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Abstract

Decision aids (DAs) are non-directive communication tools that help patients make value-consistent health-care decisions. However, most DAs have been developed without an explicit theoretical framework, resulting in a lack of understanding of how DAs achieve outcomes.

Keywords

effectiveness;, deliberative, aid, vs., decision, exploration, promoting, health-related, processing, impact, affective

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An exploration of decision aid effectiveness: the impact of promoting affective vs. deliberative processing on a health-related decision

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Abstract

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Keywords: decision-making, decision aid, dual-process theory, health psychology

Background Decision aids (DAs) are non-directive communication tools that help patients make value-consistent health-care decisions. However, most DAs have been developed without an explicit theoretical framework, resulting in a lack of understanding of how DAs achieve outcomes.

Objective To investigate the effect of promoting affective vs. deliberative processing on DA effectiveness based on dual-process theory.

Design, setting and participants One hundred and forty-eight female university students participated in a randomized controlled experiment with three conditions: emotion-focused, information-focused and control. Preference-value consistency, knowledge, decisional conflict and satisfaction were compared across the conditions using planned contrast analyses.

Intervention The intervention comprised two different DAs and instructional manipulations. The emotion-focused condition received a modified DA with affective content and instructions to induce an affective reaction. The information-focused and control conditions received the same DA without the affective content. The information-focused condition received additional instructions to induce deliberative processing.

Results Controlling for the experiment-wise error rate at $P < 0.017$, the emotion-focused and information-focused conditions had significantly higher decisional satisfaction than the control condition ($P < 0.001$). The emotion-focused condition did not demonstrate preference-value consistency. There were no significant differences for decisional conflict and knowledge.

Discussion Results suggest that the promotion of affective processing may hinder value-consistent decision making, while deliberative processing may enhance decisional satisfaction.

Conclusions This investigation of the effect of affective and deliberative processes in DA-supported decision making has implications for the design and use of DAs. DA effectiveness may be enhanced by incorporating a simple instruction to focus on the details of the information.

Introduction

Medical encounters often involve making multiple decisions about tests, treatments and procedures in which there is no single ‘best’ choice (e.g.¹). Guidelines from the International Patient Decision Aid Standards (IPDAS) Collaboration define an optimal decision as one in which the individual has greater knowledge of the choice options and their features, greater satisfaction with the decision, lower levels of decisional conflict and greater decision-value consistency.^{2,3} For patients to make an optimal decision, they need to weigh up costs and benefits associated with available options in consideration of their values and specific needs.⁴ Making optimal health-care decisions is particularly difficult when the benefit–cost ratio of a treatment option is small, where options produce similar survival but different quality of life outcomes, or where there is no clear data on outcomes.

Decision aids (DAs) have been developed to assist patients in these situations. They are non-directive tools designed to prepare patients to make specific, deliberated choices consistent with their own values.¹ DAs present evidence-based information on the options and outcomes relevant to the patient’s health in a clear, graphical way and commonly include exercises to assist patients in clarifying their values and weighing up the pros and cons.⁵ A systematic review found that DAs improve patients’ knowledge, reduce decisional conflict and motivate people to take a more active role in decision making.¹ Therefore, they serve as a valuable tool for enabling patients to engage in shared decision making and make optimal decisions about their health care.

To provide a standardized, evidence-based framework for DA development, the IPDAS

Collaboration⁶ established a quality criteria for DA development and evaluation. This provides guidance for developers about using a systematic development process, what information to provide, and how to present it. Even so, the IPDAS quality criteria do not stipulate explicit use of theory and the majority of DAs appear to have been developed in the absence of an explicit theoretical hypothesis about how patients will reach decisions.⁷ As a consequence, there is a lack of understanding of how DAs affect outcomes.⁸ DAs demonstrate different levels of effectiveness, but there has been insufficient research investigating the mechanisms responsible for this variability.^{7–10}

Decision-making theories have the potential to clarify this issue by providing explanations of how people make choices and identifying the factors that influence the decision-making process.⁷ There is insufficient research to purport the superiority of any particular decision-making theory on which to base DAs; however, expected utility theory has been the most widely used approach informing DA developers of the factors to consider, while dual-process theories provide a potentially useful alternative perspective (see^{11,12}). Dual-process theories acknowledge both deliberative and affective processes as integral to decision making.¹³ They acknowledge the existence of two complementary systems – one logical, controlled, and analytical and the other affect-based, automatic and intuitive – which operate in parallel with each other in producing behaviour.^{13–15} These systems have been referred to as the analytic and intuitive systems, respectively.^{13,14}

