Social Comparisons with Media Images are Cognitively Inefficient Even for Women Who Say They Feel Pressure from the Media.

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Abstract

The present study investigated whether social comparisons with media images are cognitively efficient (demanding minimal mental effort) or cognitively effortful processes, in a sample of female undergraduate students (*N* = 151) who reported feeling pressure from the media regarding their appearance. Two groups were shown 12 images of thin and attractive female models. One group was asked to memorize a complex 8-digit number during exposure to the images (Cognitively Busy condition), while the other memorized a much simpler number (Free View condition). A third group (Control condition) viewed images without people. Participants in the Free View condition demonstrated significantly increased negative mood and lowered appearance satisfaction from before to after exposure, while participants in the Cognitively Busy and Control conditions did not. We argue that these results suggest social comparisons with media images are at least somewhat cognitively effortful even among women who say they feel pressure from the media.

Keywords: Social comparison; Media images; Body image; Efficiency; Automaticity; Cognitive busyness

Introduction

Meta-analyses demonstrate that in-lab exposure to images of thin and physically attractive women from media images (e.g., magazines, websites) causes small decreases in appearance satisfaction and increases in negative mood (e.g., anger) among university-aged women (Groesz, Levine, & Murnen, 2002; Want, 2009), although these effects may be moderated by pre-existing concerns about appearance (Ferguson, 2013; Hausenblas et al., 2013). Research has consistently identified upward social comparisons (Festinger, 1954) that viewers make between their own appearance and these extremely thin and attractive images as the mechanism of these short-term detrimental effects (Tiggemann & Polivy, 2010; Tiggemann, Polivy, & Hargreaves, 2009). However, much remains to be learned about the way in which these comparisons operate.

One question that has yet to be conclusively answered is how cognitively efficient social comparisons with media images are. A cognitively efficient mental process is one that requires little time or mental effort to carry out (Bargh, 1994), as for example, when a skilled reader merely glances at a word and the meaning of it becomes apparent. The cognitive efficiency of a mental process is theoretically distinct from other aspects of its automaticity, such as whether the process is spontaneously (versus deliberately) initiated, whether it can be interrupted once initiated, and whether we are aware of its operation (for a discussion, see Bargh, 1994). Taking their lead from Gilbert, Giesler, and Morris (1995), many researchers (e.g., Dalley, Buunk, & Umit, 2009; Want, 2009) have speculated that social comparisons with media images are highly cognitively efficient processes. However, data directly addressing this question are currently sparse.

There are two accepted indicators that a mental process is highly cognitive efficient (Payne, 2012): (1) if it operates when little time can be devoted to it, and; (2) if it operates while we are engaged in another, simultaneous task (i.e., while we are cognitively busy). Thus, if social comparisons with

media images are highly cognitively efficient, then such images should cause detrimental effects on viewers even if presented only briefly, or while viewers are distracted with another task. To date, studies using these two different approaches have found mixed results.

On the one hand, Brown and Dittmar (2005) found that exposure to a series of media images for just 150ms per image increased weight-related anxiety for women who scored above the mean on the Internalization subscale of the Sociocultural Attitude Towards Appearance Questionnaire (SATAQ: Heinberg, Thompson, & Stormer, 1995). This result suggests that participants had made social comparisons to the images despite seeing them only briefly, and thus that the comparisons were somewhat cognitive efficient. On the other hand, in two experiments, Want, Botres, Vahedi, and Middleton (2015) found no detrimental effects of a series of media images on young women when they were made cognitively busy (by having to memorize a complex number) during exposure. Want et al.'s results suggest that social comparisons with media images are relatively inefficient, in that occupying participants' cognitive resources with a simultaneous task seemed to prevent them.

