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“Don’t Know” responses in young adults’ inferences about the emotions of self and others in equivocal versus unequivocal emotional situations

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Abstract

This study investigated how people around 20 years of age make “Don’ t Know” (DK) responses in inferring the emotions of others in equivocal versus unequivocal (positive or negative) emotional situations. There were four main patterns of results: (1) The frequency of DK responses was greater in equivocal situations than in unequivocal situations. (2) DK responses in inferring the emotions of others (Other Emotion Condition; OEC) were more frequent than DK responses in inferring the emotions of self (Self Emotion Condition; SEC), although this difference was not found in unequivocal situations. (3) In equivocal situations, DK responses occurred more frequently when inferences about the self were made first (Self First Condition; SFC) than when inferences about others were made first (Other First Condition; OFC). This suggests that inferring the emotions of self activates self-consciousness and enhances discrimination between self and others, thus increasing the frequency of occurrence of DK responses. (4) In an analysis of response patterns (distributions of DK responses), a lack of correspondence was found between DK responses in SEC and in OEC. This suggests that the projection of inferencing about the self --that is, an egocentric process--does not appear (or appears only weakly) with DK responses in inferring the emotions of others.

Keywords：“Don’t Know” response, Emotion understanding, self, other, equivocal situation

I　Introduction

Understanding the emotions of others is required for effective interpersonal communication and is an especially important developmental task for children. Two directions in the development of emotion understanding have been identified (Kondo, 2017): One is the process by which children come to understand the emotions of others, and another is the process by which children become aware that they may not fully understand the emotions other people are experiencing, in other words, that there is uncertainty in their knowledge of the emotions of others. The results of many studies of the former process suggest that (1) emotion understanding at the perceptual level appears several months after birth (e.g., Young-Brown et al., 2013), (2) emotion understanding at the inference level improves over preschool childhood (Deconti & Dickerson, 1994; Michalson & Lewis, 1985), and (3) understanding complicated emotions (e.g., the real-appearance distinction) is acquired during middle childhood (Banerjee & Yuill, 1999; Harris et al., 1986; for a review, see also Kondo, 2014a).

On the other hand, few studies have examined the process by which children become aware of uncertainty about others’ emotions. For example, in Kondo (2014b), 3- to 6-year-old children were asked to infer the emotion of another in an “equivocal” situation in which they were not given enough information to judge the other’s emotional response; for example, a beetle falls on a child’s arm, but it is unknown whether or not the child likes bugs and would enjoy this experience. The results indicated that children

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began to make “Don’t Know” (DK) responses in inferring the emotion of others at 6 years of age. However, studies of preschool children (Kondo, 2014b, 2017) have not revealed when it is that people fully recognize that they don’t know the emotions of others. To clarify the developmental process of recognizing uncertainty about the emotions of others, it is important to establish its developmental end point.

When do people recognize uncertainty about the emotions of others? In Gnepp and Domanic (1987), children aged 5 to 8 inferred the emotions of characters in unequivocal situations, which elicit only positive or negative emotional reactions, and equivocal situations, which commonly elicit positive emotional reactions in some people and negative reactions in others. With increasing age, children came to consider both positive and negative emotional possibilities for the equivocal situation, but even 8-year-olds often failed to distinguish between unequivocal and equivocal situations (p.121). In Gnepp and Klayman (1992), 6-, 8-, and 12-year-old children and 19-year-old adults (college students) inferred the emotions of story characters in equivocal situations. Compared with the other age groups, 6-year-olds had greater difficulty considering more than one emotional possibility. These studies suggest that the uncertainty of emotions of others is recognized through middle childhood. On the other hand, college students also had some difficulty recognizing equivocal situations. In other words, it is possible that people around 20 years of age are both aware and unaware of uncertainty about the emotions of others. Therefore, in order to investigate the developmental end point of recognizing the uncertainty of emotions of others, it is important to examine people at this age (i.e., around 20 years old). Although Gnepp and Klayman investigated whether children (or college students) consider more than one emotion in equivocal situation, they did not examine DK responses directly. Thus it is not clear whether college students provide DK responses when they infer the emotions of others in equivocal situations. The present study investigated how people of college age make DK responses when they infer the emotions of others in equivocal situations. Four main aspects of emotion inference were examined.

