, numerous media entities and experts have cooperated to carry out fact-checking. However, these efforts have not fully permeated society. In Japan, 71% of survey respondents reported never having heard the term "fact-checking" (Yamaguchi et al., 2020). Given this situation, it is crucial to contemplate suitable policy responses to facilitate smoother dissemination of fact-checking results within society.

2. Research question

2.1 Literature review

In recent years, several empirical studies have been conducted on fact-checking and debunking information (for meta-analyses, see Lewandowsky et al., 2012; Walter et al., 2020; Walter and Murphy).

The issues presented are as follows. First, it is related to individuals' beliefs, particularly political beliefs. That is, the effect of corrective information depends on whether its content is consistent with an individual's political beliefs (Nyhan and Reifler, 2012; Swire et al., 2017; Wood and Porter, 2018). Naturally, pro-attitudinal information is more effective (Walter et al., 2020). This is called motivated reasoning (Nyhan and Reifler, 2012). It

has also been shown that fact-checking is sometimes selectively ingested and spread based on an individual's belief (Shin and Thorson, 2017).

Second, the backfire effect was noted in relation to this point. The backfire effect occurs when individuals encounter fact-checking results conflicting with their beliefs, which consequently strengthens their faith in the original misinformation. For example, Republican supporters of the U.S. invasion of Iraq in 2003, even after correcting that the information about the existence of Weapons of Mass Destruction (WMD) in Iraq was false, still strengthened their misbelief in the misinformation about the existence of WMD in Iraq (Nyhan and Reifler, 2010). The above points are based on a study of how an individual's political beliefs (liberal or conservative) relate to the effects of corrective information. Despite great academic interest, there are some challenges concerning policy implications. This is because policymakers generally cannot manipulate individual beliefs.

Therefore, the third and fourth points are the focus of this study. The third point relates to literacy, as it relates to information. If we can clarify the type of literacy involved in accepting fact-checking, it will be possible to implement policy responses. Regarding the relationship between misinformation identification and literacy, Jones-Jang et al. (2021) astutely categorize literacy into four domains—news literacy, media literacy, information literacy, and digital literacy—and investigate the effects of each. The results indicate that only information literacy significantly contributes to the identification of misinformation.

On the other hand, few studies have considered literacy as a variable in examining the effect of fact-checking, and the results have been inconsistent.

Vraga et al. (2020) and Tanihara et al. (2022) conducted two of the few existing studies on this subject. Vraga et al. (2020) performed an experiment where subjects were exposed to tweets containing misinformation and their corrections, following tweets that invoked news literacy. This study, however, did not establish that invoking news literacy significantly influences information correction. The authors posited that tweets invoking news literacy may have been lost in the timeline noise. Tanihara et al. (2022), employing the categorization by Jones-Jang et al. (2021), divided literacy into the aforementioned four categories and investigated their influence on the effect of fact-checking. The results demonstrated that individuals who reconsider their views when fact-checking results are presented via mass media tend to have higher news literacy. In contrast, those who change their minds when fact-checking results are presented through social media exhibit low information literacy. A significant issue in this study is that media and news literacy were self-reported and not adequately measured. It is also perplexing that individuals with low information literacy tend to accept fact-checking results from social media more readily than those with high information literacy. Given that the survey design did not explicitly identify the corrected information as fact-checking, Tanihara et al. (2022) suggested that individuals who alter their views based on corrected information from social media are susceptible to the information and tend to change their minds without thorough examination.

Fourthly, the medium's impact differs: in line with McLuhan's (1964) assertion "the medium is the message," reactions may vary based on the medium delivering corrective information. Identifying the most effective media for fact-checking could enable more potent policy

responses, focusing on highly effective platforms. Tanihara et al. (2022) offered insights here but only differentiated between mass and social media, without inferential statistical analysis of the two.

2.2 Research gaps

The research gap in related studies, with respect to policy implications, can be summarized as follows. First, many studies have focused on variables that are difficult to address in policy terms, such as individual political beliefs. Second, the few studies examining relationship with literacy have produced inconsistent results. Third, the identification of specific media types where fact-checking is effective is lacking.

Therefore, this study contributes to related research and policy by adopting the following approach. First, we designed a survey experiment that transforms literacy items into a test format and specifies that the presented corrective information has undergone fact-checking. Second, we categorized the media into four groups (online news, social media, newspapers, and government websites) and randomly divided participants into these groups for the survey experiment. As discussed below, by incorporating an interaction term for each medium into the regression model, we can identify individual characteristics that respond to fact-checking and the differential effects of each medium. The following research questions (RQs) were set for this study based on the above:

RQ1: How does individual literacy influence the effectiveness of fact-checking?
RQ2: Are there differences among media concerning the effectiveness of fact-checking?

