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1 Judgments of Blame and Forgiveness: A Comparison of Young Adults, Older Adults, and
2 Older Adults with Dementia

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6
7 Abstract

8 *Introduction:* Alzheimer's disease may modify moral judgment.

9 *Objective:* In two studies, we assessed the impact of dementia on blame and forgiveness.

10 Study 1 compared the ways in which young adults, older adults, and older adults with
11 dementia cognitively integrated two factors. Study 2 assessed the number of different factors
12 that older adults with dementia were able to integrate during these moral judgments.

13 *Method:* The participants recorded their moral judgements in a blame task and in a
14 forgiveness task. In study 1, the two questionnaires contained scenarios built from the
15 combination of two factors. In study 2, the participants were confronted with the same tasks
16 under three different conditions with scenarios that combined three, four or five factors.

17 *Results:* The data from study 1 showed that the older adults with dementia did not combine
18 the two factors in the same way as young adults did: the combination depended on the type of
19 moral judgment. Study 2 revealed differences in moral judgment between older adults with
20 dementia and adults without dementia in all tasks (i.e. with three, four or five factors
21 combined).

22 *Conclusion:* Dementia has an impact on moral judgments. Moral judgment among people
23 with dementia is both task- and condition-dependant.

24
25 *Keywords:* dementia, information integration, moral judgment, older adults.

1 Jugements de Blâme et de Pardon : Une Comparaison entre de Jeunes Adultes, des Personnes
2 Agées et des Personnes Agées Atteintes de Démence

3

4

Résumé

5 *Introduction* : La maladie d'Alzheimer peut modifier les jugements moraux.

6 *Objectifs* : Deux études ont été menées pour estimer l'impact de la démence sur les jugements
7 de blâme et de pardon. La première étude a comparé la manière dont les jeunes adultes, les
8 personnes âgées en bonne santé et les personnes âgées atteintes de démence ont intégré
9 cognitivement deux informations. La deuxième étude a comparé leur capacité à intégrer plus
10 de deux informations pour établir leurs jugements.

11 *Méthode* : Les participants ont rendu leurs jugements moraux via deux tâches (jugement de
12 blâme et jugement de pardon). Dans l'étude 1, deux questionnaires ont été proposés
13 comprenant des scénarios construits à partir de la combinaison de deux informations. Dans
14 l'étude 2, les participants ont été soumis aux mêmes tâches dans 3 conditions différentes
15 proposant des scénarios dans lesquels 3, 4, ou 5 informations ont été combinées.

16 *Résultats* : L'étude 1 a révélé que les personnes âgées atteintes de démence n'ont pas combiné
17 les deux informations de la même manière que les jeunes adultes. Leur combinaison
18 dépendait du type de jugement moral. Dans l'étude 2, des différences sont apparues lorsque 3,
19 4, ou 5 informations étaient combinées et ceci, quel que soit le type de jugement.

20 *Conclusion* : La démence a un impact sur les jugements moraux. Le jugement moral des
21 personnes âgées atteintes de démence est dépendant de la tâche et de la condition.

22

23 *Mots clés* : démence, intégration de l'information, jugements moraux, personnes âgées

24

1 Judgments of Blame and Forgiveness: A Comparison of Young Adults, Older Adults, and
2 Older Adults with Dementia

3 Dementia is one of the main causes of disability and dependency among older adults
4 worldwide. However, dementia is not a normal component of aging. According to the World
5 Health Organization (2020), dementia is typically a chronic or progressive syndrome in which
6 there is deterioration in cognitive function (i.e. the ability to process thought) beyond what
7 might be expected from normal ageing. The deterioration affects memory, thinking,
8 orientation, comprehension, calculation, learning capacity, language, and judgment (World
9 Health Organization, 2020). Dementia may also affect the process of moral judgment
10 (Fontaine et al., 2004).

11 Judgments of blame and forgiveness both refer to moral perspectives of the same
12 painful reality (Telock, 2002). From a prosecutorial moral standpoint, the judgment of blame
13 corresponds to an appropriate penalty for a harmful act. From a theological moral standpoint,
14 the judgment of forgiveness corresponds to the level of sympathy with the offender.

15 Judgments of blame and forgiveness belong to the moral algebra that constitutes the
16 foundation of moral science, i.e. how people integrate information cues involved in actions
17 (Anderson, 2019). Anderson (1996, 2008) postulated that any thought or action depends on
18 the integration of different information cues. Furthermore, Anderson (1996, 2008) described a
19 cognitive algebra, i.e. the use of simple cognitive rules to describe how individuals will
20 combine information to make a global judgment. For example, the additive model assumes
21 that an implicit moral judgment (blame or forgiveness) results from the addition (after
22 weighting) of the scale values granted to the selected stimuli (e.g., Intent, Consequences, and
23 Apologies). The multiplicative model assumes that the implicit moral judgment results from
24 the multiplication of the scale values attached to these stimuli.

25 Anderson (2008, 2019) considered that the blame schema follows an additive rule:

1 blame = intent + consequences (e.g., Hermand, Mullet, Tomera, & Touzart, 2001; Przygotzki
2 & Mullet, 1997; Wolf, 2001). Girard and Mullet (1997) considered that forgiveness also
3 follows an additive rule: propensity to forgive = intent + cancellation of consequences +
4 proximity [to the offender] + apologies. Other studies have provided support for the latter
5 schema (e.g., Azar & Mullet, 2001; Azar, Mullet, & Vinsonneau, 1999; Girard, Mullet, &
6 Callahan, 2002; Mullet & Girard, 2000). The blame and forgiveness schemas have some
7 common components, and the rules used by young adults and older adults are similar (e.g.,
8 Przygotzki & Mullet, 1997).

9 Researchers in the field of information integration have studied the effect of medical
10 conditions on moral judgment processes. Notably, Rogé and Mullet (2011) examined moral
11 judgments (of blame and forgiveness) among individuals with autism. They compared the
12 ability of children, adolescents and adults with vs. without autism to (i) use information cues
13 on intent and the severity of the consequences to blame an offender, and (ii) use information
14 on intent and apology to infer willingness to forgive. In the blame task, people with autism
15 were indeed able to use intent information but not to the same extent as people without autism
16 did. In the forgiveness task, people with autism (regardless of age) never took intent into
17 account. Rogé and Mullet's results showed that people with autism were able to use intent
18 information for judging blame but did not take intent to forgive into account. Hence, the
19 researchers suggested that people with autism's ability to use intent information was task-
20 dependent. More recently, Moralez-Martinez, Lopez-Ramirez and Mullet (2015) examined
21 moral judgments in people with Down's syndrome (DS). In particular, the researchers looked
22 at how participants with DS and control participants mentally combined information about the
23 intent of a harmful act and the severity of its consequences by assigning blame. People with
24 DS were found to be able to make moral judgments in much the same way as control
25 participants of the same age - even though they were not able to explain or justify their

1 judgments with sophisticated philosophical arguments. Fontaine, Salvano-Pardieu and
2 Renoux (2004) studied the algebraic structure of blame patterns in 18 elderly adults with
3 Alzheimer's disease and 18 healthy elderly adults. The researchers notably analysed the
4 effects of intent, consequences, and the seriousness of the act on blame patterns. The two
5 groups of participants did not differ in how they combined the intent and consequence of the
6 act in their blame judgment. However, people with Alzheimer's disease were less able to take
7 account of the seriousness of the act. These results confirmed the involvement of two different
8 mechanisms in the judgment of blame.

9 In two studies, we compared the cognitive processes involved in judgments of blame
10 and forgiveness by young adults, older adults, and older adults with dementia. The
11 experimental paradigms were based on Anderson's theory of information integration (1996,
12 2008, 2019).

13 Study 1

14 The objective of the first study was to complete Fontaine, Salvano-Pardieu and
15 Renoux (2004)'s work by considering the cognitive processes involved in judgments of blame
16 and forgiveness by adults with dementia. It transposed the issue of blame judgment in
17 individuals with dementia to the blame schema derived from intent and consequences (e.g.,
18 Wolf, 2001). We also considered judgments of forgiveness. To this end, we compared the
19 cognitive processes or rules (i.e. ways of cognitively integrating information cues) involved in
20 judgments of blame and forgiveness in a "vulnerable" population (older adults with dementia)
21 vs. two healthy control populations (young adults, and older adults).