The effectiveness of DAs has been explained in terms of their influence on cognitive and emotional processes, which are subsumed by the analytic and intuitive systems, respectively.^{11,12} With regard to cognitive processes, DAs have

been shown to encourage more systematic and knowledgeable evaluations of the decision information. These are thought to lead to more stable cognitions and thereby reduce decisional conflict and increase satisfaction with the decision.^{11,16,17}

However, the mechanisms by which DAs influence emotional processes and subsequent outcomes are less clear. DAs have been associated with reducing feelings associated with decisional conflict that impact adversely on decision making.¹⁷ However, Bekker *et al.*¹¹ suggest that part of the effectiveness of DAs may result from allowing the expression of decision-relevant feelings that are not usually accessed in unaided choices. They compared the content of usual care vs. DA-supported consultations when people were making decisions about prenatal diagnosis for emotional expression, information seeking and evaluation of the information. People expressed more negative emotions, less positive emotions, more cognitive phrases and thinking about the decision, and more positive and negative evaluations of options in the DA group than those receiving usual care. Information seeking was equivalent across groups. At the time of decision making, greater emotional expression was associated with reduced reasoning, and greater decisional conflict and anxiety. At 1-month follow-up, positive evaluations and information seeking were associated with increased decisional conflict, while positive evaluations were also associated with generation of fewer reasons for their choice and negative evaluations were associated with lower anxiety. Participants in the DA condition overall evaluated more information and experienced a decrease in decisional conflict over time, while the usual care group's decisional conflict scores increased.¹⁸ Thus, DAs appear to encourage greater use of both affective and deliberative strategies, which overall positively affected short- and long-term evaluations of the decision outcome.

To date, most theoretical and empirical DA research has focused on elucidating relevant cognitive processes rather than examining emotional influences.¹¹ By adopting a dual-process approach, the aim of the current study was to

clarify the role of emotional processes in DAs by assessing the impact of promoting affective vs. deliberative processing on DA effectiveness. It is acknowledged that affective and deliberative processing may not be considered as functioning entirely separately, but rather in a highly interdependent fashion (e.g.¹⁹). However, it is a useful conceptualization in which to undertake this exploratory research.

Decision aid effectiveness was considered in terms of optimal decision making. Differences in indicators of an optimal decision were compared across three conditions distinguished by instructional manipulations to induce affective or deliberative processing: emotion-focused vs. information-focused vs. control. It was hypothesized that the promotion of affective or deliberative processing would influence decision-making outcomes of knowledge of the options and their features, decisional conflict, satisfaction with the decision and preference-value consistency. This was explored using a DA on contraceptive methods developed specifically for this study. This topic was chosen to ensure that the subject matter would be meaningful to the predominantly young female target population.

Method

Participants

One hundred and forty-eight female undergraduate students from a large metropolitan university in Sydney, Australia, participated in the experiment. Participants were given course credit for an introductory psychology course.

Design

A randomized experimental design was used including three arms: emotion-focused, information-focused or control condition. As shown in Fig. 1, the groups differ by the DA administered and instructional manipulations adapted from previous research by Lockenhoff *et al.*^{12,20} The emotion-focused group received an emotion-enhanced DA-containing modifications aimed at inducing affective