As both RQ1 and RQ2 do not have consistent effects in previous studies, we do not set specific hypotheses. We examine the effects of each variable in an exploratory manner.

3. Methodology

Participants

This study utilized data from an internet survey conducted in Japan in 2022 by the Center for Global Communications at the International University of Japan. The survey period spanned from February 18 to February 23, 2022. The survey was disseminated to 8,394 respondents via My Voice.com Inc. and its partners, garnering 5,987 responses. After eliminating responses from samples that answered cursorily as indicated by trap questions, the final sample size was set at 5,569. This survey, however, was designed such that about 90% of the respondents had been exposed to the misinformation presented in the preliminary survey. Consequently, the analysis was weighted according to the percentage of respondents who had encountered misinformation in the pre-survey. In the preliminary survey, 40.9% of the respondents encountered one or more pieces of misinformation. Conversely, in the main survey, they accounted for 90.1%. Therefore, weighting was employed to adjust for this discrepancy. The sample sizes are presented in Table 1.

Table 1 Sample size

	male	female
20-29	430	474
30-39	524	531
40-49	598	695
50-59	614	624
60-69	546	533

Research Design

The misinformation utilized in the survey experiment reflects actual misinformation circulated in society. We specifically employed the following two types of misinformation, both of which were determined to be "False" by fact-checking conducted by FIJ's partner organizations:

1. *The current cabinet decided to abolish the plastic bag fee system (related to politics).*

2. *The French government began vaccinating children against the coronavirus without parental consent starting in September 2021 (related to COVID-19).*

Participants who were already aware of the above two news items before the survey were excluded from the analysis. Participants encountering the news items for the first time were asked whether they perceived the news to be accurate. The choices were: "1 = It is correct information," "2 = It is misinformation / unsubstantiated information," and "3 = Do not know / cannot say either." Subsequently, the respondents were presented with corrective information regarding the news and asked again about their perception of it. Specifically, we created scenarios in which corrective information was posted on online news, social media, newspapers, and government websites, and assigned the sample to each of the four randomly divided groups. For instance, the group for whom the correction information was posted on online news responded to the following questions:

The following information was published in an online news article. The Recycling Promotion Office of the Ministry of the Environment, the department in charge, categorically denied that the current cabinet had made a decision regarding the abolition of plastic bag fees, stating, "There is no such fact." In light of this information, how would you reconsider the following news? "The current cabinet decided to abolish the plastic bag fee system."

For the remaining three groups, the questions were posed by replacing "was published in an online news article" with "was posted on social media," "was published in a newspaper article," and "was posted on a government website," respectively. The options were "1 = It is correct information," "2 = It is misinformation / unsubstantiated information," and "3 = Do not know / cannot say either." Those who chose 2 were accurate, indicating that they had arrived at the correct perception of the information. In the process described above, participants were queried about their opinion on the two pieces of misinformation before and after fact-checking. After the survey's completion, respondents were notified by email that all listed news were false.

Cross tabulation

The results of the survey experiment are depicted in Tables 2 and 3. Table 2 indicates the respondents' perceptions of the news without the presence of fact-checking. Concerning the political news, approximately 62% of the respondents selected "It is misinformation / unsubstantiated information," suggesting that over half of the respondents identified the misinformation. In regard to the COVID-19-related news, the distribution of responses prior to the introduction of fact-checking revealed that over half of the respondents, around 59%, answered "Do not know / cannot say either." This implies that forming a judgement on this was more challenging compared to political

Table 2 Cross-tabulation (before fact-checking)

	Politics-related news	COVID-19-related news
It is correct information.	1.6%	1.5%
It is misinformation/unsubstantiated information.	61.2%	38.3%
Do not know/ Can not say either	37.2%	60.3%
n	4,857	5,238

Table 3 Cross-tabulation (after fact-checking)

	Media (Politics)			
	Online news	Social media	Newspaper	Government website
It is correct information.	17.1%	18.7%	17.5%	18.6%
It is misinformation/unsubstantiated information.	53.3%	51.8%	54.7%	57.6%
Do not know/ Can not say either	29.6%	29.5%	27.8%	23.8%
n	1,214	1,205	1,220	1,218

	Media (COVID-19)			
	Online news	Social media	Newspaper	Government website
It is correct information.	13.4%	14.8%	13.7%	16.4%
It is misinformation/unsubstantiated information.	50.4%	50.8%	53.9%	52.4%
Do not know/ Can not say either	36.2%	34.4%	32.4%	31.2%
n	1,288	1,301	1,320	1,329

news.