What might explain the discrepancy in the results of these two studies? We assume that social comparisons become efficient the same way other mental processes do, through practice (Mussweiler, Rüter, & Epstude, 2004). The more routine or habitual a social comparison, the fewer cognitive resources are likely needed to make it (just as the resources needed for reading decline with practice). One possibility is that Brown and Dittmar's (2005) participants were simply more practiced at making comparisons with media images than Want et al.'s (2015). As noted, the participants who were affected by brief presentations of media images in Brown and Dittmar (2005) scored above the mean of the Internalization subscale of the original SATAQ. The items on this subscale all ask respondents whether they compare with, or wish to look like, women in media images (TV, movies, music videos, magazines, models). As such, this scale taps into two potentially separate issues: (1) the desire to have a thin body

type, and; (2) the extent to which participants are routinely influenced by, and compare with, media images. Having scored above the mean on this subscale, Brown and Dittmar's participants may have all been individuals who routinely and habitually compared themselves with media images. Want et al. (2015) did not exclusively study women who reported habitually making such comparisons, leaving open the possibility that social comparisons with media images are cognitively efficient only among this highly-practiced subset of the population.

Thus, in the present study, we directly replicated the procedures and analyses from Want et al. (2015) but added a pre-screen to recruit a sample of women who habitually compared themselves with media images. Our pre-screening measure was the Pressures: Media subscale of the updated SATAQ-4 (Schaefer et al., 2015), which includes four items assessing the extent to which participants feel pressure from the media to change their weight, shape, and appearance. We reasoned that the major component of feeling pressure from the media is tied up with seeing and comparing oneself to the appearance standards presented therein, and thus this subscale provides the purest measure of the extent to which participants habitually compare specifically with media images. Other SATAQ-4 subscales, such as the Internalization: Thin/Low Body Fat subscale, measure the general desire for a thin body type. As recognized by the Tripartite Model (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), such a desire can stem from the influence of the media, peers, or the family, and so this subscale is less likely to reflect the extent to which comparisons specifically with media images have habitually been made.

We measured participants' satisfaction with their appearance and their levels of negative mood before and after exposure to a series of images. Participants were randomly assigned to a Cognitively Busy condition (exposure to media images while memorizing a complex 8-digit number), a Free View condition (exposure to media images while memorizing a simple 8-digit number), or a Control condition (exposure to control images). If social comparisons with media images are highly cognitively efficient in

this group of young women, the images should cause decreases in appearance satisfaction and increases in negative mood in both the Cognitively Busy and Free View conditions (Hypothesis 1). However, if such comparisons are relatively cognitively inefficient, such effects should only occur in the Free View condition; participants in the Cognitively Busy condition should be relatively unaffected (Hypothesis 2). The Control condition was included to assess whether the hypothesized detrimental effects in the Free View condition were caused by viewing media images specifically (rather than resulting from simply asking participants to reflect on their mood and appearance satisfaction twice, with a pause in-between).

Method

Participants

Our sample consisted of 151 female undergraduates from introductory psychology classes at Ryerson University who participated in exchange for course credit. The number of participants in each condition, and their demographic characteristics are shown in Table 1.

Table 1

Characteristics of participants

	Free View condition (*n* = 49)		Cognitively Busy condition (*n* = 53)		Control condition (*n* = 49)	
Characteristic	*M (SD)*	95% CI	*M (SD)*	95% CI	*M (SD)*	95% CI
Age in years	19.02 (2.09)	[18.42, 19.62]	19.08 (2.07)	[18.50, 19.65]	19.04 (1.63)	[18.57, 19.51]
BMI	23.95 (4.24)	[22.71, 25.20]	22.84 (4.20)	[21.68, 24.00]	23.90 (3.82)	[22.80, 25.01]
RSES	16.31 (5.23)	[14.80, 17.81]	16.38 (5.21)	[14.94, 17.81]	16.90 (5.19)	[15.41, 18.39]
SATAQ-4 Pressures: Media subscale	4.49 (0.51)	[4.34, 4.64]	4.55 (0.49)	[4.42, 4.69]	4.48 (0.51)	[4.33, 4.63]
Ethnic background	25 White/Caucasian		21 White/Caucasian		23 White/Caucasian	
	11 Asian		13 Asian		7 Asian	
	6 Black/African-American		4 Black/African-American		2 Black/African-American	
	4 Middle-Eastern		3 Middle-Eastern		5 Middle-Eastern	
	1 South Asian		9 South Asian		9 South Asian	
	0 Hispanic/Latina		1 Hispanic/Latina		1 Hispanic/Latina	
	2 Multi-Ethnic		2 Multi-Ethnic		2 Multi-Ethnic	

Note. BMI = Body mass index; RSES = Rosenberg Self-Esteem Scale (min-max: 0-30); SATAQ-4 = Sociocultural Attitudes Towards Appearance Questionnaire (Pressures: Media subscale, min-max: 1-5).