1. Situation. As mentioned above, in an unequivocal situation, almost everyone feels the same emotion (e.g., win the lottery, lose a wallet); thus it should be easy to infer either positive or negative emotion. An equivocal situation is one which elicits different emotions depending on the person experiencing it (e.g., have a dog, eat a tomato) (Gnep, McKee, & Domanic, 1987; Gnepp & Klayman, 1992). Thus when one infers the emotions of another person about whom there is inadequate information (e.g., whether or not he likes dogs), a DK response is the correct answer. In previous research, such situations were developed for children (Gnepp, McKee, & Domanic, 1987; Gnepp & Klayman, 1992). The present study developed unequivocal and equivocal situations for adults and investigated how people make DK responses for each situation. Hypothesis 1 was that DK responses would be more frequent in equivocal situations than in unequivocal situations.

2. Person (self versus other). In the study by Kondo (2014b), DK responses were more frequent in conditions in which participants made inferences about the emotions of others (other emotion condition: OEC) than when they inferred their own emotions (self emotion condition: SEC). The fact that participants inferred some emotion (positive or negative) in SEC while also making DK responses in OEC is evidence that they recognized their own uncertainty about others’ emotions. Hypothesis 2 of the present study is that DK responses would be more frequent in OEC than in SEC.

3. Order of inferencing about emotions. More DK responses were observed in a study in which both SEC and OEC were included (Kondo, 2014b)

than in one consisting of only OEC (Kondo, 2017). This suggests that inferring emotions of the self activates self-consciousness, which makes the difference between self and others more clear. This present study compared a condition in which SEC was presented first (self-first condition: SFC) with a condition in which OEC was presented first (other-first condition: OFPC). Hypothesis 3 is that DK responses would be more frequent in SFC than in OFC.

4. Correspondences between DK responses in SEC and those in OEC. Previous studies of the process of inferring another's emotions or behaviors (e.g., Van Boven & Lowenstein, 2003; Kondo & Ikegami, 2012) have suggested that an egocentric process of inferencing about the self is projected for inferencing about the other. In other words, these studies suggest that a correspondence exists between inferencing the self and inferencing the other. However, it is possible that DK responses in inferring the emotions of others are actually based on recognition of the difference between self and other, rather than on the operation of an egocentric process. Thus the egocentric process may be unrelated to the recognition of the uncertainty about the emotions of others and corresponding DK responses. Thus Hypothesis 4 holds that if the egocentric process is not related to DK responses in inferring the emotions of others, DK responses in SEC and DK responses in OEC should not correspond.

Method

Participants

Participants were 158 undergraduate and graduate students from one university (73 males, 85 females, Mean age = 21.20 years, *SD* = 2.39 years). Questionnaires were distributed in classes related to psychology. The face sheet of the questionnaire included assurances that participation was voluntary and data would remain anonymous and confidential. Additional points for course credit were given at each participant's request.

Procedure

Two questions were printed in the questionnaire: "What is your feeling in the situations below?" (self emotion condition: SEC), and "What is another person's general feeling in the situations below?" (other emotion condition: OEC). There were 20 unequivocal situations (10 situations eliciting positive emotion and 10 eliciting negative emotion) and 20 equivocal situations. A total 40 situations were presented in SEC and OEC respectively (see Tables 1, 2, and 3)[1]. Participants judged the emotions using five-point scales; -2 (*very bad*), -1 (*slightly bad*), 0 (*don't know*), 1 (*slightly good*), 2 (*very good*).

Unequivocal situations and equivocal situations were the same in SEC and OEC and presented in random order in each condition. However, the ordering of conditions differed in two types of questionnaire. In one questionnaire (used in the self-first condition: SFC), inferences about emotions of the self were presented first, before inferences about the emotions of others, while in the other questionnaire (other-first condition; OFC) inferences about the emotions of others were presented first. The conditions of SFC and OFC were counterbalanced across participants.

Results

The data of two men and two women were excluded from analysis because they reversed SEC and OEC. (The data of participants who failed to answer every question were included.)

Table 1 and Table 2 show the numbers of participants who rated each unequivocal situation from -2 to +2 for negative and positive emotions, respectively. The mean rating scale values in positive-emotion situations were almost all greater than zero, while the mean rating scale values in negative-emotion situations were almost all negative. In unequivocal situations, responses of 0 (don't know) were rare.