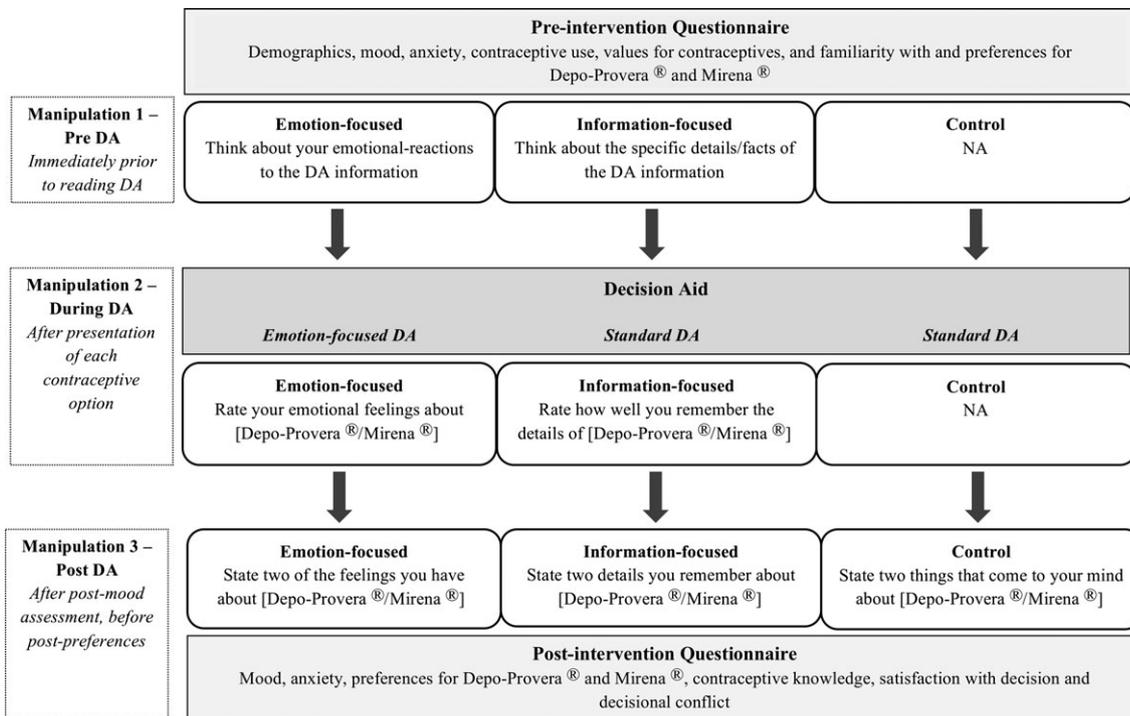


Figure 1 Study design.

reaction for the participants plus instructions to focus on their emotional reactions to the choice options; the information-focused group received a standard DA plus instructions to focus on the details of the information presented, while the control group received the standard DA and no decision-making guidance, thereby simulating natural processing (i.e. usual care). The emotion-enhanced DA was developed to improve upon the emotion-focused instructional manipulation in the studies by Lockenhoff *et al.*,^{12,20} as the instructional manipulation alone was not successful in eliciting a difference in processing style compared with control.

Instructional manipulations

Before reading the DA, participants were asked to think about: (i) their emotional reactions to the information given in the DA (emotion-focused condition) or (ii) the specific details/facts of the information given in the DA (information-focused condition). Two additional manipulations during and after reading of the DA were used to reinforce the salience

of the initial instructions. Here, participants rated: (i) the valence of their emotional feelings about Depo-Provera® and Mirena® followed by writing two emotional feelings they felt about them (emotion-focused condition) or (ii) how well they remembered the details of Depo-Provera® and Mirena® followed by writing two facts they remembered about them (information-focused condition).

Decision aids

The DAs were presented to participants on paper.

1. The emotion DA (emotion-focused condition): This DA was identical to the standard DA, with modifications aimed at inducing a strong affective reaction for the participant. These included emotional images, smiley faces instead of systematic ovals in the icon arrays as personlike figures have been shown to be more evocative than bar graphs²¹; handwriting font for the 'I' statements for the summary of the pros and cons to facilitate understanding that the statements are

personally applicable and hence make the information more concrete,²² and specific colours shown to be mood arousing (i.e. 'mood-lifting').²³ The first three modifications were targeted at enhancing the vividness of the information.²²

2. The standard DA (control and information-focused conditions): This DA presented general information on contraception followed by more specific information, including the benefits and risks/side-effects, on the contraceptive options of Depo-Provera[®] and Mirena[®]. Accompanying the text in black and white was images of the contraceptives, explanatory diagrams, including icon arrays consisting of 100 systematic ovals, and values clarification exercises. These are key DA components.

Procedure

After providing informed consent, participants were randomly allocated to one of the three groups. They completed an electronic questionnaire immediately before and after reading the DA and were debriefed after study completion. Ethics approval was obtained from the university Human Research Ethics Committee.