Materials and Procedure

At the beginning of the semester, all introductory psychology students at Ryerson University may complete a pre-screen that determines their eligibility for individual studies. Eligible participants were tested singly in a dedicated testing room. After consent, the experimenter left the room and all measures were completed via a computer. The steps in the procedure are outlined, in order, below.

Pre-screen. The Pressures: Media subscale of the SATAQ-4 asks participants to rate their agreement on a 5-point scale (1 = *Definitely disagree* to 5 = *Definitely agree*) with four statements, such as "I feel pressure from the media to improve my appearance". Only those who scored a mean of 3.75 or higher on the Pressures: Media subscale were eligible. A score of 3.75 on the Pressures: Media subscale is slightly above the mean score for non-eating-disturbed North American women (M = 3.70; Schaefer et al., 2015) meaning that our participants all said they felt above-average pressure from the media regarding their appearance.

Cover story. To reduce demand characteristics, we described the study in all materials as addressing the question "Does mood affect perception and short-term memory?" Participants were told that their mood would be measured and they would memorize either a complex or simple number while they looked at various images. Mood was described as a potential moderator of memory for the number, to give a plausible reason for presenting the mood and appearance satisfaction measures.

Visual Analogue Scale (VAS) items (pre-test). Participants first completed 10 computerized Visual Analogue Scale (VAS; Heinberg & Thompson, 1995) items, scored from 1 to 100. These VASs were identical to those used by Want et al. (2015) and we used them to ensure comparability with Want et al.'s experiments. Three VASs asked participants to rate their mood (with end-points marked as *Happy-Unhappy*, *Confident-Insecure*, and *Angry-Calm*). These items were averaged (with the Angry-Calm item reversed) to create a negative mood score, with higher scores indicating greater negative mood.

Cronbach's α for these three items was .75 at pre-test. Four VASs asked participants to rate their satisfaction with their facial appearance, weight, and overall appearance (with end-points marked from *Very dissatisfied* to *Very satisfied*), and to rate how attractive they felt (with end-points marked *Very unattractive* to *Very attractive*). These four items were averaged to create an appearance evaluation score, where higher scores indicate greater satisfaction with appearance. Cronbach's α for these four items was .85 at pre-test. There were also three VASs that asked participants about their levels of relaxation (*Worried-Relaxed*), alertness (*Alert-Drowsy*), and energy (*Sluggish-Energetic*), which were included to support the cover story and which are not analyzed here.

Cognitive busyness manipulation. Participants then had 30 seconds to memorize an 8-digit number, either 59368724 in the Cognitively Busy Condition, or 11111111 in the Free View and Control Conditions. Participants were told they would be asked to report this number after exposure to a series of images.

Exposure to images. Participants in the Cognitively Busy and Free View conditions viewed 12 images of female models who were young, thin, attractive, and White/Caucasian, for 10 seconds per image. Five of the images showed only the models' faces, while the other seven were full body shots. In the Control conditions, the images consisted of 12 black-and-white or colored rectangles that were the backgrounds to the media images from the other conditions with the models digitally erased. All these images were used in Study 2 of Want et al. (2015).

Memory check. Immediately after image exposure, participants reported the number they had been trying to remember.

VAS items (post-test). After the memory check, participants completed the same 10 VASs as they had completed before image exposure. At post-test, the Cronbach's α of the mood measure was .81, and of the appearance evaluation measure was .90.

