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Minority talks: The influence of descriptive social norms on fruit intake

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Previous research established that norms describing the behaviour of a majority (e.g. ‘many people consume too much alcohol’) can have ironic and unwanted effects on health behaviour. To date, no research has addressed the effects of *minority* descriptive norms (e.g. ‘only few people use sunscreen’), while such minority norms are frequently communicated to the public. The current studies investigate the effects of minority and majority norms on intended and actual fruit intake. University students received either minority or majority normative information describing fruit intake behaviour of a referent group. Identification strength with this referent group was measured (Study 1) or manipulated (Study 2). Results showed that, compared to majority norms, minority norms negatively affected fruit intake when participants strongly identify with the referent group. Moreover, absolute negative (minority norm) and positive (majority norm) effects of one-third portion of fruit were found compared to a no-norm condition. Since minority norms are often communicated with the intention of alarming people regarding their low engagement in health protective behaviour, the potential ironic effects of these minority norms should be taken into account when presenting such information to the public.

Keywords: social norms; normative influence; minority norms; referent group identification; fruit intake

Introduction

Descriptive norm information is information regarding the acceptable or typical way to behave within a certain group and is derived from the behaviour of other group members (Aronson, Wilson, & Akert, 2005). A substantial body of research has shown that descriptive norms constitute an important source of influence on behaviour (Asch, 1951; Sherif, 1936) including health behaviour (e.g. Larimer,

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Turner, Mallet, & Markman Geisner, 2004; Louis, Davies, Smith, & Terry, 2007; Nordrehaug Åstrøm & Rise, 2001; Wiium, Torsheim, & Wold, 2006). However, this influence is not always in the desired direction. For example, informing college students about heavy alcohol use on campus has been shown to actually increase their alcohol consumption (Perkins, Haines, & Rice, 2005). This is ironic and unwanted given that the provision of such information is likely rather intended to stimulate them *not* to engage in this unhealthy behaviour.

To date, most studies on descriptive norms and health behaviour have focused on, as we refer to them, *majority* norms. Such norms, like the one in the example above, describe the behaviour of a majority and hold the potential for ironic effects when the referenced behaviour is unhealthy. Less is known, however, about the influence on health behaviour of norms describing the behaviour of a minority – even though, in the practical context of health behaviours, people are frequently confronted with such minority norms. Observations of other people's behaviour will indicate, for example, that only few people perform such desired health behaviours as using sunscreen and consuming sufficient fruit (Centers for Disease Control and Prevention, 2009; Hall, Everett Jones, & Saraiya, 2009), forming a first source of encounters with minority norms. The fact that so few people adhere to recommended health behavioural guidelines is highly newsworthy and, as such, is often reported about in the media (e.g. '88% of children do not eat the recommended amounts of fruit and 92% don't eat enough vegetables', reported in the *Los Angeles Times*, 17 November 2010, 'too few Americans are getting the recommended [breast, cervical and colon cancer] screens or getting them regularly enough', reported in *US News & World Report*, 15 January 2009). Such media reports form a second source of encounters with minority norms. In response to such low engagement figures, public health campaigns are instigated to alert the population to the low frequency with which it performs various important health behaviours – thus constituting a third source of minority norm encounters. For example, the Dutch Nutrition Center ran a campaign focused on promoting fruit and vegetable consumption with the slogan '80% knows [how much fruit and vegetables should be consumed daily], but only 20% behaves accordingly' (Dutch Nutrition Center, 2010), and the American Environmental Working Group in one of their campaigns states that 'few people use enough sunscreen to benefit from the SPF protection promised on the label' (Environmental Working Group, 2010). Both these campaigns thus explicitly mention a minority norm in their slogan.