22 Our first hypothesis was that young adults, older adults, and older adults with
23 dementia would combine intent and consequence information cues in the same manner in both
24 blame and forgiveness judgments (Fontaine et al., 2004). Our second hypothesis was that the
25 ability of adults with dementia to use intent and consequence information cues would differ

1 for judgments of blame vs. judgments of forgiveness, i.e. in a task-dependent way (Rogé &
2 Mullet, 2011).

3 **Methods**

4 **Participants**

5 Three groups of participants (all recruited from the city of Calais, in northern France)
6 were included in the study. The first group consisted of 40 older adults with dementia ($M_{age} =$
7 $78.54, SD = 10.63$) living in the “La Roselière” residential home for dependent elderly people
8 (operated by Calais General Hospital). The main study inclusion criterion was geriatrician-
9 diagnosed dementia. The main exclusion criteria were severe visual or auditory impairments,
10 major depression (as determined by the residential home’s physician) and/or severe
11 behavioural disorders. The second group consisted of 40 community-dwelling older adults
12 ($M_{age} = 65.07, SD = 10.73$) recruited in the street. The third population consisted of 34 young
13 adults ($M_{age} = 21.08, SD = 3.62$) recruited at a university in Calais. None of the participants
14 received remuneration. All participants were given comprehensive information on the study’s
15 objectives and procedures and gave their written consent to participation. Verbal assent was
16 collected if an elderly person with dementia was unable to give written consent but was able
17 to understand the nature of the study. In such a case, a parent or a legal guardian gave their
18 written consent to participation of the elderly person with dementia. Lastly, the investigator
19 and the participant (or the parent or legal guardian) arranged where and when to perform the
20 experiment.

21 **Material**

22 The study material comprised two questionnaires, each of which contained six
23 scenarios. The first questionnaire concerned blame (Task 1), and the second concerned
24 forgiveness (Task 2). Each scenario contained a hypothetical story, a question, and a response
25 scale. The scenarios described an everyday situation that was familiar to elderly people and

1 could be very easily understood by all participants: help with showering at home provided by
2 Julie, a nurse. During the shower, the elderly person (“Fred”) falls. Pictograms were used to
3 make the scenario easier to read and understand (as previously described by Morales-
4 Martinez et al., 2015). In all the scenarios, a transgression was committed. The transgression
5 was sometimes accidental and sometimes deliberate (intentional), and the consequences
6 differed in the degree of seriousness (no consequences; moderate consequences, i.e., the
7 elderly person requires a walking aid after the fall; or severe consequences, i.e. the elderly
8 person will never be able to walk again). The orthogonal combination of these two factors
9 resulted in six scenarios.

10 In the blame task (questionnaire 1), the question “In your opinion, what level of blame
11 does Julie deserve?” was presented beneath each scenario, and was followed by a 20 cm
12 response scale ranging from “No blame at all” at the left anchor and the “A very high level of
13 blame” at the right anchor.

14 In the forgiveness task (questionnaire 2), the question was “If you were Fred, would
15 you forgive Julie?”, and the 20 cm response scale ranged from “I am absolutely sure I would
16 not forgive her” at the left anchor and the “I am absolutely sure I would forgive her” at the
17 right anchor. An example of a blame scenario and an example of a forgiveness scenario are
18 given in the Appendix.

19 **Procedure**

20 The study was approved by the Research Ethics Committee of Federal Toulouse Midi-
21 Pyrénées University (France), and by the director of the residential home. All participants
22 responded individually. Half of the participants were presented with the blame scenarios and
23 then the forgiveness scenarios, and the other half were presented with the same scenarios but in
24 the opposite order. The investigator explained what was expected of each participant. In the
25 first (familiarization) phase of the study, the participant was invited to read three short stories

1 in which the water went cold while a nurse was helping an older adult to have a shower. Each
2 story had a different level of intent by the nurse, and a different level of consequence. The
3 investigator checked that the participants had understood the story and the pictograms. Each
4 story was read aloud by the participant, and he/she could read and re-read the stories as many
5 times as he/she wished before making a judgment. During this phase, the participant was
6 allowed to compare his/her answers for the three stories. In the second (experimental) phase,
7 the six stories were presented in random order. The participant read each story out loud twice.
8 To help the participant to recall the details of each story, he/she could refer to the text and the
9 associated pictograms until he/she was ready to make a judgment. The judgment was made by
10 marking a position (using a pen) on the response scale. Each participant was allowed to make
11 judgments at his/her own pace; no time limit was imposed. In contrast to the familiarization
12 phase, however, the participant was not allowed to refer to or change previous answers.

13 **Data analysis**

14 The participant's ratings on the response scale were converted into a numerical value
15 by measuring the distance between the left anchor (the origin) and the mark. The distance data
16 were then processed in graphical and statistical analyses. Data from the familiarization phase
17 were not processed. In each task (blame or forgiveness), we performed an analysis of variance
18 (ANOVA) with repeated measures. To test the first hypothesis (i.e. that young adults, older
19 adults, and older adults with dementia would combine intent and consequence information
20 cues in the same manner in both blame and forgiveness judgments (Fontaine et al., 2004)), an
21 ANOVA with a $2 \times 3 \times 3$ design (Intent \times Consequence \times Group (young adults, older adults,
22 older adults with dementia)) was applied to each task. To test the second hypothesis (i.e. that
23 the ability of adults with dementia to use intent and consequence information cues would
24 differ for judgments of blame vs. judgments of forgiveness (Rogé & Mullet, 2011)), an
25 ANOVA with a 2×3 design (Intent \times Consequence) was applied to each group and each task.

Results

Task 1: Judgment of blame

In the first ($2 \times 3 \times 3$) ANOVA, the Intent factor had a significant effect ($F(1,111) = 279.42, p < .001, \eta^2_p = .72$), as did the Consequence factor ($F(2,222) = 17.81, p < .001, \eta^2_p = .14$) and the Group factor ($F(2,111) = 4.66, p < .011, \eta^2_p = .08$). For the Group factor, Tukey's test did not indicate significant differences between young adults and older adults ($p = .254$) or between older adults and older adults with dementia ($p = .284$). Nevertheless, the difference between young adults and older adults with dementia was significant ($p < .008$ in Tukey's test). Furthermore, the Intent \times Consequence \times Group interaction was significant ($F(4,222) = 2.84, p < .011, \eta^2_p = .05$). The three groups differed in their manner to combine Intent and Consequence factors.

The results of the second (2×3) ANOVA are summarized in Table 1. The effect of intent and the effect of consequence were significant in the two healthy groups. The effect size was larger for Intent ($\eta^2_p = .64$ and $.92$ in young adults and older adults, respectively) than for Consequence. The Intent \times Consequence interaction was not significant in young adults ($p = .649$) or older adults ($p = .248$). In contrast, this interaction was significant in older adults with dementia ($p < .042$).

Insert Table 1

The full results for the six blame scenarios in the three groups of participants are shown in Figure 1. In each panel, the three levels of the Consequence factor are given on the horizontal axis, and the degree of blame is given on the vertical axis. The two curves correspond to the two levels of the Intent factor (accidental or deliberate).

Insert Figure 1

In young adults (Figure 1, left panel) and in older adults (Figure 1, middle panel), the two curves are clearly separate - indicating a marked effect of the Intent factor. The two

1 curves rose from left to right: the more severe the consequence, the more the participants were
 2 willing to blame the nurse. Lastly, the two curves are approximately parallel, indicating that
 3 an additive integration rule had been applied.

4 In older adults with dementia (Figure 1, right panel), the fact that the two curves rose
 5 from left to right again indicates an effect of consequence. The curves are closer together than
 6 those of the young adults and older adults; this indicates an effect of intent in older adults with
 7 dementia, albeit to a lesser extent than in the two other groups. The fact that the curves are not
 8 parallel suggests that an interactive integration rule has been applied.

9 **Task 2: Judgment of forgiveness**

10 In the first ($2 \times 3 \times 3$) ANOVA, the Intent factor had a significant effect ($F(1,111) =$
 11 $186.42, p < .001, \eta^2_p = .63$), as did the Consequence factor ($F(2,222) = 29.17, p < .001, \eta^2_p =$
 12 $.21$). However, the Group factor ($F(2,111) = 1.46, p = .237, \eta^2_p = .03$) and the Intent \times
 13 Consequence \times Group interaction ($F(4,222) = 2.09, p = .083, \eta^2_p = .03$) were not statistically
 14 significant. There was no difference between the three groups in their manner to combine
 15 Intent and Consequence factors.

