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ARTICLE

Do the ‘Valentine’s Day Blues’ Exist? A Legacy Report on a Purported Psychological Phenomenon

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HIGHLIGHTS

New research reveals that the ‘Valentine’s Day Blues’ is not an urban myth but a real form of situational depression. It can affect people of different ages or gender who do not receive gifts, although men seemingly rebound faster than women.

ABSTRACT

The ‘Valentine’s Day Blues’ is an enduring concept rooted in pop psychology that has unfortunately received little empirical attention. On this point, it is commonly assumed that the increasing commodification of romance plus the social trappings of Valentine’s Day can elicit stress similar to that evoked by traditional holidays. This view might predict that women’s greater experience of ‘mattering’ and greater tendencies toward depression and rumination should place women at a greater risk of ‘Valentine’s Day Blues’ than men. Accordingly, when no Valentine’s Day gift is received such distress likely lasts longer in women than in men in addition to being stronger in general. These hypotheses were tested based on the data of 2,070 participants in a 2004 consumer sentiment survey who completed a 34-item online questionnaire within four weeks following Valentine’s Day. This questionnaire addressed (a) anxiety, (b) depression, (c) rumination, and (d) social anxiety as derived from existing instruments. Rasch scaling analyses found that men and women’s generalized depression (i.e., a combination of the four aforementioned item types) was greater for those not receiving a gift relative to that expressed by those who did receive a Valentine’s Day gift. However, while men rebounded after two weeks, women’s greater depression continued after three weeks. Of greatest clinical concern are 30-to-40-year olds, whereas those least affected were respondents over 40 years of age.

KEYWORDS

Holiday depression, invented syndromes, pop psychology, Rasch scaling, stress reactions

INTRODUCTION

Popular (pop) psychology is an umbrella term for psychological ideologies, therapies, or other techniques that gain popularity through mass or social media and thus are deemed credible by the general population. An adverse trend in this context is the rise of health scares via ‘invented disorders and syndromes.’ Along with criticisms (e.g., Allsopp et al., 2019) levied at mainstream psychology and psychiatry for ill-defined diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-

5, American Psychiatric Association, 2015), the penchant for pop psychologists, activist scientists and clinicians, or other social influencers to propose new, or expand on existing, biomedical conditions, disorders, or syndromes has promoted a culture of ‘medicalization’ (Frances, 2013; Lack & Rousseau, 2020), i.e., an increase in ‘mentally ill’ individuals or the pathologizing of ‘normal’ behaviors. This can cause an influx of new patients who are exposed to unnecessary or even counterproductive medications or therapeutics (for discussions, see Bradford, 2010; Frances, 2013; Kirschner, 2013; Pickersgill, 2014; Roy et al., 2019).



One potential example of an invented syndrome is the phenomenon known colloquially as the 'Valentine's Day Blues.' The authors became intimately aware of this reputed affliction during research projects with different online dating services (e.g., Houran & Lange, 2004, 2010; Houran et al., 2004, 2005; Lange et al., 2004b, 2005). Part of that prior work supported product development and marketing initiatives for these websites. This allowed us to conduct focus groups and consumer sentiment surveys with individuals seeking romantic relationships. Interestingly, there was a consistent though anecdotal pattern to the type of feedback that single (i.e., unpartnered) adults shared during the Valentine's Day season. The following narrative is highly representative of the emotional state described by many such individuals:

I didn't have a valentine this past Valentine's Day—as usual. I've never had a valentine or been someone's valentine. I felt nothing. I felt numb. I felt full from eating too much chocolate. I cried when I got home. Valentine's Day . . . the one day set aside in the entire year where lovers affirm to each other in front of the world that they love and cherish and adore one another. I wanted this desperately. (Lily, a 43-year-old female member of an online dating site, personal communication, 2004)

This raises the question of whether poignant and disquieting experiences like this are typical of most contemporary singles or if select cases are being dramatized to create what essentially amounts to an urban myth.

The popular view argues that the commercial and societal norms surrounding St. Valentine's Day in Westernized societies have a detrimental impact on the psychological well-being of adult singles not involved in romantic relationships and/or those who do not receive tokens of love on this holiday (see e.g., DB&MH, n.d.; Hoffman & Davis, 2014; Patrick, 2022). Pressure to conform to these norms might have credence as evidenced by recent statistics on Valentine-related festivities. For example, Americans are estimated to spend \$23.9 billion for associated merchandise in 2022 (National Retail Federation & Prosper Insights and Analytics, 2022). Trend analyses show that consumers purchase approximately 1 billion greeting cards each year (McLaughlin, 1997) excluding packaged valentines for classroom exchanges by children (Greeting Card Association, 2019), 58 million pounds of chocolate (George, 2022), and 250 million roses (Society for American Florists, n.d.).