Given the frequency with which such minority norms are communicated to large audiences, it is important to know whether minority descriptive norm information about healthy behaviours poses the same dangers of unwanted, ironic effects (i.e. decreasing engagement in a healthy behaviour even further) as does majority descriptive norm information about unhealthy behaviours. The current set of studies explores the influence of providing minority norm information vs. majority norm information regarding others' fruit consumption on participants' fruit intake. Fruit consumption was chosen as the target behaviour because only few people consume sufficient fruit, a minority norm that is often featured in campaigns and media outlets (see above). Moreover, insufficient fruit consumption is an important health-risk factor: it is implied in increased risk for high blood pressure, cardiovascular and other chronic degenerative diseases and several types of cancer (Dutch Nutrition Center, 2010).

Minority norms

Majority norms are a powerful motivator because they refer to what most people do, thereby clarifying the typical behaviour in a certain situation. This provides people with information about 'social reality' (Festinger, 1954). Such norms also provide consensus information: the more people who behave in one way in a given situation, the more correct that behaviour is perceived to be (Thibaut & Kelley, 1959). In the case of minority norms, the social reality and consensus information arguments do not apply: there seems to be little sense in modelling an, as it were, a-typical or rare behaviour.

Nevertheless, the focus theory of normative conduct (Cialdini, Reno, & Kallgren, 1990) suggests that minority norms, too, may influence behaviour. This theory holds that norms will exert an influence over behaviour, particularly when the given norm is salient at the time of acting. Even when descriptive norm information refers to a minority, this information can still be salient when one acts and, through this salience, influence behaviour. We therefore suggest that a minority norm, too, can influence behaviour. This is corroborated by findings outside the arena of health behaviour, showing that a minority group can indeed also exert influence over behaviour (Aronson & O'Leary, 1982; Cialdini et al., 1990; Moscovici & Lage, 1969). Whether the magnitude of the effect of minority norms on health behaviour is similar to the influence of majority norms, or rather smaller, will be investigated in the current studies. One important aspect to consider is the role that identification processes may play in the effect that social norms have over behaviour.

Identification with the referent group

The influence of norms on behaviour substantially depends on the extent to which one identifies with the norm's referent group (Turner, 1991). Identity theory (Burke, 1980; Stryker, 1987) stipulates that one's self-concept consists of a number of identities reflecting different roles across environments and groups. Every social situation has its own set of appropriate behaviours and performing these behaviours validates one's identity and sense of belonging within that specific social group. Building upon these basic identity theory premises and upon social identity theory (e.g. Turner, 1999), the referent informational influence model (Terry & Hogg, 1996) holds that when identification with a certain group is strong, this group's behaviours will influence behaviour more than when identification is weak, which has also been empirically demonstrated (Johnston & White, 2003; Louis et al., 2001). Whether identification with the referent group is of equal importance when people are confronted with information about a minority remains subject to investigation. As minority norms do not directly indicate the typical behaviour within a broader referent group, but rather indicate a-typical or less common behaviour, identification with the referent group may have a less strong moderating effect than in the case of majority norms.

Present studies

The current studies explore the influence of minority vs. majority descriptive norm information on fruit intake intentions (Study 1) and actual fruit intake (Study 2). Expectations are that, compared to receiving majority norm information,

participants receiving minority norm information will exhibit lower intentions to consume sufficient fruit and lower actual fruit intake, but only when identification with the referent group is strong.

In addition to the novel focus on minority norm messages, these studies contribute to the existing literature by investigating the effect of explicitly providing participants with normative information instead of working with perceptions, as occurred in most health-related studies to date. As health campaigns often provide people with normative information in an explicit manner, it is highly relevant to investigate what its effects on behaviour are. Moreover, the current studies focus on the effects of descriptive norms on both health behavioural intentions (Study 1) and actual health behaviour (Study 2), allowing for a comparison of the effects of descriptive norms across intention and behaviour.

Study 1

In Study 1, university students received information indicating that either many (majority norm) or few (minority norm) university students eat sufficient fruit. We hypothesised that, compared to a majority norm, participants receiving minority norm information would report significantly lower fruit intake intentions. Moreover, this effect was expected only for participants strongly identifying with the referent group.