Table 3 presents the ratings of emotions in the

Table 1 Number (%) of persons who made each rating and mean (and SD) rating values in unequivocal negative situations.

	Other Emotion Condition					
	-2	-1	0	1	2	Mean (*SD*)
1. The electric appliance which I just bought is broken.	141 (97.56)	13 (8.44)	0 (0.00)	0 (0.00)	0 (0.00)	-1.92 (.28)
2. I have a car accident.	150 (97.40)	1 (0.65)	2 (1.30)	0 (0.00)	1 (0.65)	-1.94 (.40)
3. I lose a wallet.	148 (96.10)	5 (3.25)	1 (0.65)	0 (0.00)	0 (0.00)	-1.95 (.24)
4. I am ignored by a friend.	145 (94.16)	6 (3.90)	3 (1.95)	0 (0.00)	0 (0.00)	-1.92 (.33)
5. I fail a class.	144 (93.51)	8 (5.19)	1 (0.65)	0 (0.00)	1 (0.65)	-1.91(.42)
6. I am scolded by a teacher.	106 (68.83)	40 (25.97)	4 (2.60)	2 (1.30)	2 (1.30)	-1.60 (.73)
7. The thing which I lent doesn't come back.	102 (66.23)	50 (32.47)	2 (1.30)	0 (0.00)	0 (0.00)	-1.65 (.51)
8. A finger is caught in the door.	97 (62.99)	54 (35.06)	2 (1.30)	1 (0.65)	0 (0.00)	-1.60 (.55)
9.I eat a dish which is not delicious.	94 (61.04)	56 (36.36)	4 (2.60)	0 (0.00)	0 (0.00)	-1.58 (.54)
10. The clothes which I want are sold out.	53 (34.42)	91 (59.09)	10 (6.49)	0 (0.00)	0 (0.00)	-1.28 (.58)
	Self Emotion Condition					
	-2	-1	0	1	2	Mean (*SD*)
1. The electric appliance which I just bought is broken.	137 (88.96)	15 (9.74)	1 (0.65)	0 (0.00)	1 (0.65)	-1.86 (.46)
2. I have a car accident.	149 (96.75)	4(2.60)	1 (0.65)	0 (0.00)	0 (0.00)	-1.96 (.23)
3. I lose a wallet.	146 (94.81)	6 (3.90)	1 (0.65)	0 (0.00)	1 (0.65)	-1.92 (.40)
4. I am ignored by a friend.	125 (81.17)	20 (12.99)	9 (5.84)	0 (0.00)	0 (0.00)	-1.75 (.55)
5. I fail a class.	134 (87.01)	15 (9.74)	4 (2.60)	0 (0.00)	1 (0.65)	-1.82 (.53)
6. I am scolded by a teacher.	103 (66.88)	40 (25.97)	10 (6.49)	0 (0.00)	1 (0.65)	-1.58 (.67)
7. The thing which I lent doesn't come back.	90 (58.44)	60 (38.96)	4 (2.60)	0 (0.00)	0 (0.00)	-1.56 (.55)
8. A finger is caught in the door.	91 (59.09)	58 (37.66)	4 (2.60)	0 (0.00)	1 (0.65)	-1.55 (.62)
9.I eat a dish which is not delicious.	84 (54.55)	54 (35.06)	16 (10.39)	0 (0.00)	0 (0.00)	-1.44 (.68)
10. The clothes which I want are sold out.	60 (38.96)	81 (52.60)	13 (8.44)	0 (0.00)	0 (0.00)	-1.31 (.62)

Table 2 Number (%) of persons who made each rating and mean (SD) rating values in unequivocal positive situations.