16 The results of the 2×3 ANOVA are summarized in Table 2. The effects of intent and
 17 consequence were significant in the two healthy groups. The effect size was larger for Intent
 18 ($\eta^2_p = .76$ and $.62$ in young adults and older adults, respectively) than for Consequence. In
 19 older adults with dementia, the effect of intent was significant but the effect of consequence
 20 was not ($p = .167$). The Intent \times Consequence interaction was not significant in any of the
 21 three groups.

22 *Insert Table 2*

23 The full results for the six forgiveness scenarios in the three groups of participants are
 24 shown in Figure 2. In all three graphs, the two curves are clearly separate - indicating that the
 25 lower the degree of intent, the more willing the participants were to forgive the nurse. For the

1 young adults (Figure 2, left panel) and older adults (Figure 2, middle panel), the curves fell
2 from left to right - suggesting that the less severe the consequences, the more the participants
3 were willing to forgive the nurse. In each graph, the two curves are parallel – suggesting that
4 an additive integration rule had been applied. In older adults with dementia (Figure 2, right
5 panel), the curves are flatter; this indicates that this group took less account of the scenario's
6 consequences.

7 *Insert Figure 2*

8 **Discussion**

9 The objective of study 1 was to assess the impact of dementia on judgments of blame
10 and forgiveness. We compared the cognitive processes and rules involved in these moral
11 judgments in a vulnerable population and two healthy populations. Our first hypothesis was
12 that young adults, older adults, and older adults with dementia would combine intent and
13 consequence information cues in the same manner when judging blame and judging
14 forgiveness (Fontaine et al., 2004). This hypothesis was not supported by the study data.

15 In the blame task, all participants used intent and consequence information cues to
16 judge the degree of blame. This finding is consistent with the literature data (Anderson, 2008,
17 2019; Hermand et al., 2001; Przygotzki & Mullet, 1997; Wolf, 2001). Each of the three
18 groups of participants gave more weight to intent; again, this is in line with previous studies
19 (Przygotzki & Mullet, 1997). In Fontaine et al.'s (2004) analysis of the effects of intent and
20 consequences of the action on the propensity to apportion blame, there were no significant
21 differences in algebraic structure between a group of patients with Alzheimer's disease and a
22 control group; the two groups combined information about intent and consequence in the
23 same way. Our results confirmed that there was no difference in judgments between older
24 adults with dementia and those without. Furthermore, our results confirmed Przygotzki and
25 Mullet's (1997) findings; there was no difference in judgment between young adults and older

1 adults. Young adults and older adults used an additive rule to integrate intent and
2 consequence. However, our results highlighted a difference in judgment between young adults
3 and older adults with dementia. Older adults with dementia used Intent and Consequence
4 factors but attributed significantly less weight to the Consequence factor when judging blame.
5 The level of blame was primarily judged by considering intent: the more intentional the act,
6 the more blameworthy it was.

7 In the forgiveness task, the young adults and the older adults also used information
8 about intent and consequence to judge the level of forgiveness. Both groups used an additive
9 rule to integrate the information. This is consistent with a report by Girard and Mullet (1997)
10 in which young adults and older adults used an additive rule to integrate intention and
11 consequence. In contrast, consequence did not have an effect on judgment by older adults
12 with dementia; in the forgiveness task, only intent information was taken into account by this
13 group.

14 Our present findings show that the older adults with dementia did not combine intent
15 and consequence in the same way as young adults. Our results reinforce Fontaine et al.'s
16 (2004) findings; we confirmed that the cognitive processes involved in moral judgments are
17 different in older adults with dementia vs. young adults. One possible explanation for this
18 difference relates to the impairments in cognitive function associated with illness. Dementia is
19 considered to be a major neurocognitive disorder in the Diagnostic and Statistical Manual of
20 Mental Disorders, Fifth Edition (American Psychiatric Association, 2013) and is
21 characterized by cognitive decline that compromises the individual's independence. Although
22 consciousness is not affected, this cognitive decline can affect memory, reasoning,
23 calculation, learning ability, and judgment (Vanmeter & Hubert, 2014).

24 Our second hypothesis was that the ability of adults with dementia to use information
25 on intent and consequence would be task-dependent (Rogé & Mullet, 2011). The study results

1 supported this hypothesis. With regard to the structure of blame and forgiveness patterns, the
2 older adults with dementia differed in how they combined the intent and the consequence of
3 the act. In judgments of blame, the older adults with dementia used both intent and
4 consequence and applied an interactive integration rule. In judgments of forgiveness, the
5 group used the information cues on intent but not those on consequence. This is in line with
6 Rogé and Mullet's (2011) study in which the ability to use intent information by people with
7 autism was strongly task-dependent. Our results show that the use of information on intent
8 and consequence by older adults with dementia depends on the type of moral judgment. From
9 a prosecutorial moral standpoint (e.g., in the context of blame), older adults with dementia
10 appear to be capable of using information cues on intent and consequence. From a theological
11 moral perspective (e.g., in the context of forgiveness), older adults with dementia might only
12 use intent to judge a transgressive act.

13 The results of study 1 highlighted the impact of dementia on a concomitant
14 examination of blame and forgiveness. However, the study had a limitation: the scenarios
15 were simple and combined only two factors. This was a deliberate choice, so that the scenario
16 would be easier to understand and judge by people with dementia. In fact, blame and
17 forgiveness schemas are often complex (e.g., Anderson, 2019), and it is not clear whether
18 people with dementia would be able to combine three, four or five factors in their judgment-
19 making (e.g., Girard & Mullet, 1997; Przygotzki & Mullet, 1997). Hence, we performed a
20 second study with a greater number of factors.

21 **Study 2**

22 Study 2 was also based on Anderson's theory of information integration (1996, 2008).
23 We compared the cognitive processes involved in blame and forgiveness judgments of young
24 adults, older adults, and older adults with dementia. Study 2 extended study 1 in several ways.
25 In the study 1, the scenarios were simple and combined two factors only. However, other

1 factors (such as apology, proximity, and negligence) may be considered when investigating
2 moral judgment (Anderson, 2008, 2019).

3 Hence, the objective of study 2 was to test the number of factors that older adults with
4 dementia were able to integrate during moral judgments (Fontaine et al., 2004; Mullet et al.,
5 2007. What happens when older adults with dementia are confronted with more than two
6 factors? Our main hypothesis was that differences between healthy adults and older adults
7 with dementia should appear (as a results of cognitive decline in the latter) when the
8 participants had to considered scenarios with three, four or five independent factors (see
9 Vanmeter & Hubert, 2014, for example).

10 **Method**

11 **Participants**

12 All the participants in study 1 participated in study 2.

13 **Material**

14 Three sets of two questionnaires (a blame task and a forgiveness task) corresponding
15 to three conditions were used to describe a familiar situation in daily life that all elderly and
16 young people could understand very easily. In the three conditions, Julie (a nurse) helps Alain
17 (an elderly person) to shower at home. During the shower, Alain falls over. Each scenario
18 contained three information cues: (a) the nurse's degree of intent (with or without intent), (b)
19 the severity of the consequences for the older adult (no sequelae; use of a walking aid;
20 inability to walk ever again), and (c) the caregiver's willingness to apologize (apologetic or
21 not apologetic). The orthogonal combination of these three factors resulted in $2 \times 3 \times 2 = 12$
22 scenarios. Pictograms like those in study 1 were used to make the scenarios easier to read and
23 understand (e.g., Morales-Martinez et al., 2015). In the blame task, the judgment
24 corresponded to the answer to the question "In your opinion, what level of blame does Julie
25 deserve?". A 20 cm response scale ranging from "No blame at all" at the left anchor and the

1 “A very high level of blame” at the right anchor was placed under each story. In the
2 forgiveness task, the judgment corresponded to the answer to the question “If you were Fred,
3 would you forgive Julie?”; the 20 cm response scale ranged from the “I am absolutely sure I
4 would not forgive her” at the left anchor and the “I am absolutely sure I would forgive her” at
5 the right anchor.

6 Two other conditions were applied: one with four factors (Intent x Negligence x
7 Consequences x Apologies), and one with five factors (Proximity x Intent x Negligence x
8 Consequences x Apologies) combined. The degree of negligence (negligent or not) and the
9 degree of proximity (close or not) were added. The orthogonal combination of the four factors
10 resulted in $2 \times 2 \times 3 \times 2 = 24$ scenarios in the second condition. The orthogonal combination
11 of the five factors resulted in $2 \times 2 \times 2 \times 3 \times 2 = 48$ scenarios in the third condition.
12 Judgments of blame and forgiveness were recorded in the same way in each condition.