Method

Participants

Participants were 102 university students (17 men and 85 women) with a mean age of 22.5 years ($SD = 5.4$). They had, on average, eaten sufficient fruit on 3 days during the last week ($SD = 2.1$). All analyses were conducted separately for men and women, but no differences were found. Therefore, results are reported for all participants combined.

Procedure and materials

Participants were recruited in the university's psychology building to fill out a questionnaire. They were not reimbursed for their participation. The questionnaire started with two demographic items (gender and age), an item about the number of days on which participants had eaten sufficient fruit during the past week, and two items regarding identification rated on a 7-point scale (1 = not at all, 7 = very much): 'I identify with/feel a connection to Dutch university students'. One average identification measure was created (Cronbach's $\alpha = 0.79$). Most participants scored around the mean, attenuating the potential influence that truly weak and high identification scores may have on the effect of normative information on fruit intake intentions and indicating a nonlinear effect. Scores on this variable were therefore categorised (see, e.g. Becher, 2005, for an overview of categorisation in the case of nonlinear effects) as either low (below or equal to -1 SD, $n = 22$), moderate (between -1 SD and $+1$ SD, $n = 68$) or high (equal to or above $+1$ SD, $n = 12$).

Subsequently, participants read a short text: 'It is common knowledge that eating sufficient fruit (at least two portions per day) is important. However, we also know

that many people do not meet this criterion: most people eat insufficient fruit'. The norm manipulation was then introduced: 'Previous research has shown that Dutch university students...do show quite good fruit intake behavior: 73% of Dutch university students eat sufficient fruit' (majority norm) or '...also do not show very good fruit intake behaviour: only 27% of Dutch university students eat sufficient fruit' (minority norm).

Fruit intake intentions were then measured with four items answered on a 5-point scale (1 = completely disagree, 5 = completely agree): 'I want to/intend to/expect to/will eat sufficient fruit in the coming period of time'. One average intention measure was computed (Cronbach's $\alpha = 0.94$).

Results

Participants reported a moderately strong intention to eat more fruit in the coming period ($M = 3.72$, $SD = 0.87$) and identified with Dutch students to a moderate extent ($M = 3.68$, $SD = 0.80$). The three identification groups consisted of those scoring 3.88 or lower (low identification group; scores ≤ -1 SD), those scoring between 3.89 and 4.47 (moderate identification group; -1 SD < scores < $+1$ SD), and those scoring 4.48 and higher (high identification group; scores $\geq +1$ SD).

A MANOVA indicated that randomisation over the minority vs. majority norm information conditions was successful. Age, gender, fruit consumption and identification did not differ between conditions, $F_s(1, 100) < 2.15$, p 's > 0.140 .

An ANOVA showed a significant effect of minority vs. majority norms on intention, $F(1, 96) = 6.94$, $p = 0.010$. Participants who received majority norm information reported higher fruit intake intentions ($M = 3.89$, $SD = 0.97$) than participants receiving minority norm information ($M = 3.53$, $SD = 0.72$). This effect was qualified by a marginally significant interaction effect between norm condition and identification, $F(2, 96) = 2.39$, $p = 0.095$ (Figure 1). Norm information significantly influenced intentions when participants strongly identified with the referent group, $t(10) = 2.57$, $p = 0.028$) but not when identification was moderate ($t(59) = 0.83$, $p = 0.409$) or weak ($t(20) = 0.61$, $p = 0.546$). *Post hoc* pairwise comparisons (LSD) indicated that only the minority norm/high identification participants differed from all other participants, reporting significantly lower fruit intake intentions (mean differences > 0.749 , p 's < 0.030). All other participants' intentions did not differ significantly, mean differences < 0.626 , p 's > 0.165 (Table 1).

Discussion

Providing majority vs. minority normative information influenced intended fruit consumption such that a minority norm led to lower intentions to eat sufficient fruit in the coming period of time as compared to a majority norm. This effect was only present in participants who strongly identified with the referent group. Receiving minority norm information of a referent group with which one strongly identifies was thus especially detrimental to fruit intake intentions.