	Other Emotion Condition					
	-2	-1	0	1	2	Mean (*SD*)
1. I get into my first choice university.	0 (0.00)	0 (0.00)	0 (0.00)	3 (1.95)	151 (98.05)	1.98 (.14)
2. My lottery ticket is a winner.	0 (0.00)	0 (0.00)	0 (0.00)	8 (5.19)	146 (94.81)	1.95 (.22)
3. The person I love confesses to loving me back.	0 (0.00)	0 (0.00)	0 (0.00)	12 (7.79)	142 (92.21)	1.92 (.27)
4. I get a Christmas present.	0 (0.00)	0 (0.00)	1 (0.65)	21 (13.64)	132 (85.71)	1.85 (.38)
5. I get a perfect score on a test.	1 (0.65)	0 (0.00)	2 (1.30)	19 (12.34)	131 (85.06)	1.82 (.50)
6. I win an intramural game.	0 (0.00)	0 (0.00)	6 (3.90)	30 (19.48)	118 (76.62)	1.73 (.53)
7. I travel with my friend.	0 (0.00)	0 (0.00)	7 (4.55)	30 (19.48)	117 (75.97)	1.71 (.54)
8. I am praised by a teacher.	0 (0.00)	0 (0.00)	2 (1.30)	41 (26.62)	111 (72.08)	1.71 (.48)
9. The picture which I drew is commended.	0 (0.00)	0 (0.00)	1 (0.65)	47 (30.52)	106 (69.83)	1.68 (.48)
10. I am treated to dinner.	0 (0.00)	0 (0.00)	9 (5.84)	59 (38.31)	86 (55.84)	1.50 (.61)
	Self Emotion Condition					
	-2	-1	0	1	2	Mean (*SD*)
1. I get into my first choice university.	1 (0.65)	1 (0.65)	2 (1.30)	10 (6.49)	140 (90.91)	1.86 (.51)
2. My lottery ticket is a winner.	0 (0.00)	0 (0.00)	3 (1.95)	17 (11.04)	134 (87.01)	1.85 (.41)
3. The person I love confesses to loving me back.	0 (0.00)	0 (0.00)	3 (1.95)	14 (9.09)	137 (88.96)	1.87 (.39)
4. I get a Christmas present.	1 (0.65)	2 (1.30)	2 (1.30)	21 (13.64)	128 (83.12)	1.77 (.60)
5. I get a perfect score on a test.	1 (0.65)	1 (0.65)	1 (0.65)	19 (12.34)	132 (85.71)	1.82 (.53)
6. I win an intramural game.	0 (0.00)	0 (0.00)	4 (2.60)	30 (19.48)	120 (77.92)	1.75 (.49)
7. I travel with my friend.	2 (1.30)	1 (0.65)	7 (4.55)	18 (11.69)	126 (81.82)	1.72 (.70)
8. I am praised by a teacher.	0 (0.00)	0 (0.00)	7 (4.55)	47 (30.52)	100 (64.94)	1.60 (.58)
9. The picture which I drew is commended.	0 (0.00)	2 (1.30)	5 (3.25)	65 (42.21)	82 (53.25)	1.47 (.63)
10. I am treated to dinner.	0 (0.00)	5 (3.25)	14 (9.09)	55 (35.71)	80 (51.95)	1.36 (.78)

equivocal situation. The mean rating scale values ranged from -1 to 1, except for situations 17, 19, and 20 ("I go skiing", "I go to a pastry buffet", and "I go swimming in the sea"), suggesting that responses of zero (don't know) were present in the equivocal situation.

The number of DK responses (i.e., "0" ratings) in unequivocal and equivocal situations were summed up respectively to calculate the frequency of DK response (maximum = 20, respectively). These data were analyzed using a 2 (situation: unequivocal vs, equivocal) × 2 (person; SEC vs. OEC) × 2 (inferencing order: SFC vs OFC) ANOVA, with situation and person as within-subject factors and inferencing order as a between-subjects factor.

Table 3 Number (%) of persons who made each rating and mean (SD) rating values in equivocal situations.