13 **Procedure**

14 The study was approved by the Research Ethics Committee of Federal Toulouse Midi-
15 Pyrénées University (France), and by the director of the residential home. As advocated by
16 Anderson, a pilot feasibility study of 10 participants with dementia was performed first. The
17 pilot study’s results confirmed that older adults with dementia were able to understand the
18 everyday scenarios in the questionnaires and were able to rate their judgments on the answer
19 scale. As in study 1, all the participants were informed about the study’s objectives and
20 methods and were told that they could withdraw from the study at any time. In line with
21 Anderson's methodology (1996), the overall procedure for study 2 was the same as for study
22 1, with familiarization and experimental phases. Three separate experimental sessions (one
23 per week, corresponding to the three conditions) were organized.

24 **Data analysis**

1 As in study 1, two separate repeated-measures ANOVAs were applied for each task
 2 (blame and forgiveness) and each condition. The first ANOVAs had the group membership as
 3 a between-subject variable, the factors as independent variables, and the judgment as
 4 dependent variable. The second ANOVAs were performed on each group.

5 In condition 1, the first ANOVA was performed with a three-factor (Intent x
 6 Consequence x Apologies) x Group (young adults, old adults, old adults with dementia)
 7 design, i.e. $2 \times 3 \times 2 \times 3$. The second ANOVA had a $2 \times 3 \times 2$ design (Intent x Consequence x
 8 Apologies) in each group.

9 In condition 2, the first ANOVA was performed with a four-factor (Intent x Negligence
 10 x Consequence x Apologies) x Group design, i.e. $2 \times 2 \times 3 \times 2 \times 3$. The second ANOVA had a
 11 $2 \times 2 \times 3 \times 2$ design (Intent x Negligence x Consequence x Apologies) in each group.

12 In condition 3, the first ANOVA was performed with a five-factor (Proximity x Intent
 13 x Negligence x Consequence x Apologies) x Group design, i.e. $2 \times 2 \times 2 \times 3 \times 2 \times 3$. The
 14 second ANOVA had a $2 \times 2 \times 2 \times 3 \times 2$ design (Proximity x Intent x Negligence x
 15 Consequence x Apologies) in each group.

16 Results

17 Task 1: Judgment of blame

18 *First condition: the three-factor questionnaire*

19 ANOVAs were performed on all three groups of participants. In the first ($2 \times 3 \times 2 \times$
 20 3) ANOVA, the Intent factor had a significant effect ($F(1,111) = 274.83, p < .000, \eta^2_p = .71$),
 21 as did the Consequence factor ($F(2,222) = 21.29, p < .000, \eta^2_p = .16$), the Apologies factor
 22 ($F(1,111) = 43.31, p < .000, \eta^2_p = .28$) and the Group factor ($F(2,111) = 3.60, p < .03, \eta^2_p =$
 23 .06). For the Group factor, Tukey's test did not reveal significant differences between young
 24 adults and older adults ($p = .940$) or between older adults and adults with dementia ($p = .080$).

1 Nevertheless, the difference between young adults and older adults with dementia was
2 significant ($p < .044$ in Tukey's test).

3 The results of the $2 \times 3 \times 2$ ANOVAs (Intent \times Consequence \times Apologies) are
4 presented in Table 3. In young adults and older adults, the effects of Intent, Consequence, and
5 Apologies were significant. In older adults with dementia, the effects of Intent and Apologies
6 were significant.

7 Figure 3 shows the combined effect of Intention, Consequence, and Apologies on
8 judgments of blame in the three groups of participants. In each panel, the three levels of the
9 Consequence factor are given on the horizontal axis, and the degree of blame is given on the
10 vertical axis. The two curves correspond to the two levels of the Intent factor (accidental or
11 deliberate). Each pattern corresponds to one level of the Apologies factor (apologetic or not).
12 The mean ratings of judgments of blame are on the y-axis.

13 *Insert Figure 3*

14 In each panel, the two curves are clearly separate - indicating a marked effect of the
15 Intent factor. The effect size of the factor Intent is the strongest ($\eta^2_p = .77$ in young adults and
16 $\eta^2_p = .86$ in older adults and $\eta^2_p = .42$ in older adults with dementia): the greater the intent, the
17 more the participants were willing to blame the nurse.

18 In young adults (Figure 3, top panel) and older adults (Figure 3, middle panel), the two
19 curves rise from left to right: the more severe the consequence, the more the participants were
20 willing to blame the nurse. The two curves are approximately parallel, indicating that an
21 additive integration rule had been applied.

22 In older adults with dementia (Figure 3, bottom panel), the two curves are separate but
23 closer together than those in the young adults and older adults: the stronger the intention, the
24 more the nurse was blamed. The two curves are approximately parallel to the x-axis, with
25 confirms that the consequence did not have a significant effect.

1 ***The second condition: the four-factor questionnaire***

2 In the first (2 x 2 x 3 x 2 x 3) ANOVA, each factor had a significant effect. The Intent
3 factor ($F(1,111) = 209.09, p < .000, \eta^2_p = .65$), the Negligence factor ($F(1,111) = 96.95, p <$
4 $.000, \eta^2_p = .46$), the Consequences factor ($F(2,222) = 24.46, p < .000, \eta^2_p = .18$), the Apologies
5 factor ($F(1,111) = 36.27, p < .000, \eta^2_p = .24$) and the Group factor ($F(2,111) = 6.61, p < .001,$
6 $\eta^2_p = .10$) had a significant effect. For the Group factor, Tukey's test did not reveal significant
7 differences between young adults and older adults ($p = .304$) or between young adults and
8 older adults with dementia ($p = .118$). However, the difference between healthy older adults
9 and older adults with dementia was significant ($p < .001$).

10 The results of the second ANOVA (with a 2 x 2 x 3 x 2 design: Intent x Negligence x
11 Consequences x Apologies) are presented in Table 3. In young adults and healthy older adults,
12 the effects of Intent, Negligence, Consequences, and Apologies were significant. In older
13 adults with dementia, only the effects of Intent and Negligence were significant.

14 ***The third condition: the five-factor questionnaire***

15 In the first (2 x 2 x 2 x 3 x 2 x 3) ANOVA, the Proximity factor did not have a
16 significant effect ($F(1,111) = 1.33, p = .25, \eta^2_p = .01$). The Intent factor had a significant effect
17 ($F(1,111) = 130.62, p < .000, \eta^2_p = .54$), as did the Negligence factor ($F(1,111) = 65.33, p$
18 $< .000, \eta^2_p = .37$), the Consequences factor ($F(2,222) = 34.86, p < .000, \eta^2_p = .23$), the
19 Apologies factor ($F(1,111) = 29.55, p < .000, \eta^2_p = .21$) and the Group factor ($F(2,111) = 7.31,$
20 $p < .001, \eta^2_p = .11$). For the Group factor, Tukey's test did not reveal significant differences
21 between young adults and older adults with dementia ($p = .588$). However, the differences
22 between young adults and older adults ($p < .030$) and between healthy older adults and older
23 adults with dementia ($p < .001$) were significant.

24 The results of the second ANOVA performed on each group with a 2 x 2 x 2 x 3 x 2
25 design (Proximity x Intent x Negligence x Consequences x Apologies) are presented in Table

1 3. In young adults, the effects of Intent, Consequences, Apologies, Negligence, and Proximity
 2 were significant. In older adults, the effects of Intent, Consequences, Apologies, and
 3 Negligence, and Proximity were significant. In older adults with dementia, only the effect of
 4 Intent was significant.

5 **Task 2: Judgment of forgiveness**

6 *The first condition: the three-factor questionnaire*

7 In the first ($2 \times 3 \times 2 \times 3$) ANOVA, the Intent factor had a significant effect ($F(1,111)$
 8 $= 106.34, p < .000, \eta^2_p = .48$), as did the Consequence factor ($F(2,222) = 40.95, p < .000, \eta^2_p =$
 9 $.26$), and the Apologies factor ($F(1,111) = 67.12, p < .000, \eta^2_p = .37$). The Group factor
 10 ($F(2,111) = 2.75, p < .06, \eta^2_p = .04$) was not significant.

11 The results of the second $2 \times 3 \times 2$ ANOVA (Intent \times Consequence \times Apologies)
 12 performed on each group are presented in Table 4. In young adults and older adults, the
 13 effects of Intent, Consequence, and Apologies were significant. In older adults with dementia,
 14 the effects of Intent and Apologies were significant.