Study 1 did not include a control condition, meaning that no conclusions can be drawn regarding the magnitude of the relative effects of minority- and majority-norm information. Moreover, identification with the referent group was self-reported by participants, with most participants scoring around the mean.

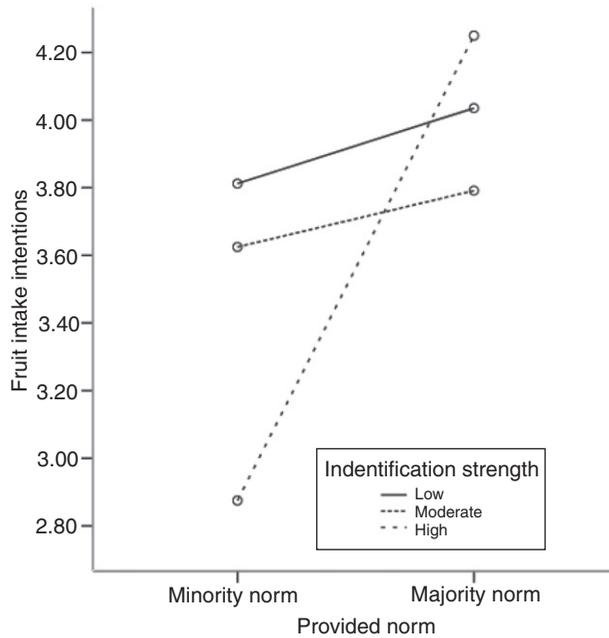


Figure 1. The interaction effect of majority vs. minority descriptive norm information and level of identification with the reference group on fruit intake intention.

Table 1. Mean fruit intake intentions (with standard deviations) by norm condition and identification strength.

| | | Identification strength | | |
|---------------|---------------|--------------------------|--------------------------|--------------------------|
| | | Low identification | Moderate identification | High identification |
| Provided norm | Minority norm | 3.81 ^a (0.61) | 3.63 ^a (0.62) | 2.88 ^b (0.88) |
| | Majority norm | 4.04 ^a (0.91) | 3.79 ^a (1.00) | 4.25 ^a (0.87) |

Note: Means with different superscripts differ significantly from each other at $p < 0.050$.

In addition, it was not measured whether participants believed the information they read. Therefore, the possibility cannot be precluded that the majority-norm information was more or less credible than the minority-norm information. Lastly, in Study 1, only intended fruit intake was investigated. Study 2 was designed to replicate and extend the findings from Study 1.

Study 2

Study 2 encompassed reported actual fruit intake over the course of 1 week as the dependent measure. Moreover, rather than using a self-report measure of participants' identification with the referent norm group, the extent to which participants

can identify with the referent group was experimentally manipulated so as to ensure sufficient variability. Additionally, a control condition was included.

To conceal the true purpose of the study from participants, a cover story was developed. Participants were informed that the study was designed to test the effects of keeping a diary on fruit consumption. All participants believed they were in an experimental condition compared to supposed control subjects who would not keep a diary. Due to this cover story, we expected an overall increase in fruit consumption across the conditions. Importantly, we expected that majority norm/high identification participants' fruit consumption would increase more than that of control participants, and that minority norm/high identification participants' fruit intake would decrease compared to control participants. We expected no differences between control and low identification participants.

Method

Participants

Assuming that a certain threshold level of ability or willingness to eat sufficient fruit must be present in order for participants to adapt fruit intake, only participants who reported eating sufficient fruit on at least 1 day during the previous week were included in the study. After removing participants who missed more than three diary instalments ($n=26$), 119 participants remained (22% men and 78% women). Participants had a mean age of 21.7 years ($SD=2.9$). All analyses were separately conducted for men and women, but no differences were found. Therefore, results are reported for all participants combined.