	Other Emotion Condition					
	-2	-1	0	1	2	Mean (*SD*)
1. I climb a mountain.	2 (1.30)	16 (10.39)	80 (51.95)	48 (31.17)	8 (5.19)	.29 (.77)
2. I drink coffee.	2 (1.30)	10 (6.49)	80 (51.95)	51 (33.12)	11 (7.14)	.38 (.77)
3. I am told the troubles of a friend.	0 (0.00)	6 (3.90)	77 (50.00)	56 (36.36)	15 (9.74)	.52 (.73)
4. I give a presentation in public.	6 (3.90)	57 (37.01)	75 (48.70)	12 (7.79)	3 (1.95)	-.33 (.76)
5. I find a beetle.	0 (0.00)	10 (6.49)	73 (47.40)	62 (40.26)	9 (5.84)	.45 (.71)
6. I jog.	0 (0.00)	22 (14.29)	65 (42.21)	59 (38.31)	8 (5.19)	.34 (.79)
7. I go to an art museum.	0 (0.00)	5 (3.25)	65 (42.21)	76 (49.35)	8 (5.19)	.56 (.65)
8. I go for study abroad.	1 (0.65)	3 (1.95)	65 (42.21)	63 (40.91)	22 (14.29)	.66 (.77)
9. I read a book.	0 (0.00)	2 (1.30)	64 (41.56)	79 (51.30)	9 (5.84)	.62 (.62)
10. I go to a haunted house.	8 (5.19)	44 (28.57)	62 (40.26)	34 (22.08)	6 (3.90)	-.09 (.93)
11. I ride a roller coaster.	3 (1.95)	10 (6.49)	53 (34.42)	66 (42.86)	22 (14.29)	.61 (.88)
12. I have a dog.	3 (1.95)	2 (1.30)	53 (34.42)	55 (35.71)	41 (26.62)	.84 (.90)
13. I watch a soccer game.	1 (0.65)	3 (1.95)	52 (33.77)	68 (44.16)	30 (19.48)	.80 (.80)
14. I listen to classical music.	0 (0.00)	10 (6.49)	48 (31.17)	82 (53.25)	14 (9.09)	.65 (.74)
15. I go to a concert of rock'n'-roll music.	1 (0.65)	5 (3.25)	47 (30.52)	64 (41.56)	37 (24.03)	.85 (.85)
16. I watch a romance movie.	0 (0.00)	3 (1.95)	31 (20.13)	91 (59.09)	29 (18.83)	.95 (.68)
17. I go skiing.	0 (0.00)	2 (1.30)	31 (20.13)	84 (54.55)	37 (24.03)	1.01 (.70)
18. I study mathematics.	24 (15.58)	95 (61.69)	25 (16.23)	7 (4.55)	2 (1.30)	-.86 (.78)
19. I go to a pastry buffet.	0 (0.00)	1 (0.65)	20 (12.99)	70 (45.45)	63 (40.91)	1.27 (.71)
20. I go swimming in the sea.	0 (0.00)	5 (3.25)	15 (9.74)	76 (49.35)	58 (37.66)	1.21 (.75)
	Self Emotion Condition					
	-2	-1	0	1	2	Mean (*SD*)
1. I climb a mountain.	8 (5.19)	21 (13.64)	50 (32.47)	52 (33.77)	23(14.94)	.40 (1.06)
2. I drink coffee.	8 (5.19)	22 (14.29)	36 (23.38)	50 (32.47)	38 (24.68)	.57 (1.16)
3. I am told the troubles of a friend.	0 (0.00)	5 (3.25)	41 (26.62)	74 (48.05)	34 (22.08)	.89 (.78)
4. I give a presentation in public.	14 (9.09)	55 (35.71)	46 (29.87)	33 (21.43)	6 (3.90)	-.25 (1.02)
5. I find a beetle.	7 (4.55)	19 (12.34)	57 (37.01)	54 (35.06)	17 (11.04)	.36 (.99)
6. I jog.	6 (3.90)	18 (11.69)	47 (30.52)	72 (46.75)	11 (7.14)	.42 (.93)
7. I go to an art museum.	6 (3.90)	14 (9.09)	44 (28.57)	65 (42.21)	25 (16.23)	.58 (1.00)
8. I go for study abroad.	8(5.19)	13 (8.44)	42 (27.27)	52 (33.77)	39 (25.32)	.66 (1.10)
9. I read a book.	2 (1.30)	12 (7.79)	46 (29.87)	71 (46.10)	23 (14.94)	.66 (.87)
10. I go to a haunted house.	36 (23.38)	41 (26.62)	30 (19.48)	31 (20.13)	16 (10.39)	-.32 (1.31)
11. I ride a roller coaster.	15 (9.74)	14 (9.09)	12 (7.79)	37 (24.03)	76 (49.35)	.94 (1.35)
12. I have a dog.	6 (3.90)	13 (8.44)	27 (17.53)	42 (27.27)	66 (42.66)	.97 (1.14)
13. I watch a soccer game.	5 (3.25)	11 (7.14)	43 (27.92)	48 (31.17)	47 (30.52)	.79 (1.06)
14. I listen to classical music.	3 (1.95)	22 (14.29)	48 (31.17)	53 (34.42)	28 (18.18)	.53 (1.01)
15. I go to a concert of rock'n'-roll music.	4 (2.60)	21 (13.64)	39 (25.32)	39 (25.32)	51 (33.12)	.73 (1.14)
16. I watch a romance movie.	2 (1.30)	11 (7.14)	43 (27.92)	53 (34.42)	45 (29.22)	.83 (.98)
17. I go skiing.	4 (2.60)	18 (11.69)	22 (14.29)	63 (40.91)	47 (30.52)	.85 (1.07)
18. I study mathematics.	31 (20.13)	56 (36.36)	34 (22.08)	25 (16.23)	7 (4.55)	-.52 (1.12)
19. I go to a pastry buffet.	4 (2.60)	5 (3.25)	15 (9.74)	39 (25.32)	91 (59.09)	1.35 (.97)
20. I go swimming in the sea.	3 (1.95)	18 (11.69)	22 (14.29)	67 (43.51)	44 (28.57)	.85 (1.03)