15 Figure 4 shows the combined effect of Intention, Consequence, and Apologies on
 16 judgments of forgiveness in the three groups of participants. In each panel, the three levels of
 17 the Consequence factor are given on the horizontal axis, and the degree of blame is given on
 18 the vertical axis. The two curves correspond to the two levels of the Intent factor (accidental
 19 or deliberate). Each pattern corresponds to one level of the Apologies factor (apologetic or
 20 not). The mean ratings of judgments of forgiveness are on the y-axis.

21 *Insert Figure 4*

22 In all the panels, the two curves are clearly separate - indicating that the lower the
 23 degree of intent, the more the participants were willing to forgive. For the young adults
 24 (Figure 4, top panel) and older adults (Figure 4, middle panel), the curves fell from left to
 25 right - indicating that the less severe the consequences, the more the participants were willing

1 to forgive. In each graph, the two curves are parallel, which suggests that an additive
 2 integration rule had been applied. In all cases, the left graph is above the right graph on the y-
 3 axis. This indicates the effect of the Apologies factor: the less apologetic the nurse, the lower
 4 the degree of forgiveness.

5 In contrast, the curves for the older adults with dementia (Figure 4, bottom panel) are
 6 separate, flat, and parallel to the x-axis. This indicates that the older adults with dementia took
 7 account of the Intent factor: the greater the intent, the lower the degree of forgiveness. In the
 8 pair of patterns, each left graph is above the right graph on the y-axis. This again indicates the
 9 effect of the apologies factor: the less apologetic the nurse, the lower the degree of
 10 forgiveness.

11 ***The second condition: the four-factor questionnaire***

12 In the first ($2 \times 2 \times 3 \times 2 \times 3$) ANOVA, the Intent factor ($F(1,111) = 105.85, p < .000,$
 13 $\eta^2_p = .49$), the Negligence factor ($F(1,111) = 48.25, p < .000, \eta^2_p = .30$), the Consequence
 14 factor ($F(2,222) = 56.44, p < .000, \eta^2_p = .33$), the Apologies factor ($F(1,111) = 44.85, p < .000,$
 15 $\eta^2_p = .28$) and the Group factor ($F(2,111) = 12.15, p < .000, \eta^2_p = .18$) all had a significant
 16 effect. For the Group factor, Tukey's test did not reveal a significant difference between
 17 young adults and older adults ($p = .606$). However, the differences between young adults and
 18 older adults with dementia ($p < .001$) and between healthy older adults and older adults with
 19 dementia ($p < .001$) were significant.

20 The results of the second ($2 \times 2 \times 3 \times 2$: Intent x Negligence x Consequence x
 21 Apologies) ANOVA performed on each group are presented in Table 4. In young adults and
 22 older adults, the effects of Intent, Negligence, Consequence, and Apologies were significant.
 23 In older adults with dementia, the effects of Intent and Negligence were significant.

24 ***The third condition: the five-factor questionnaire***

1 In the first ANOVA (with a $2 \times 2 \times 2 \times 3 \times 2 \times 3$ design), the Intent factor had a
 2 significant effect ($F(1,111) = 88.57, p < .000, \eta^2_p = .44$), as did the Negligence factor
 3 ($F(1,111) = 39.78, p < .000, \eta^2_p = .26$), the Consequences factor ($F(2,222) = 65.20, p < .000,$
 4 $\eta^2_p = .37$), the Apologies factor ($F(1,111) = 51.71, p < .000, \eta^2_p = .31$), the Proximity factor
 5 ($F(2,111) = 7.31, p < .001, \eta^2_p = .11$), and the Group factor ($F(1,111) = 16.28, p < .00, \eta^2_p =$
 6 $.22$). For the Group factor, Tukey's test did not reveal a significant difference between young
 7 adults and older adults ($p = .267$). However, the differences between young adults and older
 8 adults with dementia ($p < .001$) and between healthy older adults and older adults with
 9 dementia ($p < .001$) were significant.

10 The results of the second $2 \times 2 \times 2 \times 3 \times 2$ ANOVA (Proximity \times Intent \times Negligence \times
 11 Consequences \times Apologies) performed on each group are presented in Table 4. In young
 12 adults and older adults, the effects of Intent, Consequences, Apologies, Negligence, and
 13 Proximity were significant. In older adults with dementia, only the effect of Intent was
 14 significant.

15 **Discussion**

16 The purpose of the second study was to test the number of factors that older adults
 17 with dementia are able to integrate in judgments of blame and forgiveness (Fontaine et al.,
 18 2004; Mullet et al., 2007). In view of the cognitive decline observed in people with dementia
 19 (Vanmeter & Hubert, 2014), we supposed that differences between the healthy adults and the
 20 older adults with dementia would appear when the latter were confronted with scenarios
 21 containing three, four or five independent factors. We hypothesized that as the number of
 22 factors rose, the less older adults with dementia would be able to combine them. Indeed, our
 23 results confirmed this hypothesis.

24 There were differences between healthy adults and older adults with dementia in the
 25 number of factors taken in account in three-, four- and five-factor scenarios. In the majority of

1 conditions, healthy adults took account of all the factors when judging blame or forgiveness.
2 In contrast, older adults with dementia were able to consider only two factors when the
3 scenario comprised three or four factors. Furthermore, these two factors differed according to
4 the condition and the task. Intent and Apologies were considered when scenarios were
5 composed of three factors (condition 1), regardless of whether blame or forgiveness was
6 being judged. Intent and Negligence were considered when scenarios were composed of four
7 factors (condition 2) and blame was being judged (task 1). Intent and Consequence were
8 considered when scenarios were composed of four factors (condition 2) and forgiveness was
9 being judged (task 2).

10 The results of study 2 confirmed those of study 1. Older adults with dementia were
11 able to combine at most two factors specially to blame. According to the task, older adults
12 with dementia did not take into account the same two factors. As in the study 1, the moral
13 judgment among older adults with dementia is task-dependant. The results of study 2 also
14 extended those of study 1: older adults with dementia were not able to integrate more than
15 two factors when they were confronted with three, four or five. Furthermore, the way that
16 older adults with dementia took account of these two factors depended on the condition.
17 Moral judgment among older adults with dementia is condition-dependant.

18 Whatever the task and the condition, older adults with dementia gave greater weight to
19 the intent factor. In both tasks, intent was the only factor taken into consideration when
20 scenarios were composed of five factors (condition 3). These findings showed that intent is an
21 invariant factor for moral judgments of blame and forgiveness by older adults with dementia.

22 **General discussion**

23 The main objective of the two studies described here was to compare the cognitive
24 processes involved in blame and forgiveness judgments by young adults, older adults, and
25 older adults with dementia.

1 Study 1 extended Fontaine et al. (2004)'s study. It assessed the impact of dementia on
2 judgments of blame and forgiveness when the Intention and Consequence factors were
3 combined. The main finding was that both Intent and Consequence were taken into account
4 by older adults with dementia when judging blame. Nevertheless, older adults with dementia
5 attributed significantly less weight to the Consequence factor: the more intentional the act, the
6 more blameworthy it was judged to be. In contrast, older adults with dementia only took
7 account of intent information in the forgiveness condition. The moral judgment among older
8 adults with dementia is task-dependant.

9 The results of study 2 confirmed the impact of dementia on moral judgments of blame
10 and forgiveness in the same population as in study 1. Healthy older adults and older adults
11 with dementia were able to take account of least two factors, depending on the task.

12 Moreover, study 2 tested the number of factors that older adults with dementia were
13 able to integrate during these moral judgments (Fontaine et al., 2004; Mullet et al., 2007).
14 Unlike healthy older adults, older adults with dementia had difficulty in considering more
15 than two factors and integrating as much information. As a result of cognitive decline
16 (Vanmeter & Hubert, 2014), older adults with dementia did not use all the available
17 information (three, four or five cues) to make their judgment and they primarily considered
18 the intent of the act. Among older adults with dementia, moral judgment is not only task-
19 dependant but also condition-dependant, and intent is an invariant factor.