Table 3 depicts the distribution of judgments after exposure to fact-checking through various media. As for the politics-related news, While the percentage of respondents answering "Do not know / cannot say either" for political news decreased, the proportion of respondents maintaining incorrect beliefs increased. The percentage of respondents attaining correct comprehension was slightly reduced post-correction. In terms of COVID-19-related news, the percentage of those responding "Do not know / cannot say either" decreased significantly. While the number of respondents stating, "It is misinformation / unsubstantiated information" (indicating correct comprehension) increased, the percentage who answered, "It is correct information" also rose.

This presents the surprising outcome that in both news categories, even when confronted with fact-check results, some respondents persisted in their belief in the original information. While the corrected information seems to have assisted in discerning the veracity of the information, it did not necessarily result in correct comprehension. As it is crucial to elucidate this situation, further analysis will be conducted in subsequent sections.

In terms of the medium, the percentage of correct responses for political news increased in the sequence of online news < social media < newspapers < government websites. For COVID-19-related news, the percentage of correct responses escalated in the order social media < online news < newspapers < government websites. However, in both instances, the difference is minor, and a thorough analysis in the upcoming section is required to determine its statistical significance.

The foregoing results reveal an unexpected increase in the percentage of individuals who incorrectly identified misinformation as "correct" in both political and COVID-19-related news, even after undergoing fact-checking. To delve further into this issue, Table 4 presents a detailed account of the pre-fact-checking decisions made by those who misidentified misinformation post-fact-checking. For instance, approximately 46.3% of those who initially labelled the COVID-19-related misinformation as "correct information" continued to do so even after exposure to fact-checking. This phenomenon may be explained by the previously mentioned backfire effect, wherein respondents initially misled by misinformation remain misled, fact-checked information, thereby sustaining their original misconception. However, the backfire effect fails to explain the cases of those respondents who initially identified the news as "misinformation/ unsubstantiated information" or "do not know/ cannot say either", but later reversed their decision to "correct information". In these cases, respondents initially rendered the correct judgment, but subsequently arrived at an incorrect understanding after encountering fact-checking. We tentatively term this the "adverse effect of fact-checking". To illuminate the characteristics of individuals who develop incorrect perceptions after fact-checking, we proceeded with a regression analysis.

Regression Analysis

Building on the results from the previous section, we will conduct a regression analysis to discern the characteristics of those forming correct or incorrect perceptions based on fact-checking. The method of variable creation is as follows.

Independent Variables
Media literacy and information literacy

To address RQ1, we established literacy as an independent variable, incorporating two forms of literacy: media and information. For media literacy, we referenced Kodera (2017), who structured both domestic and international measurements of media literacy. The questions, presented in a test-like format, gauged respondents' understanding of six properties of media: the constructive nature of media messages, the media's capacity to shape "social reality," the commercial aspects of media, the ideological and value-based transmission of media, media style and language, and the non-uniform interpretability of the recipient. Media literacy measurements are as follows. Respondents were asked to respond to each of the following questions using a four-point scale, from "1 = strongly agree" to "4 = strongly disagree". The questions were presented in random order.

[1] Online news is neutral and objective.
[2] The "average person" depicted in the news represents an average Japanese individual.

Table 4 Cross-tabulation (before and after fact-checking)

		Politics-related news	COVID-19-related news
		After fact-checking	
		It is correct information.	It is correct information.
Before fact-checking	It is correct information.	26.7%	46.3%
	It is misinformation/unsubstantiated information.	22.2%	21.5%
	Do not know/ Can not say either	10.9%	10.1%

[3] The range of opinions online closely reflects societal reality.

[4] Television programs are produced with viewer responses in mind (reverse-coded).

[5] TV and internet content can be influenced by the preferences of sponsors (reverse-coded).

[6] The media provides viewers with value judgments of what is "good" and "bad" (reverse-coded).

[7] The same event is reported identically in mass media (newspapers, TV, etc.) and online news.

[8] Different images used in the same TV news broadcast can generate different impressions (reverse-coded).

[9] If the news is the same, the elements that most people focus on should be identical.