As indicated in Table 4, the main effects of situation (F (1, 152) = 418.34, partial η^2 = .73, p < .001) and person (F (1, 152) = 14.04, partial η^2 = .09, p < .001) were significant. The frequency of DK responses in the equivocal situation (M = 11.85, SD = 6.83) was greater than that in the unequivocal situation (M = 1.09, SD = 2.00) (p < .001). DK responses were more frequent for OEC (M = 7.39, SD = 5.40) than for SEC (M = 5.55, SD = 4.40) (p < .001).

The situation × person interaction was significant (F (1, 152) = 206.38, partial η^2 = .18, p < .001). Post hoc tests indicated that in unequivocal situations, the frequency of DK responses did not differ between SEC (M = .72, SD = 1.63) and OEC (M = .45, SD = .98), while in equivocal situations the frequency of DK responses was greater for OEC (M = 7.02, SD = 5.01) than for SEC (M = 4.83, SD = 3.48) (p < .001).

The situation × inferencing order interaction was also significant (F (1, 152) = 74.07, partial η^2 = .05, p < .01). Post hoc tests indicated that the frequency of DK responses in the unequivocal situation did not differ between SFC (M = .97, SD = 1.67) and OFC (M = 1.29, SD = 2.44), while in the equivocal situation the frequency of DK response was greater for SFC (M = 12.80, SD = 6.74) than for OFC (M = 10.32, SD = 6.75) (p < .05).

The correspondence between DK responses in SEC and in OEC was analyzed in two ways. First, the correlation between DK response in SEC and in OEC was calculated[2)]. As shown in Table 5, all variables were positively correlated except SEC in the equivocal situation and OEC in the unequivocal situation.

Table 4　Mean (SD) frequency of DK response in each condition.

	Self Emotion Condition		Other Emotion Condition	
	Unequivocal	Equivocal	Unequivocal	Equivocal
Self First Condition (n = 95)	.66 (1.27)	5.20 (3.20)	.37 (.93)	7.60 (5.27)
Other First Condition (n = 59)	.81 (2.10)	4.24 (3.83)	.59 (1.05)	6.80 (4.44)

Table 5　Correlations of DK responses between conditions.

	1	2	3	4
1. Unequivocal/Self Emotion Condition	1	.403**	.234**	.180*
2. Equivopcal/Self Emotion Condition		1	.065	.272**
3. Unequivocal/Other Emotion Condition			1	.421**
4. Equivocal/Other Emotion Condition				1

* p < .05. ** p < .01.

The second analysis investigated three response patterns: (1) self only: DK responses appearing only in SEC; (2) other only: DK responses appearing only in OEC; (3) both: DK responses appearing in both SEC and OEC. Tables 6, 7, and 8 show the number of persons who produced "self only", "other only", or "both" response patterns in the negative and positive unequivocal situations and in the equivocal situation, respectively[1].

DK responses in the unequivocal situation were rare and thus not tested statistically. However, the descriptive statistics suggest that the number of persons who produced the "self only" responsepattern was generally greater than that for the other two response patterns (see Tables 6 and 7).

Chi square tests (1 × 3) were performed on the number of persons who produced "self only", "other only", and "both" response patterns in each equivocal situation. Table 8 shows the results of multiple comparisons using the nominal level of Ryan1. For the results that were significant, the number of participants who produced the "other only" response pattern was greater than that for the other two response patterns, except for situation 16 ("I watch a romance movie").