Self-esteem and demographics. Participants then completed the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) to check for differences in global self-esteem between participants in the conditions. The RSES has 10 items measuring participants' agreement, on a 4-point scale (0 = *Strongly disagree* to 3 = *Strongly agree*), with statements such as "On the whole, I am satisfied with myself". Cronbach's α for the RSES was =.88. Next, participants self-reported age, height, weight, and ethnic background. Participants' body mass index (BMI) was calculated (as kg/m^2) from their height and weight.

Sociocultural Attitudes to Appearance Questionnaire (SATAQ-4). At the end of the study, participants completed the SATAQ-4 again to double-check that their Pressures: Media subscale scores were above 3.75. Data from an additional 12 participants whose subscale scores were below this cut-off were collected but excluded from our sample. Cronbach's α for the Pressures: Media subscale was .86.

Results

Anonymized data from this study are publically available through the Open Science Framework at https://osf.io/gndyr/

Whole Sample Analyses

Between-group analyses of demographics. Participants in the three conditions did not differ significantly in terms of age, $F(2, 148) = 0.01$, $p = .990$, $\eta_p^2 < .01$, BMI, $F(2, 145) = 1.20$, $p = .304$, $\eta_p^2 = .02$, RSES scores, $F(2, 148) = 0.19$, $p = .827$, $\eta_p^2 < .01$, or SATAQ-4 subscale scores, $F(2, 148) = 0.31$, $p = .734$, $\eta_p^2 < .01$.

Memory check. The 8-digit number was corrected recalled by 43 of the 53 participants in the Cognitively Busy Condition. The most frequent error (seven of 10 participants) was a transposition of just two digits.

Mood. A 3 (Condition: Free View vs. Cognitively Busy vs. Control) x 2 (Time: Pre-test vs. Post-test) mixed-design ANOVA on participants' negative mood scores revealed a significant interaction between Time and Condition, $F(2, 148) = 8.37$, $p < .001$, $\eta_p^2 = .10$, a significant main effect of Condition, $F(2, 148) = 4.20$, $p = .017$, $\eta_p^2 = .05$, but no significant main effect of Time, $F(1, 148) = 0.08$, $p = .773$, $\eta_p^2 < .01$. The significant interaction between Time and Condition was followed up with paired-samples *t*-tests, one for each condition. The results of these analyses are presented in Table 2. Participants' mood at post-test was significantly more negative than at pre-test only in the Free View condition. Thus, the mood results supported Hypothesis 2.

Appearance evaluations. A 3 (Condition: Free View vs. Cognitively Busy vs. Control) x 2 (Time: Pre-test vs. Post-test) mixed-design ANOVA on participants' appearance evaluations revealed a significant interaction between Time and Condition, $F(2, 148) = 5.74$, $p = .004$, $\eta_p^2 = .07$, but no significant main effect of Condition, $F(2, 148) = 0.85$, $p = .429$, $\eta_p^2 = .01$, nor of Time, $F(1, 148) = 1.46$, $p = .230$, $\eta_p^2 = .01$. Paired-samples *t*-tests (see Table 2), revealed that participants' appearance evaluations were significantly lower at post-test than they had been at pre-test only in the Free View condition. Thus, the appearance satisfaction results also supported Hypothesis 2. To examine the possibility that social comparisons with media images are cognitively efficient only in specific subsets of our sample, we also conducted two sets of exploratory subsample analyses.

Table 2

Results of paired-samples t-tests for each condition, in the whole sample and in specific sub-groups.