Procedure

University students wanting to eat more fruit were recruited for a diary study. They completed a baseline questionnaire, a 7-day fruit diary and an exit questionnaire. When participants signed up, they had to provide their email address. All parts of the study were administered online through a unique link sent every day to each participant's email address. On day 1, which was always the first Monday after participants signed up for the study, the baseline questionnaire was administered. On days 2 through 8, the fruit diary was administered. On day 9, participants received an exit questionnaire. In return for completion of all nine parts of the study, participants received course credit or 8 euros.

The experimental manipulation occurred in the baseline questionnaire and was repeated in each instalment of the fruit diary. Minority and majority normative information were manipulated similar to Study 1. High vs. low identification was manipulated by using either Dutch university students or the Dutch population as the referent group. A pilot study was conducted amongst 149 university students (21% males, M age = 21.7 years) to pre-test these two referent groups. A repeated-measures ANOVA showed that participants identified more with Dutch students ($M=3.7$ on a 5-point scale) than with the Dutch population ($M=3.2$ on a 5-point scale), $F(1,148)=34.16$, $p < 0.001$. The pilot study thus indicated that this manipulation indeed created a low and a high identification group.

The baseline questionnaire started with the following text: 'From previous research, we know that good eating habits are promoted by making people aware of

what they actually eat. Keeping a diary is a useful strategy to achieve this. This has also been shown in previous fruit diary studies'. This cover story was deemed necessary because we found in earlier work that simply providing normative information does not lead to differences between conditions. It seems that manipulating norms and identification to influence repetitive, multiple-day behaviour may be more complex than influencing intentions or one-trial behaviour (such as the decision to reuse a towel or not; Goldstein, Cialdini, & Griskevicius, 2008). Participants seem to need some more background information to be able to internalise the normative information, which is why a cover story was devised about becoming more aware of one's behaviour and the relevance of self-monitoring through keeping a diary.

After this text, the manipulation followed in the form of an informative statement which read '73% (vs. 27%) of Dutch students (vs. the Dutch population) eat at least two portions of fruit per day during the week they kept a fruit diary', resulting in a 2 (majority vs. minority descriptive norm) \times 2 (high vs. low identification referent group) between-subjects design. From previous research, we know that the referent group's behaviour has to be realistically attainable which is why we restricted the reported referent group's behaviour to 1 week.

A fifth group of participants only read the first text piece and did not receive a statement, constituting the control condition. Participants were randomly assigned to a condition.

Materials

Baseline fruit intake and fruit intake intentions. One item assessed fruit intake at baseline: 'How many portions of fruit do you typically eat per day?' Fruit intake intentions were measured with four items answered on a 5-point scale (1 = completely disagree, 5 = completely agree): 'In the coming research week, I want to/intend to/expect to/will eat sufficient portions of fruit'. One average intention measure was computed (Cronbach's $\alpha = 0.91$).

Fruit diary. Participants received a link to the fruit diary every day at 7.30 pm, which remained active until 11 am the following morning. The diary always started with a screen on which the descriptive norm information was repeated. Participants continued to a screen where they indicated whether they had consumed fruit that day (if not, the diary was automatically closed). They were then routed to a screen providing a list of 21 types of fruit and checked all types they consumed, providing the number of portions consumed. The next screen asked participants if they had eaten any other types of fruit (if they indicated no, the diary was terminated). They were then routed to a final screen where they provided the other types of fruit they consumed, including the number of portions.

Average fruit consumption was calculated by dividing the total number of consumed portions by the number of diaries completed. Change in fruit intake from baseline to the research week was calculated by subtracting the baseline consumption from this average consumption score.

Perceived effort and success. Perceived effort and success were measured in the exit questionnaire with one item each, 'This week, I tried harder than usual to eat

sufficient fruit' and 'This week, I ate sufficient fruit more often than usual', both rated on 5-point scales (1 = completely disagree, 5 = completely agree).