Table 6 Response patterns in unequivocal negative situations.

	Self Only	Other Only	Both
1. The electric appliance which I just bought is br	1	0	0
2. I have a car accident.	1	2	0
3. I lose a wallet.	1	1	0
4. I am ignored by a friend.	8	2	1
5. I fail a class.	4	1	0
6. I am scolded by a teacher.	8	2	2
7. The thing which I lent doesn't come back.	2	0	2
8. A finger is caught in the door.	4	2	0
9. I eat a dish which is not delicious.	14	2	2
10. The clothes which I want are sold out.	9	6	4
total	52	18	11

Table 7 Response patterns in unequivocal positive situations.

	Self Only	Other Only	Both
1. I get into my first choice university.	2	0	0
2. My lottery ticket is a winner.	3	0	0
3. The person I love confesses to loving me	3	0	0
4. I get a Christmas present.	2	1	0
5. I get a perfect score on a test.	1	2	0
6. I win an intramural game.	4	6	0
7. I travel with my friend.	5	5	2
8. I am praised by a teacher.	6	1	1
9. The picture which I drew is commended.	5	1	0
10. I am treated to dinner.	12	7	2
total	43	23	5

Table 8 Response patterns in equivocal situations.

	Self Only	Other Only	Both	$\chi^2(2)$ =	Multipul Comparision
1. I climb a mountain.	16	46	34	14.25, $p < .01$	Self＜Other＝Both
2. I drink coffee.	9	53	27	32.99, $p < .01$	Self＜Both＜Other
3. I am told the troubles of a friend.	12	48	29	21.87, $p < .01$	Self＜Other＝Both
4. I give a presentation in public.	17	46	29	13.85, $p < .01$	Self＝Both＜Other
5. I find a beetle.	25	41	32	3.94, *n.s.*	
6. I jog.	19	37	28	5.79, *n.s.*	
7. I go to an art museum.	20	41	24	8.78, $p < .05$	Self＜Other
8. I go for study abroad.	19	42	23	10.79, $p < .01$	Self＝Both＜Other
9. I read a book.	24	42	22	8.27, $p < .05$	no significant diferrence
10. I go to a haunted house.	10	42	20	22.34, $p < .01$	Self＝Both＜Other
11. I ride a roller coaster.	5	46	7	55.28, $p < .01$	Self＝Both＜Other
12. I have a dog.	14	40	13	20.99, $p < .01$	Self＝Both＜Other
13. I watch a soccer game.	23	32	20	3.12, *n.s.*	
14. I listen to classical music.	22	22	26	0.46, *n.s.*	
15. I go to a concert of rock' n' -roll music.	21	29	18	2.85, *n.s.*	
16. I watch a romance movie.	31	19	12	8.94, $p < .05$	Both＜Self
17. I go skiing.	17	26	5	13.88, $p < .01$	Both＜Self＝Other
18. I study mathematics.	29	20	5	16.34, $p < .01$	Both＜Self＝Other
19. I go to a pastry buffet.	12	17	3	9.44, $p < .01$	Both＜Other
20. I go swimming in the sea.	14	7	8	2.97, *n.s.*	
total	359	696	385		

Discussion

This study investigated how people around 20 years of age make “don’t know” responses in inferring the emotions of others. We compared unequivocal and equivocal situations, inferences of the emotions of oneself (SEC) versus others (OEC), as well as correspondences in DK responses in these conditions, and effects of order of presentation of self versus other inferences.

In general, situations that were assumed to be unequivocally negative received negative ratings, and those assumed to be unequivocally positive were given positive ratings, while equivocal situations received more neutral ratings. The frequency of DK responses was greater in in the equivocal situation than in the unequivocal situation, supporting Hypothesis 1. However, there were unequivocal situations that received more neutral ratings (e.g., “The clothes which I want are sold out,” “I am treated to dinner”).

Further, there were equivocal situation that received few DK responses (e.g., “I go to a pastry buffet.” “I go swimming in the sea.”). Future studies should pre-test and select the situations more rigorously.