Zayas et al. (2017) demonstrated the importance of Valentine's Day on perception and expectation in a large, diverse US sample. Their findings indicated that as Valentine's Day neared, evaluations of roses and chocolates (but

not a comparison object) were evaluated more positively. Further consistent with societal depictions of Valentine's Day as romantic, another study using sentiment analysis—i.e., a technique that extracts opinions and feelings through the analysis of text—found that tweets about Valentine's Day mostly focused on emotions and material aspects of the celebration versus sexual elements (Sansone et al., 2021). But what happens when the flowers, candy, and cards are not forthcoming and there is no romantic partner in the picture to provide them?

Although there is little academic research specifically relating to Valentine's Day, some studies on mental health during holiday periods are available. For example, one review documented increases in dysphoric moods following holidays (Friedberg, 1990), and Sobel et al. (1998) similarly found a significant increase in emergency contacts at a rural mental health clinic coinciding with holidays. Increases in deliberate (but non-fatal) self-harming behavior at a London hospital on Valentine's Day did not reach statistical significance in one study (Culham et al., 1993), but Davenport and Birtle (1990) reported that the rates of parasuicide among adolescents on this holiday were significantly increased. Finally, Baier (1988) described 'holiday blues syndrome' as a situational stress reaction related to social demands, unmet expectations, and biological stressors such as lack of sleep.

Accordingly, her proposed interventions involved reducing the specific stressors activated by the holidays and promoting and mobilizing the support and coping mechanisms already in operation for an individual. These suggestions echo Goin (2002), who discussed how the 'holiday blues' have great potential for being associated with anniversary reactions. Unfortunately, the sociocultural milieu surrounding certain holidays can make it quite difficult for individuals like Lily in the earlier quote to effectively enact Baier's (1988) proposals. As we review next, Valentine's Day certainly seems to be a prime event given its strong psychological and societal reinforcements.

SOCIALIZATION AND VALENTINE'S DAY EXPECTATIONS

St. Valentine's Day as it is currently practiced is a modern, commercial holiday with vague origins (Schmidt, 1993), although many sources suggest that it has roots in the pagan culture of ancient Rome combined with later Christian and secular modifications (for overviews, see e.g., *Encyclopaedia Britannica*, 2021; History.com, 2022; Nelson, 2020). In particular, February marked the beginning of spring and a time of purification for ancient Romans. This involved celebrations of the fertility festival, *Lupercalia*, commencing February 15th. Young women practiced the ritual of plac-

ing their names in an urn from which bachelors would select the year's companion. Often these pairings resulted in marriage. Later, in A.D. 498, Pope Gelasius declared February 14th as St. Valentine's Day, and the Roman lottery system—frowned upon as an un-Christian practice—became outlawed.

The problem is that there were at least three different saints who went by the name Valentine or Valentinus, each of whom have his own martyrdom story. One legend contends that Valentine was a priest who was martyred February 14th in 270 ad for secretly marrying young couples, in direct defiance of Emperor Claudius II, who believed marriage interfered with their military service. Then there is also Saint Valentine of Terni, a bishop also put to death by Claudius II, who the day reportedly commemorates. Another potential explanation is that there was a martyr by the name of Valentine who, while imprisoned, fell in love with a young girl—possibly his jailor's daughter—who visited him during his confinement. Before his death, it is alleged he wrote her a letter signed "From your Valentine," a popular expression still used by many in cards and other expressions of love (Saint Leo University, 2018, para. 3–5).

However, a news story from CaribbeanNationalWeekly.com (2021, para. 6–19) reported that Valentine's Day evidently did not come to be celebrated as a day of romance until about the 14th century. During the Middle Ages, it was commonly believed in France and England that February 14 was the beginning of birds' mating season, adding to the idea that Valentine's Day should be a day for romance. The English poet Geoffrey Chaucer was the first to record St. Valentine's Day as a day of romantic celebration in his 1375 poem "Parliament of Fowles," writing, "For this was sent on Seynt Valentynes day / When every fool cometh there to choose his mate." In Great Britain, Valentine's Day began to be popularly celebrated around the 17th century. The tradition quickly spread over the years globally, including the U.S. and the Caribbean region.

The idea of valentine's cards and related gifts became culturally solidified over time. Valentine greetings were popular as far back as the Middle Ages, though written valentines did not begin to appear until after 1400. The oldest known valentine greeting still in existence was a poem written in 1415 by Charles, Duke of Orleans, to his wife while he was imprisoned in the Tower of London. Several years later, it is believed King Henry V hired a writer named John Lydgate to compose a valentine note to his first wife, Catherine of Valois. By the middle of the 18th century, it was common for friends and lovers of all social classes to exchange small tokens of affection or handwritten notes. Americans probably began exchanging hand-made valentines in the early 1700s.