Sample and Condition	Variable (VAS)	*n*	Pre-test *M (SD)*	Post-test *M (SD)*	*t*	*p*	95% CI of the pre- to post-test difference	Cohen's *d* of the pre- to post-test difference
Whole sample								
Free View	Mood	49	38.13 (16.24)	43.34 (19.04)	2.61	**.012***	[1.20, 9.23]	0.29
	Appearance Evaluation	49	42.80 (17.25)	38.44 (18.52)	3.58	**.001***	[-6.80, -1.91]	0.24
Cognitively Busy	Mood	53	36.15 (17.68)	35.90 (16.04)	0.19	.853	[-2.96, 2.45]	0.02
	Appearance Evaluation	53	44.92 (18.44)	44.66 (19.13)	0.26	.793	[-2.28, 1.75]	0.01
Control	Mood	49	33.12 (18.48)	28.96 (17.56)	2.91	**.006***	[-7.03, -1.28]	0.23
	Appearance Evaluation	49	43.48 (16.72)	45.37 (19.25)	1.14	.261	[-1.45, 5.23]	0.10
Participants with SATAQ-4 Pressures: Media scores > 4.42								
Free View	Mood	27	38.31 (19.58)	44.05 (21.69)	2.19	.038*	[0.36, 11.13]	0.27
	Appearance Evaluation	27	41.06 (20.93)	35.08 (23.17)	3.28	**.003***	[-9.73, -2.24]	0.26
Cognitively Busy	Mood	31	34.63 (17.17)	36.17 (14.06)	0.84	.406	[-2.19, 5.27]	0.10
	Appearance Evaluation	31	39.02 (18.27)	38.40 (18.58)	0.39	.699	[-3.82, 2.60]	0.03
Control	Mood	24	33.15 (20.80)	29.04 (19.17)	2.72	.012*	[-7.23, -0.99]	0.20
	Appearance Evaluation	24	39.70 (16.47)	39.56 (19.07)	0.09	.932	[-3.40, 3.13]	0.01
White/Caucasian participants								
Free View	Mood	25	39.63 (15.58)	45.25 (19.48)	1.91	.069	[-0.46, 11.72]	0.31
	Appearance Evaluation	25	45.73 (16.11)	41.00 (16.67)	2.72	.012*	[-8.32, -1.14]	0.28
Cognitively Busy	Mood	21	34.68 (18.75)	35.56 (17.27)	0.42	.680	[-3.48, 5.22]	0.05
	Appearance Evaluation	21	50.37 (18.38)	48.60 (22.18)	0.93	.362	[-5.74, 2.19]	0.08
Control	Mood	23	31.36 (18.45)	28.62 (18.94)	1.09	.286	[-7.94, 2.46]	0.14
	Appearance Evaluation	23	41.24 (17.91)	43.21 (19.41)	1.29	.212	[-1.21, 5.14]	0.10

Note. VAS = Visual Analogue Scale; SATAQ-4 = Sociocultural Attitudes Towards Appearance Questionnaire. Values marked with an asterisk are statistically significant; values in bold remain significant after Holm-Bonferroni correction.

Exploratory Subsample Analyses: SATAQ-4 Pressures: Media subscale > 4.42

Schaefer et al. (2015) found that the mean score on the SATAQ-4 Pressures: Media subscale for women with eating disturbances was 4.42. We repeated the mood and appearance evaluations analyses using this higher value as a cut-off for the inclusion of participants' data.

Mood. A 3 (Condition) x 2 (Time) mixed-design ANOVA revealed the significant interaction between Time and Condition, $F(2, 79) = 5.32$, $p = .007$, $\eta_p^2 = .12$, but no significant main effect of Condition, $F(2, 79) = 2.04$, $p = .137$, $\eta_p^2 = .05$, nor of Time, $F(1, 79) = 0.78$, $p = .380$, $\eta_p^2 = .01$. Paired-samples *t*-tests (see Table 2), revealed that participants' mood was significantly more negative at post-test than at pre-test only in the Free View condition.

Appearance evaluations. A 3 (Condition) x 2 (Time) mixed-design ANOVA revealed a significant interaction between Time and Condition, $F(2, 79) = 3.73$, $p = .028$, $\eta_p^2 = .09$, no significant main effect of Condition, $F(2, 79) = 0.04$, $p = .958$, $\eta_p^2 < .01$, and a significant main effect of Time, $F(1, 79) = 5.38$, $p = .023$, $\eta_p^2 = .06$. Paired-samples *t*-tests (see Table 2), revealed that participants' appearance evaluations were significantly lower at post-test than they had been at pre-test only in the Free View condition.