Measures

Based on IPDAS guidelines, an optimal decision in the current study was operationalized as: greater knowledge of the options and their features, greater satisfaction with the decision, lower levels of decisional conflict and greater preference-value consistency.^{2,3} Both the pre- and post-intervention questionnaire assessed mood, anxiety, personal values regarding contraceptives and preferences for the presented contraceptive options. The pre-intervention questionnaire assessed age, religion, ethnicity, relationship status, contraceptive use and familiarity with the presented contraceptive options. The post-intervention questionnaire included manipulation checks and assessed contraceptive knowledge, satisfaction with decision and decisional conflict. Figure 1 outlines the schedule of measures.

Affect measures included the validated 20-item Positive and Negative Affect Schedule (PANAS²⁵). *Anxiety* was assessed using a six-item short form of the State-Trait Anxiety Inventory (STAI²⁶).

Participants' *values* were assessed by eight items based on a scale by O'Connor.⁵ This included factors relating to the risks/side-effects and benefits of contraceptive use, and participants were asked to rate their personal importance, on a scale from 0 (*not at all important*) to 10 (*extremely important*), where higher scores indicate greater importance.

To assess participants' *preferences for the contraceptive options*, they were asked to rate the strength of their preference separately for Mirena[®] and Depo-Provera[®] contraceptive methods, on a scale from 0 (*do not prefer this option*) to 10 (*strongly prefer this option*). As in this study, the decision between Depo-Provera[®] and Mirena[®] was hypothetical for participants, it was more appropriate to ask their preferences than to make an actual choice.

Four items were used to check whether the instructional manipulations worked. Participants were asked to rate, on a scale of 0 (*not at all*) to 10 (*extremely*), the extent to which: (i) they focused on the specific details/facts of the DA booklet; (ii) they focused on their emotional feelings about the options; (iii) they felt positive and negative emotions; and (iv) the DA booklet engaged their emotions. Higher scores indicate higher levels of focus, emotional feeling or emotional engagement. The first three items were adapted from Mikels *et al.*¹²

Participants' *knowledge* of the DA content, including contraception in general and the benefits and risks/side-effects of the specific contraceptives, was assessed using 10 purpose-designed true/false items. Higher total scores indicated greater knowledge. The validated *Satisfaction With Decision* (SWD¹⁶) scale was used to assess participant's satisfaction with their decision. The validated *Decisional Conflict Scale* (DCS¹⁷) was used to assess factors related to uncertainty with decision making. Total standardized scores of 25 or lower are associated with follow-through with decisions,

whereas scores that exceed 38 are associated with delayed decision making.²⁴

Statistical analysis

All statistical data analyses were conducted using SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago, SPSS Inc. Differences between conditions were assessed using three planned contrasts, with coefficients 1 0 –1, 0 1 –1 and 1 –1 0, respectively, for emotion-focused, information-focused and control conditions. As per O'Connor *et al.*,²⁴ preference-value consistency was assessed by comparing the multiple correlation coefficients between participants' values and their preferences for Depo-Provera[®] and Mirena[®] across conditions. The experiment-wise error rate for the planned contrast analyses was controlled at the 0.05 level using the Bonferroni procedure, with a critical value of $F_{1,145} = 5.98$ (or $P < 0.017$). For all other analyses, a P -value of <0.05 was considered statistically significant.

Results

Demographic and health characteristics

One hundred and forty-eight women participated in the study (response rate 88.1%). The sample characteristics are summarized in Table 1, and there were no statistically significant differences between the conditions.

Manipulation checks

The means of the manipulation checks scores are displayed in Table 2. Planned contrast analyses revealed little success in the instructional manipulations and emotion-focused DA modifications. Only one significant difference was found, indicating that participants in the information-focused condition felt significantly less negative emotion compared with participants in the emotion-focused condition. This result, however, was not confirmed by the negative affectivity subscale of the PANAS, as indicated in the next paragraph.