Soon, printed cards began replacing written letters

due to improvements in printing technology. Ready-made cards were an easy way for people to express their emotions in a time when direct expression of one's feelings was discouraged. In the 1840s, Esther A. Howland of Worcester, Massachusetts, began selling the first mass-produced valentines in America. Known as the "Mother of the Valentine," she made elaborate creations with real lace, ribbons, and colorful pictures. The enduring popularity of this tradition makes Valentine's Day the second largest card-sending holiday (National Retail Federation & Prosper Insights and Analytics, 2022).

Various other trappings of love and romance also continue to be universally synonymous with Valentine's Day, but the psychological pressures of romantic relationships themselves are significant stressors irrespective of any commercial efforts to promote this day. Illustratively, Joyner and Udry (2000, p. 371) cited evidence that adolescents sometimes become romantically involved in order to elevate their social status, express their maturity, individuate from their parents, or deny homosexual tendencies. That review also suggested that females' greater vulnerability to romantic involvement explains a large part of the emerging gender difference in depression during adolescence. These findings are consistent with other research indicating that females and feminine individuals regardless of biological sex are significantly more likely than males and less feminine individuals to say that Valentine's Day is important to them (Ogletree, 1993). Moreover, it was found that they reported giving and receiving more valentines, as well as were more likely to have purposely worn the color 'red' for Valentine's Day.

Compounding these types of individual motivations and expectations are social influences. In Western culture no holiday experience is complete without shopping, and some research indicates that the gift-giving occasions start earlier every year (Mortelmans & Damen, 2001). Recently, the rise in US consumer activity has been accompanied by pressure to keep up with increasingly high status and high dollar acquisition (Twitchell, 2002), and Valentine's Day is no exception. In fact, with its ritual of gift-giving to symbolize the importance and worth of a love relationship, the pressure could be greater than on most other holidays as evidenced by some recent consumer surveys (see, e.g., National Retail Federation & Prosper Insights and Analytics, 2022).

For instance, 38% of men contemplate terminating a relationship rather than face the task of choosing a 'really good' gift for their partners (Lund, 2004). Rugimbana et al. (2003) further noted that individual motivations for gift-giving on Valentine's Day can be based on a confluence of obligation, self-interest, and altruism, and that these motivations have deep manifestations in the perceived social

power relationship between the genders. Faced with prospect of a gift-less Valentine's Day, 20% of women in the US acted on their own and ordered flowers for themselves in 2003 (Ipsos-Insight, 2003).

Boden and Williams (2002) discussed the commodification of romance and romantic relationships in their critique of Colin Campbell's (1987) seminal contribution to consumer sociology. They theorized that the act of 'buying romance' alters society's connection with genuine emotion and the reality of how individuals experience the relationship itself. When people are focused on acquiring 'just the right gift to send just the right message,' they become distracted from what is happening on a more direct interpersonal or intrapersonal level. At the same time, our own unique expressions of emotion are supplanted by mass-produced physical representations of our feelings, marketed to us as the definitively appropriate means of demonstrating our love for another.

Boden and Williams further argued how the female experience necessitates consumption on a vigorous scale in order to meet the exacting demands of our cultural images of beauty, considered a requirement in romantic relationships. Ironically, this consumption feeds into the development of women into "consumable objects" themselves, to be acquired by a man. Indeed, Illouz (1997) believes romance has fallen to the increased social pressures around accumulation of wealth and status and is now as much a capitalist activity as a genuine expression of emotion. Whether similar trends extend to homosexual relationships is not clear (see, e.g., Newman & Nelson, 1996).

But much of the marketing around romance involves fantasy and false promises, and consumers are constantly faced with the shortcomings of reality as compared to these illusions. According to Boden and Williams (2002), disappointment is not necessarily a bad thing in this context as it drives home the sometimes sad truths about life and love. Whether such disappointments are accompanied by—or develop into—depression has not been investigated in the literature. However, the relationship between feeling that one matters to others and levels of depression has been studied by Taylor and Turner (2001). They concluded that women experience higher levels of 'mattering' to others than men, and that such mattering correlates negatively with depression. Conversely, it would appear that not-mattering—as is implied by not receiving Valentine's Day gifts—should lead to greater depression in women than in men.