Identification with referent group. To check whether the high and low identification referent group manipulation was successful, participants rated the extent to which they identified with the referent group mentioned in their normative statement ('I identify with Dutch university students/the Dutch population'; answered on a 5-point scale, 1 = not at all, 5 = very strongly). This information was obtained in the exit questionnaire, and only in the experimental conditions.

Perception and credibility of normative information. Perception of the norm was probed in the exit questionnaire by asking participants 'In this study we told you what percentage of people previously participating in this research ate sufficient fruit. Did you find this percentage high or low?' (answered on a 5-point scale; 1 = very low, 5 = very high). Credibility of the normative statement was probed by the question 'Did you find this norm credible?' (answered on a 5-point scale; 1 = not at all, 5 = very much). This information was obtained only in the experimental conditions.

Results

Participants reported strong intentions to eat sufficient fruit in the coming week ($M = 4.27$, $SD = 0.82$). Moreover, they indicated having eaten an average of 1.36 ($SD = 0.57$) portions of fruit per day in the week prior to participation.

Randomisation and manipulation checks

A MANOVA including age, gender, fruit intake intention and average number of fruit portions consumed per day at baseline as the dependent variables and condition as the independent variable showed that condition did not have a significant effect on any of the variables (neither the multivariate effect nor any of the univariate effects reached significance, $F_s(4, 118) < 2.00$, $p_s > 0.120$), indicating that randomisation across the conditions was successful.¹

A *t*-test indicated that participants in the high identification conditions identified with their referent group more ($M = 3.98$, $SD = 0.93$) than participants in the low identification conditions ($M = 3.26$, $SD = 0.85$), $t(97) = 3.89$, $p < 0.001$, indicating successful manipulation of high vs. low identification. A second *t*-test indicated that the norm manipulation was also successful: participants in the minority norm conditions perceived the norm as lower ($M = 2.65$, $SD = 0.76$) than participants in the majority norm conditions ($M = 3.85$, $SD = 0.74$), $t(97) = 7.98$, $p < 0.001$. Participants rated the minority ($M = 3.53$, $SD = 1.06$) and majority ($M = 3.35$, $SD = 0.92$) norm as equally credible, $t(83) = -0.847$, $p = 0.399$.

Main analyses

An ANOVA with norm (majority vs. minority) and group (high identification vs. low identification) as independent variables and fruit intake change as

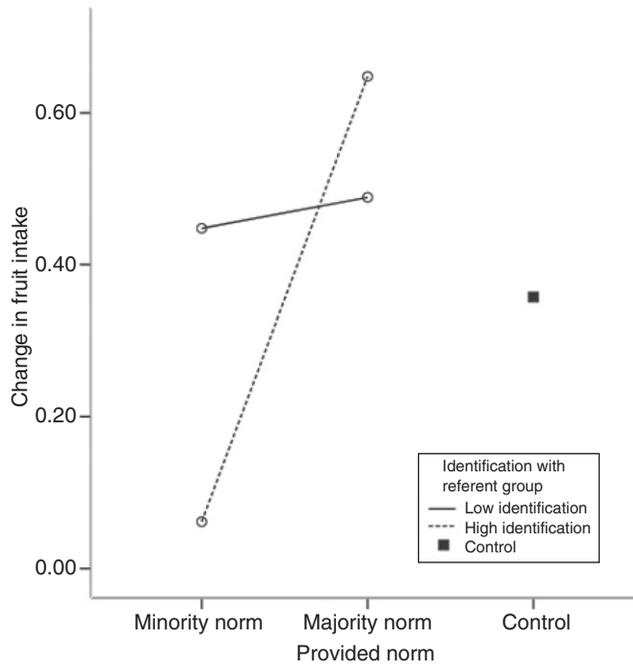


Figure 2. The interaction effect of majority vs. minority descriptive norm information and high vs. low identification group on change in fruit intake.

dependent variable indicated that there was a significant effect of normative information on fruit intake change, $F(1, 114) = 5.57$, $p = 0.020$ (Figure 2). This main effect was qualified by a significant interaction effect with identification, $F(1, 118) = 4.21$, $p = 0.042$. There was no main effect of identification, $F(1, 118) < 1$.