Table 1 Demographic characteristics and health information of the sample in the emotion, information and control conditions

Variable	Emotion	Information	Control
	(<i>N</i> = 49) Mean (SD)	(<i>N</i> = 51) Mean (SD)	(<i>N</i> = 48) Mean (SD)
Age	19.59 (3.10)	20.37 (4.64)	19.94 (2.72)
Familiarity			
Depo-Provera [®]	0.43 (1.28)	0.75 (1.94)	0.19 (0.76)
Mirena [®]	0.31 (0.90)	0.69 (2.12)	0.42 (1.50)
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Relationship status ¹			
Single	26 (53)	27 (53)	17 (36)
Dating	23 (47)	21 (42)	31 (65)
Married/de facto	0 (0)	3 (6)	0 (0)
Have had sexual intercourse			
Yes	37 (76)	36 (71)	39 (81)
No	12 (26)	15 (29)	9 (19)
Contraceptives used ²			
Condoms	35 (71)	36 (71)	36 (75)
The pill/Minipill	28 (57)	30 (59)	31 (65)
Other	8 (16)	2 (4)	3 (6)
Religion			
Agnosticism/Atheism	27 (55)	23 (48)	19 (40)
Christianity	18 (37)	22 (43)	23 (48)
Other	4 (8)	5 (10)	6 (12)
Country/region of birth ³			
Australia	33 (67)	36 (71)	35 (73)
Europe/North America	6 (12)	5 (10)	4 (8)
Asia/Africa	8 (16)	13 (24)	11 (23)
Language other than English spoken at home			
Yes	18 (37)	16 (31)	13 (27)
No	31 (63)	35 (69)	35 (73)

Familiarity (0–10).

¹Chi-square analyses could not be performed, as the values did not meet the minimum expected amount.

²Responses are only from participants who have had sexual intercourse. Chi-square analyses could not be performed on the 'Other' option, as the values did not meet the minimum expected amount.

³Chi-square analysis compared Australia and a grouped variable containing the other categories, as the values did not meet the minimum expected amount.

Mood and anxiety

Mean differences in positive and negative affectivity and anxiety from pre- to post-intervention are shown in Table 3. There was a significant decrease in positive affectivity ($F_{1,145} = 31.47$,

Table 2 Mean scores for the manipulation check variables at post-intervention

Manipulation check	Emotion Mean (SD)	Information Mean (SD)	Control Mean (SD)
Detail/fact focus	7.80 (2.14)	7.73 (1.77)	8.10 (2.01)
Emotional feelings focus	5.59 (2.40)	5.22 (2.87)	5.50 (3.12)
DA emotional engagement	5.80 (2.40)	5.43 (2.88)	5.54 (2.69)
Feel negative emotion	6.39 (1.86) ^a	5.08 (2.88) ^a	5.71 (2.76)
Feel positive emotion	4.53 (2.01)	3.63 (2.58)	4.35 (2.25)

Manipulation check (0–10).

Paired letters indicate a significant difference between groups, controlling for the EER at $P < 0.017$.

Table 3 Mean differences on positive affectivity, negative affectivity and anxiety from pre- to post-intervention

	Emotion Mean (SD)	Information Mean (SD)	Control Mean (SD)
Positive affectivity	-2.80 (4.36)	-1.77 (5.62)	-2.32 (4.81)
Negative affectivity	0.27 (3.23)	0.94 (3.82)	0.90 (3.40)
Anxiety	1.57 (8.66)	0.70 (3.49)	1.32 (9.80)

Positive and Negative Affectivity (10–50). Anxiety (20–80).

$P < 0.001$) and increase in negative affectivity ($F_{1,145} = 5.91$, $P = 0.016$) from pre- to post-intervention across the whole sample. However, there was no significant change in anxiety levels from pre- to post-intervention, indicating that the DA was not anxiety provoking. Planned contrast analyses revealed no significant differences between conditions at pre- or post-intervention, suggesting that the DA intervention lowered participants' mood regardless of condition.

Decision-making outcomes

Mean knowledge, satisfaction and decisional conflict scores across conditions are displayed in Table 4. In the knowledge test, the average score indicated good understanding of the DA. Planned contrast analyses did not show any significant differences between conditions on knowledge.

Results of mean satisfaction with decision revealed that participants were adequately satisfied with their decision. Planned contrast analyses showed that participants in the emotion-focused and information-focused conditions were more satisfied with their decision than those in the control condition. No significant differences between the emotion-focused and information-focused conditions were detected.