The Association for College and Research Libraries (ACRL) defines information literacy as "a set of abilities requiring individuals to 'recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.'" (ACRL 2000: 2). Based on this definition from the ACRL, Podgornik et al. (2016) devised a test-style questionnaire. We arranged it specifically for Japanese respondents.

(1) From the following options, select one piece of unprocessed, raw data:

[1] The number of UN member states at the end of 2020, [2] Weather map, [3] Population data presented in a table, [4] Population data represented in graphs

(2) Which of the following statements about restaurant X does not include the author's opinion? Select one.

[1] Restaurant X is situated far from the station,

[2] Restaurant X opened in 2005, [3] Don't visit restaurant X because it isn't good, [4] Restaurant X should discontinue 24-hour operations for the health of its employees

(3) Which of the following statements about Shohei Otani does not include the author's opinion? Select one.

[1] Shohei Otani is an exceptional baseball player, [2] Shohei Otani improved by moving to America, [3] Shohei Otani revolutionized the world of baseball, [4] Shohei Otani declined the National Medal of Honor.

(4) Here is news about the Amazon rainforest:

"In 2019, the total area of the Amazon rainforest destruction was 9,166 square kilometers, marking an 85% increase from the previous year. This sharp increase in deforestation coincides with a period when the current President of Brazil relaxed restrictions on the development of the Amazon rainforest, after assuming office."

From this news, select two statements we can confidently make.

[1] The area of the Amazon rainforest destroyed in 2019 was larger than in 2018, [2] The current President of Brazil orchestrated the destruction of the Amazon rainforest, [3] The destruction of the Amazon rainforest significantly impacts climate change, [4] The current President of Brazil relaxed regulations on the development of the Amazon rainforest, [5] The destruction of the Amazon rainforest emerged as a major issue for the first time in 2019, [6] One of the significant global issues is the destruction of the Amazon rainforest.

Control variables

In addition to the demographic characteristics,

we used trust in the media as a control variable. This is predicated on the assumption that individuals with higher levels of trust in a given medium are more likely to accept fact-check results presented through that medium. We established four variables corresponding to the four media categories utilized in this study: online news, social media, mass media, and government websites. We assessed trust in each of these media types using a five-point scale.

Dependent variables

As previously mentioned, we established two types of dependent variables. The first determined whether the respondents achieved accurate perception after fact-checking. A binary variable was created by assigning a '1' to those who chose '2' and a '0' to those who selected '1' or '3' from the three options: "1 = It is correct information," "2 = It is misinformation / unsubstantiated information," and "3 = Do not know / cannot say either." It should be noted that those who detected misinformation prior to fact-checking were excluded from the analysis, as the research question appropriately targets those whose perceptions changed after receiving the fact-checking results.

The second variable was whether the respondents were misled after fact-checking. A binary variable was created by assigning '1' to those who chose '1', and '0' to those who selected '2' or '3' from the given options. For this analysis, the entire sample was included because those who initially responded correctly but subsequently changed their minds after fact-checking, thus leading to incorrect responses, should be considered part of the 'adverse effect of fact-checking'.

The basic statistics of the variables are listed in Table 5.

Model

The two following models were developed:

$$logit[P(True_{ij} = 1)] = \log \left(\frac{P[True_{ij}]}{1 - P[True_{ij}]} \right)$$
$$= \alpha + \beta_1 Charactristics_{ij} +$$
$$\beta_2 Media\_dummy_i + \beta_3 Literacy_i + \beta_4 Trust_i$$

$$\dots (1)$$

$$logit[P(Fales_{ij} = 1)] = \log \left(\frac{P[Fales_{ij}]}{1 - P[Fales_{ij}]} \right)$$

Table 5 Basic Statistics

Variable	Mean	SD	Min	Max
Gender	1.497	0.500	1	2
Age	43.854	15.022	15	69
Political interest	3.413	1.090	1	5
COVID-19 interest	3.618	1.043	1	5
Media literacy	2.845	0.357	1.667	4
Information literacy	0.696	0.271	0	1
Trust in social media	2.535	0.891	1	5
Trust in online news	3.098	0.841	1	5
Trust in mass media	3.085	1.019	1	5
Trust in government website	3.370	0.918	1	5

$$= a + \beta_1 Charactristics_{ij} +$$
$$\beta_2 Media\_dummy_i + \beta_3 Literacy_i + \beta_4 Trust_i$$
$$\dots (2)$$