Post hoc pairwise comparisons (Table 2) indicated that, firstly, minority norm/high identification participants consumed significantly less fruit than participants in the other experimental conditions (mean differences > 0.38 , p 's < 0.040). Minority norm/high identification participants and majority norm/high identification participants did not significantly differ from participants in the control condition (mean differences < 0.30 , p 's > 0.130). Participants in the other conditions did not significantly differ from each other. Although not statistically significant, however, fruit intake increased with 0.3 of a portion fruit per day in majority norm/high identification participants – and decreased with the same 0.3 of a portion per day in minority norm/high identification participants – as compared to the control condition, which are substantial and relevant changes in terms of portions of fruit. The relevance of these results was corroborated by the obtained effect sizes: Cohen's d was 0.45 (majority norm) and 0.47 (minority norm), respectively, indicating medium-size effects.

Discussion

Study 2 demonstrated that compared to majority norm/high identification participants as well as compared to both low identification conditions, participants in the

Table 2. Average fruit portions consumed per day at baseline, average fruit portions consumed during the diary week and fruit intake change from baseline to diary week per condition (with standard deviations).

| | | Identification | | | | | | | | |
|---------------|---------------|--------------------|-------|--------------------------|---------------------|-------|--------------------------|---------|-------|--------------------------|
| | | Low identification | | | High identification | | | Control | | |
| | | Base | Diary | Change | Base | Diary | Change | Base | Diary | Change |
| Provided norm | Minority norm | 1.26 | 1.71 | 0.45 ^a (0.67) | 1.57 | 1.63 | 0.06 ^b (0.67) | | | |
| | Majority norm | 1.33 | 1.82 | 0.49 ^a (0.64) | 1.25 | 1.90 | 0.65 ^a (0.67) | | | |
| | Control | | | | | | | 1.45 | 1.81 | 0.36 ^a (0.61) |

Note: Means with different superscripts significantly differ from each other at $p < 0.040$.

minority norm, high identification condition ate significantly less fruit in the research week. While not statistically significant, results also indicated substantial changes in fruit intake compared to the control condition: fruit intake increased one-third portions of fruit per day in majority norm/high identification participants, and decreased with one-third portions of fruit per day in minority norm/high identification participants, as compared to control condition participants. When identification with the norm group is low, there are no differences in fruit intake compared to control participants.

General discussion

Results indicate that descriptive norms referring to either a minority or majority group can influence intended and actual fruit intake. Two main findings must be considered. First, participants receiving minority norm information regarding a high identification group decreased their fruit intake compared to participants receiving majority norm information regarding the same high identification group, as well as compared to participants receiving information regarding a low identification group. Second, these studies suggest that, compared to a no-norm control condition, descriptive norm information may have absolute effects on fruit intake, albeit that the observed changes – though meaningful in terms of practical relevance – were not statistically significant (most likely due to a lack of power). While positive effects on health-protective behaviours are well-established for majority descriptive norms, the potentially negative effects of minority norms are novel. Given the fact that minority norms are frequently quoted in the media and even used in public health campaigns, these potential negative effects of minority norms have important implications: stating that only few people perform a desirable behaviour may negatively influence the likelihood that others engage in that desirable behaviour.

While it is well-established in the literature that a negating statement (i.e. ‘many people are *not* performing this desirable behaviour’; Cialdini, 2003) has an undesirable influence on behaviour, this can be understood from a social proof perspective. Such negating information still refers to a majority and influences behaviour by providing consensus information. The current findings point to a

different mechanism for the influence of minority norms on behaviour: as the behaviour is only performed by a minority, the social proof argument no longer applies. While it may be the case that a minority norm activates a thinking process in which people conclude that 'if only few people do it, most people must therefore not be doing it', thus effectively functioning as a kind of indirect negative social proof, it may also be the case that minority norm information becomes especially focal and exerts its influence through salience rather than social proof.