Planned contrast analyses showed that there were no significant differences between conditions on total decisional conflict (or any DCS Subscales). However, there were trends for participants in the emotion-focused condition to show greater levels of total decisional conflict compared with participants in the control and information-focused conditions. Participants in the emotion-focused condition also showed a greater tendency to feel that their decision was less in line with their values compared with participants in the control condition.

Preference-value consistency was assessed by comparing the multiple correlation coefficients between participants' values and their post-preferences for Depo-Provera[®] and Mirena[®] across conditions. As shown in Table 5, values accounted for less variance in preferences for both Depo-Provera[®] and Mirena[®] in the emotion-focused condition compared with the information-focused and control conditions, with values explaining a significant amount of variance only in the latter conditions. Thus, the promotion of affective processing reduced decision-value consistency.

Discussion

The aim of this study was to examine the effect focused condition displayed lower preference-value consistency and a tendency for greater decisional conflict compared with participants in the information-focused and control conditions. In addition, participants in the emotion-focused and information-focused conditions showed higher levels of satisfaction with decision than participants in the control

Table 4 Means on knowledge, satisfaction and decisional conflict

	Emotion Mean (SD)	Information Mean (SD)	Control Mean (SD)
Knowledge score	80.41 (13.84)	79.41 (14.06)	77.92 (13.99)
Satisfaction with decision (SWD)	3.65 (0.58) ^a	3.92 (0.63) ^b	2.95 (0.99) ^{a,b}
Decisional Conflict Scale (DCS) total	35.97 (14.51) ^{c,d}	29.04 (15.12) ^c	29.13 (13.78) ^d
Uncertainty subscale	47.45 (22.58)	38.24 (26.41)	38.72 (24.52)
Informed subscale	29.25 (15.32)	23.20 (13.05)	25.00 (17.02)
Values Clarity subscale	29.25 (19.92) ^e	25.49 (17.91)	20.83 (14.07) ^e
Support subscale	36.56 (21.64)	28.92 (19.46)	28.30 (17.84)
Effective decision subscale	36.99 (16.12)	29.29 (17.61)	31.90 (16.12)

Knowledge score calculated as percentage of items correct. Satisfaction with decision.¹⁻⁵ DCS scores range from 0 (no decisional conflict) to 100 (extreme decisional conflict); scores of 37.5 or less are associated with making a decision, and scores of 25 or less are associated with follow-through with decision.³¹

Paired letters indicate a significant difference between groups, controlling for the EER at $P < 0.017$.

Paired letters indicate a trend of $P = 0.02$ between groups, controlling for the EER at $P < 0.017$.

Table 5 Multiple correlation coefficients from regressing values on preferences

	Depo-Provera [®]		Mirena [®]	
	R^2	F	R^2	F
Emotion-focused	0.08	0.49	0.28	1.91
Information-focused	0.32	2.51*	0.44	4.14**
Control	0.28	1.92	0.39	3.15**

*Significant at the 0.05 level.

**Significant at the 0.01 level.

condition. Participants in the emotion- and information-focused conditions did not differ significantly in levels of knowledge compared with the control condition.

Preference-value consistency was lowest in the emotion-focused condition. Participants' values were not predictive of preferences for Depo-Provera[®] or Mirena[®], and participants were less likely to feel that their preference was in line with their values compared with the information-focused and control conditions. Participants in the emotion-focused condition also showed a tendency to have greater levels of decisional conflict compared with participants in the control condition. The reason for these results is unclear, yet they support the assertion of Bekker *et al.*¹¹ that an individual's affective reactions to the information in DAs may be a key component in their decision making. Consistent with the current study's results, they found that emotional expression was associated

with greater levels of decisional conflict immediately after using the DA and also at 1-month follow-up. However, at follow-up, they found that use of the DA overall resulted in lower levels of decisional conflict and led participants to reflect more on how the decision fit with their values.¹⁸ Bekker *et al.*¹¹ concluded that part of the effectiveness of DAs is the way in which they help individuals assimilate their affective judgments in their decision making. In the current study, we only assessed outcomes immediately post-decision-making so we are unable to comment on the impact of the emotion-focused DA in the longer term. It may be that both the emotion-focused and information-focused conditions need longer follow-up to show divergent results. Nonetheless, the results warn against encouraging a greater focus on emotional feelings, as this appears to lead to at least a short-term shift towards less consistency between values and decision making.