These are logit models. The right-hand variables were standardized, excluding dummy variables. Stata ver. 16.1 was used in the analysis. Each variable has the following meaning: $True_{ij}$ is a dummy variable indicating whether individual i was able to identify the news as misinformation after being fact-checked for topic j. It is 1 if correct, and 0 if not. $P(True_{ij}=1)$ is the probability that $True_{ij}$. $Charactristics_{ij}$ is the attribute vector of individual i. Specifically, it is a vector with three variables: gender, age, and interest in the topic. For interest in the topic, we asked about the degree of interest on a five-point scale for both topics. $Media\_dummy_i$ is a dummy variable indicating that media individual i received fact-checking. Social media was used as a reference. $Literacy_i$ is individual i's literacy vector. Specifically, it is a vector with two variables: media and information literacy. $Trust_i$ indicates the degree to which individual i trusts each medium outlet. A vector with four variables— trust in online news, social media, mass media, and government websites. $False_{ij}$ is a dummy variable indicating whether individual i misidentified misinformation as correct information about topic j despite it being fact-checked. It is set to 1 if misidentified and 0 if not.

4. Results

Table 6 details the results of Equation (1). Regarding political misinformation, no variations were detected between media conveying fact-checking, while information literacy was significantly positively correlated. For COVID-19-related misinformation, government websites significantly positively impacted the effects, indicating a higher likelihood of correct perception when fact-checking results were presented on this source compared to social media. Both media and information literacy

Table 6 Results of Logit Model Analyses (1)

	Politics-related news			COVID19-related news		
	Coefficient	SE	p-value	Coefficient	SE	p-value
Gender	.141	.156	.368	.299*	.123	.015
Age	.067	.091	.459	-.069	.070	.322
Interest in Politics (COVID-19)	.079	.082	.335	.097	.064	.130
Media literacy	.058	.097	.552	.413**	.074	<.001
Information literacy	.413**	.094	<.001	.690**	.077	<.001
Social media dummy	(reference)			(reference)		
Online news dummy	-.147	.167	.379	-.077	.129	.551
Newspaper dummy	.112	.202	.580	.056	.160	.727
Government website dummy	.100	.197	.610	.317*	.152	.038
Constant	-.662	.293	.024	-.909**	.221	<.001
sample size	1843			3207		
R^2	.064			.131		

**: $p < .01$, *: $p < .05$

Table 7 Results of Logit Model Analyses (2)

	Politics-related news			COVID19-related news		
	Coefficient	SE	p-value	Coefficient	SE	p-value
Gender	-.197	.119	.097	-.227	.123	.064
Age	.074	.067	.267	.163*	.076	.031
Interest in Politics (COVID-19)	.198**	.069	.004	.087	.074	.237
Media literacy	-.294**	.073	<.001	-.201**	.075	.008
Information literacy	-.214**	.059	<.001	-.209**	.063	.001
Social media dummy	(reference)			(reference)		
Internet news dummy	-.153	.128	.234	-.240	.126	.057
Newspaper dummy	-.086	.154	.577	-.382*	.161	.017
Website of the government dummy	-.005	.148	.974	-.310	.158	.050
Constant	-1.230**	.221	<.001	-1.303**	.212	<.001
sample size	4857			5238		
R^2	.033			.036		

**: $p < .01$, *: $p < .05$

exhibited positive associations.

Table 7 lists the results for Equation (2), identifying characteristics of individuals who could not identify misinformation despite being presented with fact-checking results. For political misinformation, no variations were noted between the media conveying fact-checking. However, both media literacy and information literacy had significant negative correlations. For COVID-19-related misinformation, the medium of newspapers significantly reduced the likelihood of misperceptions compared to social media. Both media and information literacy were negatively associated.

5. Discussion

Our study primarily reveals that information literacy facilitates the acceptance of fact-checking results and mitigates misinterpretation. Among the four literacies presented by Jones-Jang (2021), information literacy stands as the sole effective one in identifying misinformation. This consistency is fitting as accepting fact-checking results essentially involves discerning truth from falsehood. Information literacy, which includes differentiating facts from opinions and proficient textual comprehension, proves crucial in such judgments. This study underscores the significance of information literacy, suggesting that a more literate public is less susceptible to the detrimental impacts of misinformation—a key insight for policymakers.

Secondly, media literacy fosters the acceptance of fact-checking results and hinders misinterpretation, barring political news in Equation (1). Despite inconsistent results in earlier studies (Vraga et al., 2020; Tanihara et al., 2022), the impact of media literacy became clearer when measured in a test format.