20 **Limitations and Practical Applications**




21 Our work had several limitations. Firstly, we did not distinguish between different
22 clinical types of dementia, and so we could not determine whether dementia is always
23 associated with the same judgment pattern. Secondly, the mean age of the group of older
24 adults with dementia is significantly higher than that of the older adults without dementia
25 (78.54 years vs 65.07 years). Such a significant difference in ages (more than 13 years)




1 among older people naturally may lead to remarkable differences in their cognitive
 2 functioning, regardless of presence of dementia (Letenneur et al., 1994). Thirdly, we did not
 3 distinguish between stages of dementia (e.g., Fontaine et al., 2004). Indeed, cognitive patterns
 4 might change as the disease progresses. Fourthly, other types of theological moral judgment
 5 (e.g., resentment and reconciliation) and prosecutorial moral judgement (e.g., prosecution and
 6 revenge) could have been considered (Mullet, Riviere & Muñoz Sastre, 2007). Our future
 7 investigations will focus on circumventing these limitations.


8 Life expectancy is increasing as a result of advances in medical science and the
 9 availability of better healthcare services; the proportion of elderly people in the general
 10 population is therefore rising. Given the risk of dementia rises with age, the number of
 11 persons with dementia in the general population is also increasing. Dementia is a set of
 12 behaviours or symptoms that suggest impairments in cognitive function (Sujata & Davidson,
 13 2014). It is thought that all degenerative disorders begin insidiously and progress gradually.
 14 Cognitive stimulation (i.e. group activities that are intended to provide cognitive training and
 15 improve social functioning) might optimize specific cognitive functions (Simon et al., 2012).
 16 Hence, studies of moral judgement might help to detect the symptoms of early-stage dementia
 17 and thus facilitate secondary prevention.


18 *Appendix*


19 *An example of a scenario in the task of blame judgment (Intent X Consequence)*

20 Julie is a nurse . She comes to help wash Fred , an 85-year-old person living
 21 alone at home .

22 During the shower , Julie gets very annoyed  by Fred's lack of cooperation,
 23 and she turns the tap so that the water becomes very, very cold . Fred is surprised, moves

1 back, loses his balance, and falls over .

2 After his fall, Fred goes to hospital and is examined by a doctor . Everything is



3 fine, Fred has not broken any bones, and his fall will not have any consequences . Fred goes

4 home on the same day .



6 “In your opinion, what level of blame does Julie deserve?”

7 No blame at all ----- A very high level of blame


9 *The same scenario in the task of forgiveness judgment (Intent X Consequence)*


10 Julie is a nurse . She comes to help wash Fred , an 85-year-old person living


11 alone at home .


12 During the shower , Julie gets very annoyed  by Fred’s lack of cooperation,

13 and she turns the tap so that the water becomes very, very cold . Fred is surprised, moves

14 back, loses his balance, and falls over .

15 After his fall, Fred goes to hospital and is examined by a doctor . Everything is

16 fine, Fred has not broken any bones, and his fall will not have any consequences . Fred

1 goes home on the same day .

2

3 "If you were Fred, would you forgive Julie for your fall?"

4 Absolutely sure _____ Absolutely sure

5 that I would not forgive her

that I would forgive her

6

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Table 1

Main results (ANOVAs) for the judgment of blame in study 1

Factor	Effect		Error		<i>F</i>	<i>p</i>	η^2_p
	<i>df</i>	<i>MS</i>	<i>df</i>	<i>MS</i>			
PARTICIPANTS							
YOUNG ADULTS							
Intent	1	4855.01	33	79.88	60.78	.000	.65
Consequence	2	124.90	66	11.97	10.43	.000	.24
Intent x Consequence	2	2.28	66	5.24	0.43	.649	.01
OLDER ADULTS							
Intent	1	11673.36	39	25.55	456.94	.000	.92
Consequence	2	36.35	78	5.74	6.33	.003	.14
Intent x Consequence	2	8.46	78	5.96	1.42	.248	.04
OLDER ADULTS WITH DEMENTIA							
Intent	1	3373.39	39	99.42	158.93	.000	.49
Consequence	2	91.56	78	6.51	19.86	.012	.11
Intent x Consequence	2	51.67	78	15.64	3.30	.042	.87

1 Threshold for statistical significance: $p < .05$

Table 2

Main results (ANOVAs) for the judgment of forgiveness in study 1

PARTICIPANTS	Effect		Error		<i>F</i>	<i>p</i>	η^2_p
	<i>df</i>	<i>MS</i>	<i>df</i>	<i>MS</i>			
Factor							
YOUNG ADULTS							
Intent	1	4511.06	33	42.32	106.60	.000	.76
Consequence	2	428.25	66	6.16	69.51	.000	.68
Intent x Consequence	2	5.82	66	6.17	0.94	.393	.03
OLDER ADULTS							
Intent	1	6551.11	39	101.90	64.29	.000	.62
Consequence	2	83.40	78	15.70	5.31	.007	.12
Intent x Consequence	2	4.53	78	9.74	0.47	.630	.02
OLDER ADULTS WITH DEMENTIA							
Intent	1	3568.96	39	81.45	43.82	.000	.53
Consequence	2	39.09	78	21.36	1.83	.167	.04
Intent x Consequence	2	57.69	78	22.63	2.55	.084	.06

Threshold for statistical significance: $p < .05$

Table 3.

Main results of the ANOVAs performed on the “judgment of blame” data from the three groups in the three conditions (study 2).

	Young adults							Older adults					Older adults with dementia								
	Effect		Error		F	p	η^2p	Effect		Error		F	p	η^2p	Effect		Error		F	p	η^2p
df	MS	df	MS	df				MS	df	MS	df				MS	df	MS	df			
CONDITION 1																					
Intent	1	11516.97	33	100.71	114.35	.000*	.77	1	16555.75	39	67.68	244.62	.000*	.86	1	5097.34	39	173.61	29.36	.000*	.42
Consequences	2	260.62	66	16.88	15.43	.000*	.31	2	81.18	78	11.11	7.30	.001*	.15	2	26.17	78	16.56	1.58	.212	.03
Apologies	1	341.55	33	14.03	24.34	.000*	.42	1	532.14	39	18.46	28.83	.000*	.42	1	144.54	39	32.56	4.43	.041*	.10
CONDITION 2																					
Intent	1	17825.80	33	124.30	143.37	.000*	.81	1	18546.00	39	160.40	115.63	.000*	.74	1	7885.60	39	320.40	24.60	.000*	.38
Consequences	2	332.20	66	16.60	19.97	.000*	.37	2	157.00	78	14.80	10.62	.000*	.21	2	41.50	78	16.60	2.49	.089	.06
Apologies	1	536.30	33	13.10	40.88	.000*	.55	1	438.90	39	20.30	21.59	.000*	.35	1	11.90	39	13.40	0.88	.352	.02
Negligence	1	1727.60	33	36.50	47.39	.000*	.58	1	2274.60	39	45.20	50.35	.000*	.56	1	110.20	39	22.50	4.88	.033*	.11
CONDITION 3																					
Intent	1	27583.40	33	387.80	71.12	.000*	.68	1	29038.10	39	348.00	83.43	.000*	.68	1	9304.70	39	694.50	13.39	.001*	.25
Consequences	2	749.60	66	27.20	27.59	.000*	.45	2	846.90	78	46.70	18.12	.000*	.31	2	7.10	78	12.60	0.56	.572	.01
Apologies	1	370.90	33	21.10	17.58	.000*	.34	1	372.20	39	18.20	20.44	.000*	.34	1	.00	39	12.60	0.00	.970	.00
Negligence	1	2568.50	33	54.70	46.98	.000*	.58	1	4570.10	39	134.90	33.88	.000*	.46	1	11.70	39	13.60	0.86	.358	.02
Proximity	1	35.90	33	7.60	4.71	.003*	.12	1	10.40	39	12.30	0.84	.363	.02	1	9.10	39	11.50	0.78	.381	.01

* Threshold for statistical significance: $p < .05$

Table 4.

Main results of the ANOVAs performed on the “judgment of forgiveness” data from the three groups in the three conditions (study 2).