More DK responses were produced in inferring others’ emotions than in inferring emotions of the self, supporting Hypothesis 2. Further, in equivocal situations, more DK responses were produced in OEC than in SEC, while there was no such difference in unequivocal situations. Thus Hypotheses 1 and 2 were not independent. Kondo (2014b) indicated that DK responses in inferring the emotions of others appeared from about the age of 6 years, although uncertainty about the emotions of others was not yet robust. The present study shows that people around 20 years of age are able to recognize this uncertainty to some extent. However, the mean frequency of DK responses in OEC was about seven (35%) in a maximum of 20 equivocal situations (see Table 4). Gnepp and Klayman (1992) also noted that even college students did not adequately recognize equivocal situations. In other words,

people around 20 years of age may still not fully recognize uncertainty about the emotions of others. It is possible that people have a tendency to "over infer" when they infer the emotions of others. The present study suggests that it is difficult to answer "don't know" in inferring the emotions of others for young adults as well as for children.

In equivocal situations, the frequency of occurrence of DK responses was greater when questions referring to the self were presented before questions about others (SFC) than when other-focused questions were presented first (OFC). This effect did not appear in unequivocal situations. This result partially supports Hypothesis 3 and suggests that inferring the emotions of the self activates self-consciousness and discrimination between self and others, thus increasing the frequency of occurrence of DK response. However, this effect was not restricted to the other emotion condition (OEC). In future research, more specific experimental procedures that activate self-schemas could clarify this difference.

Some significant correlations were found between DK responses in self-emotion and other-emotion conditions, such that participants who made DK responses in SEC also made DK responses in OEC. However, these effects were not strong. The stronger correlations were found between the two self-emotion conditions (unequivocal and equivocal), and the two other-emotion conditions (unequivocal and equivocal). Further, DK responses in SEC (equivocal) were not related to DK responses in OEC (unequivocal). Analysis of the response patterns of "self only", "other only", and "both" indicates that the number of persons who produced the response pattern of "other only" was greater than the numbers who produced "self only" or "both". This lack of correspondence between DK responses in SEC and DK responses in OEC supports Hypothesis 4. In other words, the projection of inferencing about the self, which is an egocentric process, does not appear (or appears only weakly) in DK responses in inferencing about the emotions of others. This contradicts previous findings of the influence of egocentric processes on inferencing about others (e.g., Van Boven & Lowenstein, 2003; Kondo & Ikegami, 2012). Although we didn't conduct statistical tests, it is interesting that in unequivocal situations, more participants produced "self only" response patterns. It is possible that DK responses in inferring the emotions of others are based on recognition of the difference between self and others. There is a need for additional evidence about the mechanisms related to the process of recognition of uncertainty about the emotions of others.

In summary, this study had three main findings: (1) To some extent, people around the age of 20 make "don't know" responses in inferring the emotions of others in equivocal situations. (2) Inferring the emotions of self promotes the recognition of uncertainty about the emotions of others. (3) "Don't know" responses in inferring the emotions of others may not be based on projections of self-inference.

Two limitations of the present study should be noted. First, the frequency of DK responses in SEC for equivocal situations was high, although we expected that even in equivocal situations the DK responses in SEC would be rare. DK responses in inferring the emotion of self were seldom observed in preschoolers (Kondo, 2014b). Thus this response may be peculiar to people around 20 years old. It is unclear what this type of DK response signifies in this study; for example, "I don't experience this situation", "I feel differently about this from day to day", or "I don't have either positive or negative feeling"). Until now, it has been assumed that the emotions of the self are understood. However, investigations of "don't know" responses in inferring the emotions of self may lead to new developments in the field of self-understanding.

The second limitation is the ordering of

conditions; that is, inferring the emotions of self first (SFC) versus inferring the emotions of others first (OFC). This was not a strict experimental manipulation, because instructions for both conditions were presented on the same page in the questionnaire. In fact, as noted in the Results, some participants confused SEC and OEC. Additional research is required to investigate effects of SFC and OFC in more detail by making the condition settings more stringent, for example, by using an experiment rather than a questionnaire survey.

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Attention

1) In the questionnaire actually used (in Japanese), the subjects of each sentence were omitted and only the situations were included. In the Tables, "I" was provisionally inserted into the situations.

2) There were individual differences. The range of DK response were 0 - 14 in self-unequivocal situation, 0 – 18 in self-equivocal situation, 0 – 6 in other-unequivocal situation, and 0 – 20 in other-equivocal situation.

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