Alternatively, it may be that the explicit focus on affective reactions in the emotion-focused condition caused participants to disregard their preferences and values. Evidence suggests that people do not use affect as information if its relevance to the task is unclear,²⁷ such as when emotional feelings are attributed to a transient external source.²⁸ In the current study, participants in the emotion-focused condition may have attributed their feelings to the manipulation and considered these instructions

as irrelevant to their preferences. This may in turn explain why participants in the emotion-focused condition also showed a tendency to have greater levels of decisional conflict compared with participants in the control condition.

Attributing the emotions they were experiencing to the manipulation could have caused them to doubt their preferences and thereby compromise certainty of their choice. Thus overall, the results caution against an explicit focus on emotional feelings in DA practice until further investigation.

The finding that emotion-focused participants showed greater levels of decisional conflict yet also significantly greater levels of satisfaction with the decision is of note. This finding contradicts the notion that decisional conflict and decisional satisfaction are influenced by similar factors. Indeed both the information- and emotion-focused arms showed greater decisional satisfaction. It is possible that the instructional manipulation in both conditions enhanced the salience of making a decision with added consideration of facts or emotions, leading these participants to feel that they were being more mindful of their decision regardless of how certain or content they were with that decision. Thus, participants in the emotion-focused and information-focused conditions may have felt more satisfied with the decision-making process compared with those in the control condition, regardless of what they thought of their decision. Future research comparing decision-making outcomes from DA-supported decisions in which individuals naturally range from highly emotive to highly analytical may be helpful in clarifying this issue.

It has been suggested that affective and deliberative styles of processing may enhance the ability to acquire knowledge.^{29,30} However, in the current study, it was found that levels of knowledge in the emotion-focused and information-focused conditions were not significantly greater than the control condition. One important point of difference in the current study, however, is that affective and deliberative processing were not examined in isolation, but

rather in the context of a DA-supported decision. Thus, the finding may reflect the ability of a DA to enhance knowledge very effectively.

Strengths & limitations

The study was the first to the authors' knowledge to experimentally assess the role of affective and deliberative processing in DA effectiveness. The main strengths of the study were the use of a theory-driven intervention and a randomized experimental design. Through the application of dual-process theory, the study conducted was a theoretically driven investigation of the processes contributing to DA effectiveness. There are also several limitations. Firstly, the manipulation checks and mood assessments indicated that the interventions might not have been successful in promoting affective and deliberative processing. This may have been because the interventions were not powerful enough to shift participants' processing, which has also been observed in previous studies for the emotion-focused condition.^{12,20} It is also possible that the DAs induced robust deliberative processing across all conditions, as supported by the high self-reported focus on details/ facts across all conditions. However, the conditions showed some divergent outcomes suggesting that processing was altered in some way. Further research is needed to understand how processing was affected in the different conditions and how this impacts decision making. Secondly, the modifications to the emotion-focused DA introduced a confound, such that it cannot be determined whether the observed effects between groups were driven by differences between the standard and emotion-focused DA or the instructional manipulations. Finally, the generalizability of the findings is limited by the use of a female university student population and a hypothetical decision.

Future research

Further research is needed to investigate the effects of deliberative and affective processing on DA effectiveness in actual clinical decision-

making settings and with a larger, more diverse sample. More direct assessment of processing style, such as process-tracing methods (e.g. think-aloud protocol and eye tracking), may be useful to understand the effects of this type of intervention with greater clarity. It would also be helpful to consider alternative ways of investigating decision- or preference-value consistency (e.g. purpose-designed items to assess whether participants evaluated the information in accord with their values).

Conclusions

This study used a theory-driven intervention to investigate the effect of affective and deliberative processes in DA-supported decision making, with implications for the design and use of DAs. The results suggest that at least in the short term, the promotion of affective processing may hinder value-consistent decision making, while both affective and deliberative processing may enhance satisfaction in decision making. Pending further investigation on the long-term effects of promoting affective and deliberative processing, it is tentatively suggested that the effectiveness of DAs may be enhanced with respect to satisfaction with decision by incorporating a simple instruction to focus on the facts and details of the information.

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Conflicts of interest

None.

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