	Young adults							Older adults					Older adults with dementia															
	Effect	df	MS	Error	df	MS	F	p	η^2p	Effect	df	MS	Error	df	MS	F	p	η^2p	Effect	df	MS	Error	df	MS	F	p	η^2p	
CONDITION 1																												
Intent	1	5253.18	33	140.06	37.51	.000*	.53		1	8492.42	39	159.99	53.08	.000*	.57		1	3689.09	39	173.06	21.32	.000*	.35					
Consequences	2	713.51	66	14.80	48.22	.000*	.59		2	234.14	78	15.74	14.87	.000*	.27		2	4.83	78	12.87	0.38	.688	.00					
Apologies	1	1265.65	33	23.90	52.96	.000*	.61		1	1483.33	39	39.94	37.14	.000*	.48		1	358.63	39	62.96	5.70	.022*	.12					
CONDITION 2																												
Intent	1	13680.08	33	132.19	103.49	.000*	.75		1	9346.14	38	251.13	37.22	.000*	.49		1	3946.70	39	331.70	11.90	.001*	.23					
Consequences	2	1096.79	66	19.39	56.57	.000*	.63		2	504.52	76	30.99	16.27	.000*	.29		2	96.40	78	13.10	7.34	.001*	.15					
Apologies	1	1493.38	33	37.44	39.88	.000*	.54		1	1317.06	38	37.72	34.91	.000*	.47		1	201.60	39	100.90	2.00	.166	.04					
Negligence	1	1000.38	33	14.82	67.49	.000*	.67		1	555.23	38	34.56	16.06	.000*	.29		1	0.0	39	15.70	0.00	.983	.00					
CONDITION 3																												
Intent	1	23540.20	33	368.70	63.85	.000*	.65		1	19554.10	39	414.80	47.14	.000*	.54		1	4181.30	39	664.90	6.29	.016*	.13					
Consequences	2	1451.30	66	36.40	39.83	.000*	.54		2	1762.30	78	55.00	32.02	.000*	.45		2	42.30	78	24.40	1.74	.183	.04					
Apologies	1	2372.70	33	66.10	35.88	.000*	.52		1	2218.20	39	70.10	31.62	.000*	.44		1	373.50	39	120.30	3.10	.086	.07					
Negligence	1	1340.00	33	30.01	44.46	.000*	.57		1	2593.10	39	144.50	17.94	.000*	.31		1	0.10	39	13.80	0.05	.941	.00					
Proximity	1	397.90	33	19.40	20.46	.000*	.38		1	65.40	39	13.40	4.88	.033*	.11		1	8.70	39	14.30	0.61	.439	.01					

* Threshold for statistical significance: $p < .05$

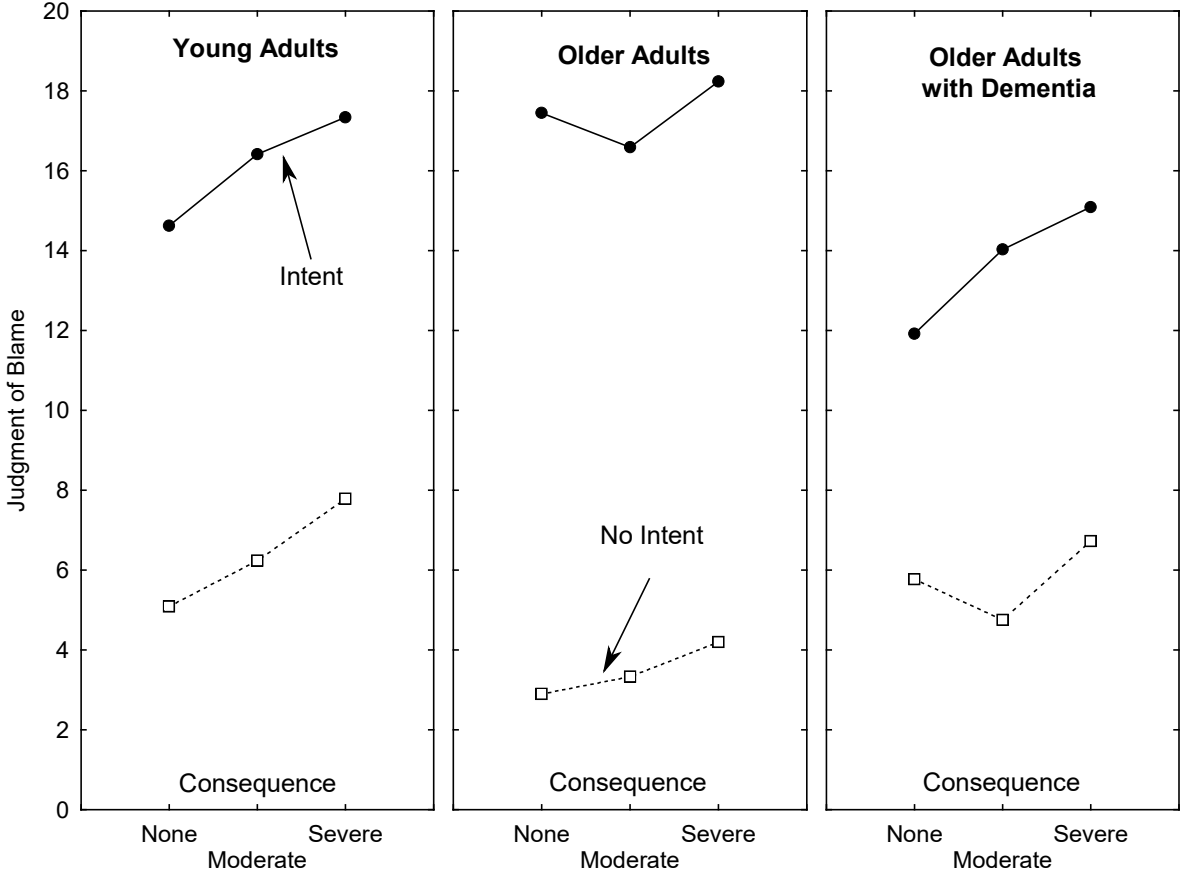


Figure 1. Effects of intention and consequence on the judgment of blame by young adults, older adults, and older adults with dementia (study 1)

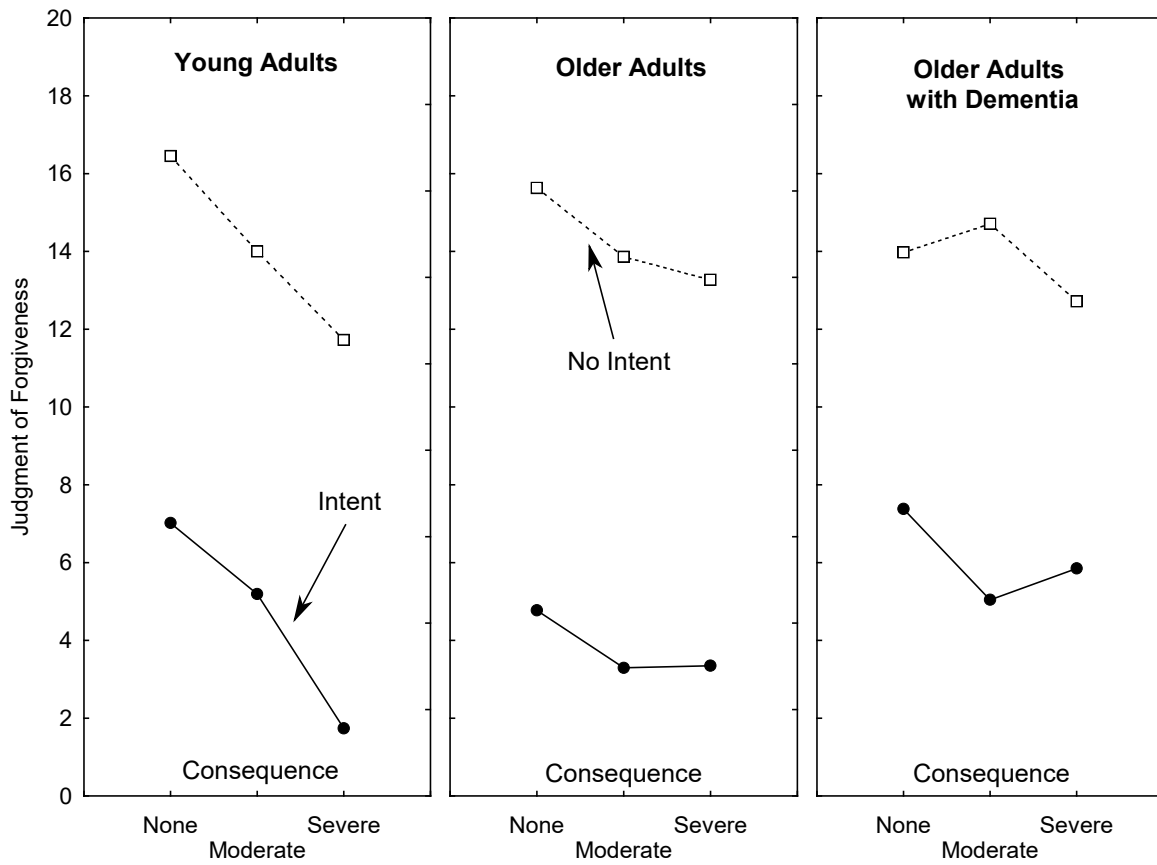


Figure 2. Effects of intention and consequence on the judgment of forgiveness by young adults, older adults, and older adults with dementia (study 1)