Exploratory Subsample Analyses: White/Caucasian Participants

The media images we used were all of White/Caucasian models. Thus, for the final analyses we used data only from participants who self-identified as White/Caucasian.

Mood. A 3 (Condition) x 2 (Time) mixed-design ANOVA revealed that the interaction between Time and Condition, $F(2, 66) = 2.73$, $p = .073$, $\eta_p^2 = .08$, was not significant. There was a significant main effect of Condition, $F(2, 66) = 3.25$, $p = .045$, $\eta_p^2 = .09$. The main effect of Time was not significant, $F(1, 66) = 0.70$, $p = .407$, $\eta_p^2 = .01$. Post-hoc comparisons for the main effect of Condition (collapsed across

Time) revealed that participants in the Free View Condition reported more negative mood than participants in the Control condition, $p = .041$. No other post-hoc comparisons were significant.

Appearance evaluations. A 3 (Condition) x 2 (Time) mixed-design ANOVA revealed a significant interaction between Time and Condition, $F(2, 66) = 3.93$, $p = .024$, $\eta_p^2 = .11$, no significant main effect of Condition, $F(2, 66) = 1.03$, $p = .363$, $\eta_p^2 = .03$, nor of Time, $F(1, 66) = 2.29$, $p = .135$, $\eta_p^2 = .03$. Paired-samples *t*-tests (see Table 2), revealed that participants' appearance evaluations were significantly lower at post-test than they had been at pre-test only in the Free View condition.

Discussion

The present results accord with the findings of Want et al. (2015). Participants who were made cognitively busy during exposure to a dozen media images were unaffected by them. In contrast, participants who were not cognitively busy demonstrated the detrimental effects typically shown by young woman who make upward social comparisons with media images, reporting reduced appearance satisfaction and increased negative mood. In a control condition, in which participants' experience most closely resembled that of the non-cognitively-busy participants (remembering a simple number, but without exposure to the media images), participants' negative mood actually decreased, meaning that the increase in negative mood in the non-cognitively-busy participants was unlikely to have resulted from simply asking participants to reflect on their mood twice, with a pause in-between. We take these results as evidence that social comparisons with media images are relatively cognitively inefficient, even among those who say they feel pressure from such images. Non-cognitively-busy participants are detrimentally affected by media images, but when participants are cognitively busy, their thoughts preoccupied with another task, they show no evidence of having made social comparisons with media images.

The same pattern of responses was observed in specific subsamples of participants (although, given the reduced sample size, not always the same pattern of statistical significance). Among those most theoretically likely to compare to the images – those with SATAQ-4 Pressures: Media subscale scores comparable to women with eating disturbance (i.e., above 4.42; Schaefer et al., 2015) and women whose self-identified ethnicity matched that of the models – viewing media images while not cognitively busy incurred detrimental effects, but viewing them while cognitively busy seemed to produce little to no effect.

The present results thus contrast with Brown and Dittmar (2005). One possibility is that the presentation of media images for 150ms each, which Brown and Dittmar (2005, p. 1097) state meant "respondents were able to perceive the images", did not preclude effortful cognitive elaboration among their participants, particularly as several such images were presented sequentially. We note that the one attempt so far to present media images subliminally, thus completely precluding effortful cognitive elaboration, showed no effects of the imagery (Jansen & de Vries, 2002). Nevertheless, the discrepancy between results using rapid presentation of media images (Brown & Dittmar, 2005) and cognitive busyness manipulations (present results, and Want et al., 2015) warrants further attention.

Limitations

The manipulation of cognitive busyness we used – asking participants to memorize a complex 8-digit number – is close to the upper limit of working memory (Miller, 1956). It may thus impose a fairly high level of cognitive busyness. So, while the present study rules out the strong claim that social comparisons with media images are highly cognitively efficient or "effortless" (Dalley et al., 2009; Want, 2009), additional research using varied manipulations of cognitive busyness is needed to determine the exact degree of effort they require. It is clear that such comparisons require more than the minimal

resources left-over by the act of rehearsing an 8-digit number, but how much more is still to be determined.