Support for this latter mechanism stems from our current finding that strong identification with the referent group seems more influential with minority norms than with majority norms (see also Moscovici & Lage, 1976). The effect of a majority norm was similar (and positive) regardless of the extent to which participants identified with the norm group, while the effect of the minority norm strongly depended on identification strength: there seems to be a trend for the effect to reverse from positive when identification is weak to negative when identification is strong. Indeed, research on identity-based motivation indicates that the behaviour of a minority with which one identifies can constitute a strong (negative) motivator for (health) behaviour (Oyserman, Fryberg, & Yoder, 2007).

Limitations and directions for future research

In Study 2, fruit intake increased in all participants, even in participants in the control condition, which can be attributed to the cover story about the importance of awareness of fruit intake and the beneficial effects of keeping a diary on this awareness. While the (relative) differences between the experimental conditions in fruit intake change were largely as expected, the actual (absolute) changes in terms of numbers of fruit portions may have been different had this cover story not been used. One could even expect actual decreases in fruit intake, especially in the minority norm/high identification condition. This points to the importance of further research into the workings of minority norm information on health behaviour that circumvent the limitations of the current studies.

The normative manipulation in Study 2 occurred in the baseline questionnaire. We cannot preclude that the majority and minority norms had different effects on social desirable reporting. For example, it may be the case that participants confronted with the information that a majority of participants ate sufficient fruit in the research week felt more pressure to report high fruit consumption than those who received a minority norm. Moreover, the normative information was repeated daily during the 7-day fruit diary of Study 2. Whether the same results would be obtained after only one single encounter with normative information remains subject to investigation. This question is especially interesting considering that fruit consumption – and eating behaviour in general – does not consist of a one-time 'yes or no' decision, which may be relatively easy to influence with a one-time normative message, but rather of a continually ongoing decision-making process. Such a continuous process, in which multiple decision-making moments are encountered every day, may be less easily influenced by a single normative message. Future studies should investigate the longevity of the effect of normative messages on behaviour.

In the current studies, participants who receive majority norm information, but do not (or only moderately) identify with the referent group show results comparable

to those who strongly identify with the referent group. This deviates somewhat from earlier studies showing that identification strength strongly influences the effects of majority descriptive norms on behaviour. The current results indicate that, under certain conditions, people may always relate to majority norm information to some extent – even if they do not identify with the referent group. When minority norm information is provided, however, a strong identification with the referent group is especially crucial. When there is no such identification, the minority norm does not exert influence. Future research should further investigate this novel finding.

Implications

The current findings suggest that minority descriptive norm information can negatively influence health behaviour when identification with the referent group is strong. This study focused on fruit intake behaviour in students. Whether the results generalise to other types of health behaviour, and to other target groups where minority norm information is communicated, remains subject to investigation. The results may hold important implications for the way in which we communicate about (non)engagement in health practices to the public. While normative information seems, at face value, very factual, conveying minority norm information can evidently pose ironic (and unwanted) dangers for the health behaviour of those receiving the information. Of course, if research indicates that – for example – very few people engage in cancer screening, this is a finding that must be communicated to the larger public. The solution therefore does not lie in simply not providing such information, but rather in framing such information carefully (e.g. by including information on the dangers of not engaging in the recommended behaviour and the benefits perceived by those who do engage in it). The current results show that, when communicating these ‘normative facts’ to the public, we must remain attentive to the potential unintentional effects on people’s behaviour.

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Note

1. A second MANOVA was conducted with the same dependent variables, but additionally including credibility of the provided norm. Condition was again the independent variable, but the control condition was excluded from this randomisation check as no normative information was provided in that condition. Results again indicated successful randomisation, with none of the effects reaching significance, all $F_s(3, 81) < 2.10$, all p 's > 0.110 .

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