As detailed above, literacy fosters acceptance of fact-checking results and mitigates misinterpretation. These skills should be developed over a medium-to-long-term horizon.

Media literacy is the ability to critically interpret broadcasted information. In the contemporary era, where information is disseminated through diverse media such as websites and social media, in addition to traditional outlets like television and newspapers, media literacy has become an increasingly crucial skill. Concurrently, fact-checkers should recognize that fact-checking results should be subject to critical analysis. Moreover, fact-checking results should be ingeniously disseminated.

Subsequently, we offer an interpretation of the counterproductive effects of fact-checking. Recent empirical studies suggest that the backfire effect is limited (Wood and Porter, 2018; Swire et al., 2017) and is observed chiefly when targeted information and participants exhibit strong partisanship (Wood and Porter, 2018). The news discussed in this study, the abolition of plastic bags by the ruling and foreign governments' vaccine enforcement for children, may stir strong partisanship, particularly the latter. Yet, the former topic doesn't incite a high degree of controversy. Regression analysis results indicate that, irrespective of the partisanship of specific news, individuals with low information literacy are particularly susceptible to the backfire effect. While related studies have considered individual political beliefs as explanatory variables, addressing this policy-wise is challenging. Contrarily, this study identifies information literacy, a variable that can be addressed by policy, as the cause of the backfire effect. This presents a substantial contribution to the discourse, revealing the potential to artificially curtail the backfire effect.

The aforementioned observations also apply to individuals who had accurate perceptions or suspended judgment before examining fact-checking results. Although this phenomenon doesn't align with the scope of the backfire effect, our data demonstrate its occurrence. This circumstance presents a challenge for policymakers. Once again, media and information literacy emerge as the solutions. This study unequivocally establishes the vital role of both types of literacy in facilitating the societal penetration of effective fact-checking.

The third issue concerns the impact of various media on fact-checking acceptance. For news related to COVID-19, groups exposed to government websites were more likely to discern the truth than those exposed to social media. Additionally, the group exposed to newspapers was less likely to misinterpret information than those exposed to social media. These observations underline the inherent vulnerabilities of social media as an information medium, as pointed out by Tanihara et al. (2022). In essence, social media has certain limitations as a medium for fact-checking dissemination. To effectively disseminate fact-checking results, it is necessary to develop a reliable platform and systematize the dissemination process. These findings underscore the risk associated with casually broadcasting fact-check results on social media. If the recipients lack literacy, the outcomes could be counterproductive.

6. Contributions and limitations

The novelty of this study lies in the following: firstly, we revisited the relationship between literacy and fact-checking, improving the literacy-measuring items. Secondly, we sought to gauge the differential effects of various media by randomly segmenting the sample, focusing on these differences.

This study enriches the literature on corrective

information effects. While related research has primarily centered on individual political beliefs as variables, our study highlights the importance of literacy and the medium of fact-checking dissemination for effective fact-checking communication and misperception prevention. These variables are relatively policy-responsive and ripe for further exploration. Though literacy has yielded inconsistent outcomes in prior studies, our findings underscore its significance in counteracting misinformation. The study also offers fresh insights into the backfire effect. The unfortunate potential for fact-checking to mislead individuals with lower literacy represents a new risk in fact-checking that requires acknowledgement.

The policy implications of our study are as follows: information literacy is crucial for both political and COVID-19-related news, as it is integral to misinformation counteraction. The ability to discern between facts and opinions, and to read and comprehend texts—components of information literacy used in our study—should be stressed in educational curricula. Concerning media, only COVID-19-related news was found to be effectively disseminated via government websites. Particularly considering the 'adverse effect of fact-checking,' hastily disseminating information on social media carries the risk of misinterpretations. It is therefore important to convey fact-checking results through accredited media.

This study is not without its limitations, particularly in the design of the survey experiment used to discern different media effects. In the survey, all groups were divided based on the medium at the sentence level—an assumption underlying our experiment. For a more eraborated analysis of different media effects, it would be necessary to present actual online news screens, social media timelines, newspaper articles, and government website screens, and then solicit respondents' judgments. Moreover, the research design must acknowledge that fact-checking is a process. Simply presenting short report results, as done in this study, may fail to encapsulate the essence of fact-checking—verifying information truthfulness from various perspectives, sharing the process with the public, and leaving the judgment of fact-checking results up to the individuals. Capturing this complexity in a survey experiment poses a significant challenge.

Acknowledgments

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