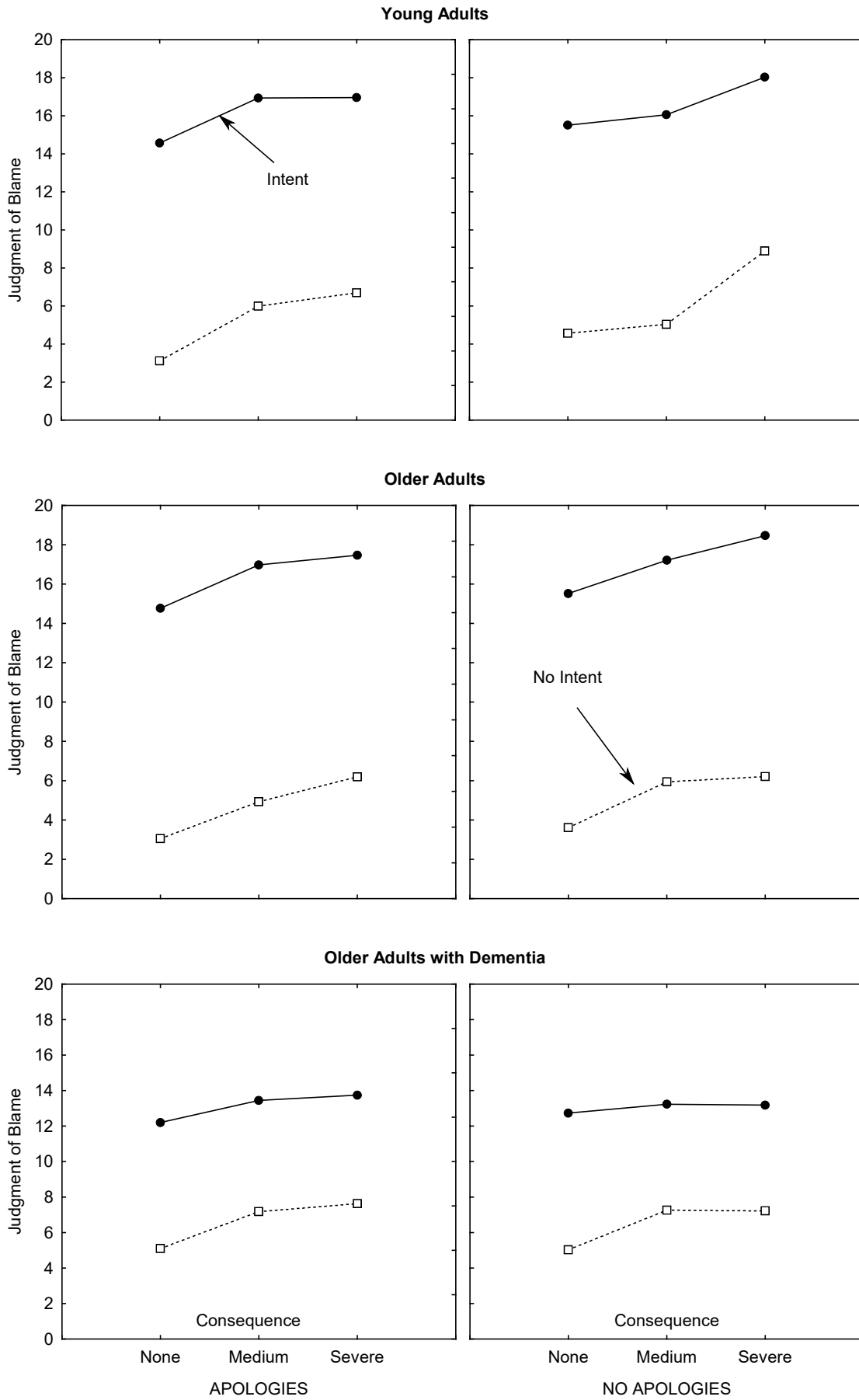


Figure 3. Effects of intention, consequence and apologies on the judgment of blame by young adults, older adults and older adults with dementia (study 2).

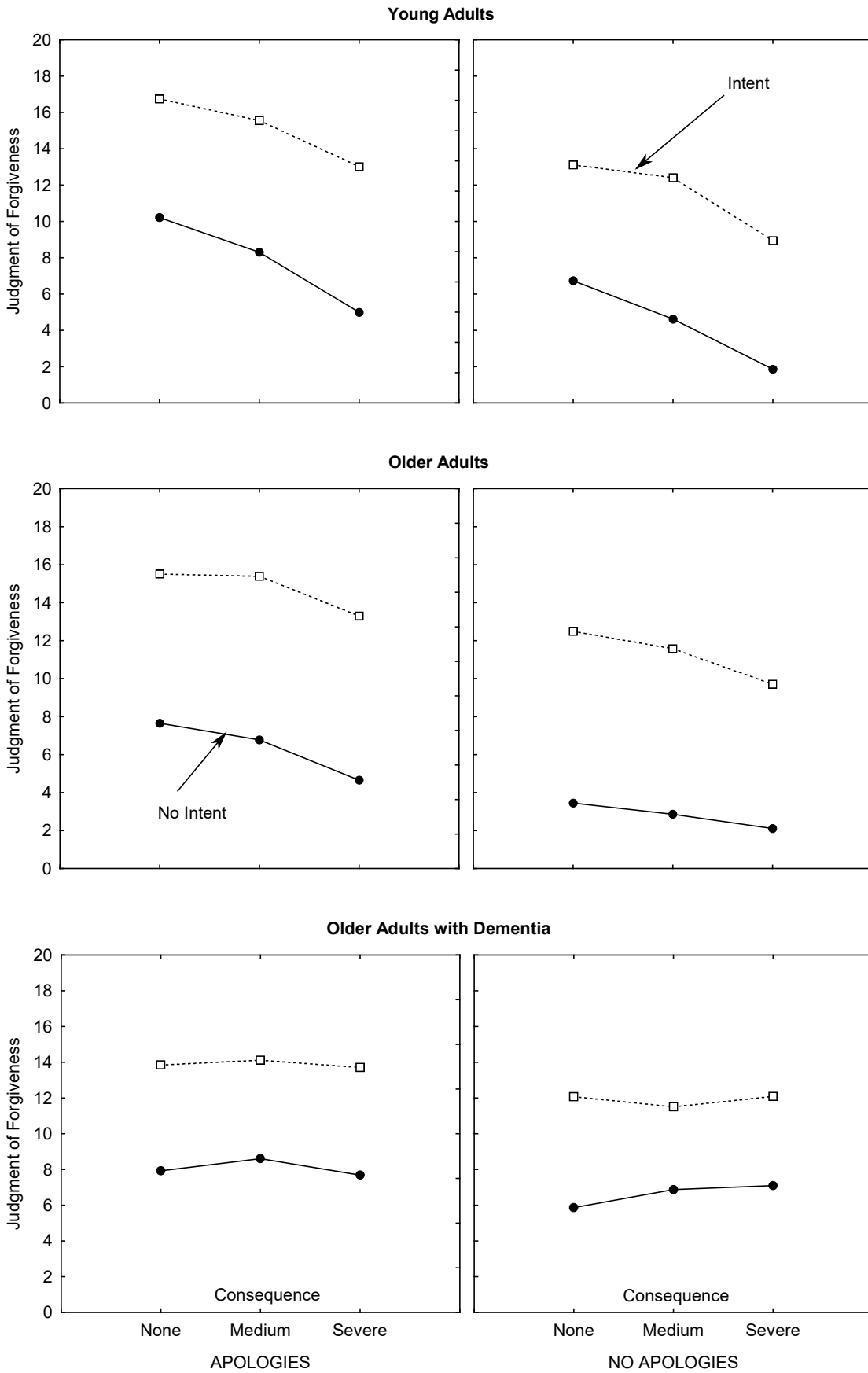


Figure 4. Effects of intention, consequence and apologies on the judgment of forgiveness by young adults, older adults and older adults with dementia (study 2).