A second limitation is the lack of randomization of the order of questions in this study, meaning that responses to earlier items (e.g., VAS mood items) may have influenced responses to later ones (e.g., VAS appearance satisfaction items). A third limitation of the present study is the lack of a direct measure of participants' self-reported social comparisons with the images during exposure (as was taken, for example, in Tiggemann & Polivy, 2010). Given this, the present data are consistent with alternative mechanisms for the detrimental effect of media images. For instance, observing thin-ideal media images may directly activate pre-existing negative self-schemata regarding appearance (see Brown & Dittmar, 2005) in young women who are not cognitively busy. Examining whether measures of self-reported social comparison and/or self-schema activation mediate the effects of media images would provide data that directly speak to this issue. That said, the present emphasis on social comparisons as the mechanism of effect dovetails with several studies showing that measures of self-reported social comparison do predict increases in negative mood and decreases in appearance evaluations following exposure to media images (e.g., Tiggemann & Polivy, 2010; Tiggemann et al., 2009). Importantly, given the presence of detrimental effects in the non-cognitively-busy participants and the lack of such effects in the cognitively busy participants, the present results suggest that, whatever the mechanism behind media effects on mood and appearance satisfaction, it is relatively cognitively inefficient.

Finally, this study examined social comparisons specifically with media images. Despite the present results, comparisons with other types of targets may be cognitively efficient. In a diary study (Patrick, Neighbors, & Knee, 2004), young women reported that appearance-related comparisons arose more frequently from everyday social interactions with friends, acquaintances, and strangers than from contact with media images. Given the frequency of such comparisons – especially comparisons with

friends, who Mussweiler and Rüter (2003) suggest are routine standards against which young people compare – they may be more likely to be cognitively efficient. This may explain the contrast between the present study and Gilbert et al. (1995), who found evidence of cognitive efficiency in comparisons with peers using the same cognitive busyness manipulation as used here. Gilbert et al. (1995) proposed a two-stage model of comparisons, in which initial comparisons are made efficiently, with a subsequent cognitively-effortful correction mechanism adjusting for the appropriateness of the comparison. We have no doubt that both comparison and correction processes can occur in social comparison. However, we depart from Gilbert et al. in that, based on the present results and those in Want et al. (2015), we believe that both the initial comparison and the correction processes may be cognitively effortful, at least when it comes to social comparisons with media images.

Conclusions

In the present study, we focused specifically on the issue of the cognitive efficiency of social comparisons with media images. We did so partly because previous research has generated much speculation, but not much data, regarding this issue. In addition, given the prevalence of media images in many societies, whether or not comparisons with them are cognitively efficient has important implications. If social comparisons with media images are rapid and minimally demanding of mental effort, then virtually every image we encounter on a daily basis, whether we are idly flicking through a magazine or walking past a billboard while thinking about something else, could potentially affect us. Cognitive efficiency would also make combatting the detrimental effects of social comparisons with such images difficult in that the effects would be produced without apparent mental effort. Alternatively, if – as is suggested by the present research – such comparisons with media images are not efficient, then only those images to which we devote our at least some time and attention will impact us. This provides encouragement to programs designed to ameliorate the effects of media images by changing the mental

effort people direct or devote to them (see also suggestions in Jansen & de Vries, 2002). Thus, if we can generalize the present results, they may be somewhat reassuring.

However, we urge some caution here. Even if social comparisons with everyday media images require time and attention, it may be that in the real world, such images are able to effectively commandeer that attention. Everyday forms of cognitive busyness (e.g., thinking about a shopping list, or one's plans for the day) may be more likely to be interrupted by thoughts of comparison following exposure to media images, as compared to being asked to memorize a complex number for an experiment. We are currently investigating this possibility. Given the high cognitive load imposed in this study, additional research varying participants' level, and type, of cognitive busyness is needed to clarify the real-world conditions under which we can expect media images to affect viewers.

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