The preceding is consistent with Nolen-Hoeksema and Jackson's (2001) study on gender differences in rumination, which can be seen as the expression of low levels of depression (Lange et al., 2002). Women expressed feeling less control over negative events in their lives than men

did, and they tended to engage in rumination as an alternative to taking direct action, perhaps as the result of socialization to remain femininely passive. Because women are still expected to play a recipient's role in the Valentine's Day ritual, they might be more likely to resort to 'brooding,' i.e., a passive comparison of one's current situation with some unachieved conduct—rather than problem-solving behavior. Such brooding is related to higher concurrent depression but lower depression over time (Treyner et al., 2003).

The Present Report

Based on the preceding review, we hypothesized that the 'Valentine's Day Blues' is a real phenomenon that might extend beyond depressive feelings to include other forms of situational distress such as anxiety, social anxiety, and rumination. In addition to diminishing over time after Valentine's Day, we also anticipate different intensities in reactions by age and gender. Specifically, it seems likely that Valentine's Day is less important for older people than for younger ones. Further, given women's greater incidence of depression and rumination, a main effect of gender is expected. Finally, we expect to replicate the earlier findings by Lange et al. (2002) indicating that men and women show qualitative differences in their expressions of depression, resulting in different hierarchies of symptom perception.

Our data derived from a 2004 consumer sentiment survey, which was part of a larger product development research project for the online dating industry. The analysis of 'legacy' (or heritage) data is admittedly not ideal and an obvious limitation, but our approach is not without precedent or rationale. Retrospective studies and case-control designs are standard within biomedical research (Talari & Goyal, 2020), and such data is especially useful to (a) buttress a sparse literature, and (b) serve as published norms to compare and contextualize future findings (Griffin & DAR-TG, 2015; Pasquetto et al., 2017). To be sure, comparative research will be needed to explore some published hints that attitudes toward Valentine's Day are undergoing cultural shifts (see, e.g., Dare, 2019). Moreover, testing our hypotheses with current data collection would undoubtedly be tainted by the concurrent prevalence of negative psychological effects from social and travel restrictions in response to the ongoing COVID-19 pandemic (Hossain et al., 2020; Tang et al., 2020; Tintori et al., 2020). Market research ostensibly corroborates this view, as Valentine's Day spending during the pandemic has notably softened (e.g., Tighe, 2022). Therefore, we argue that these reasons collectively justify the publication of our legacy data.

This study relied heavily on Rasch (1960/1980) scaling,

because this statistical approach is suited to address qualitative and quantitative issues within the same basic framework. The Methods section provides an overview of the relevant aspects to Rasch scaling and interested readers are referred to Bond and Fox (2001) and Lange (2017) for additional details. Finally, data collection was conducted online, as this provides a powerful method to investigate psychological constructs efficiently using large samples of individuals other than self-selected samples of university students who take introductory psychology courses (Gosling et al., 2004; Naglieri et al., 2004; Skita & Sargis, 2006). Of course, online psychological testing does not automatically overcome the self-selection problem of participants. However, Rasch scaling provides a partial solution to this confound by determining the extent to which questionnaire measurements are distorted by response biases across subgroups of participants (see, e.g., Lange, 2017).

METHODS

Participants

A convenience sample of 2,070 respondents participated at the Queendom.com website where this study was identified as a special research project that was approved by the Ethics Committee at Integrated Knowledge Systems. Moreover, a news release via an online dating site announced the study and solicited volunteers for a study on the "emotions, thoughts, and behaviors they experienced this past Valentine's Day." Respondents received no compensation for their participation. The respondents completed a 'Valentine's Day Blues Test' on average about two weeks ($M = 14.9$ days, $SD = 5.21$) after Valentine's Day ($range = 7$ to 25 days).

The sample comprised 394 men, 1,033 women, and 643 individuals who did not specify their gender. The ages of 1,462 respondents were known (608 unknown), yielding a mean of 22.3 years ($SD = 8.23$, $range = 18$ to 65 years). The relationship status of 567 respondents was unknown, but about half (49.4%, $n = 1022$) identified themselves as single and looking for a relationship, and about a quarter (23.2%, $n = 481$) identified themselves as single, but not looking. Unfortunately, most of these 1,503 singles ($n = 789$, or 52.5%) are under 20 years of age and the ages of 648 of the 714 remaining singles (or 90.7%) are unknown. Accordingly, it will not be possible to compare the effects of looking vs. not looking for a relationship by age.

Measures

'Valentine's Day Blues' Test. As is shown in Table 1, a 34-item, study-specific measure was developed to assess several factors potentially related to 'emotional/

psychological' problems arising before, around, and after major holidays, namely depression, anxiety, social anxiety, rumination, and unrealistic expectations. Specifically, (a) depression, anxiety, and social anxiety items were derived from two different public domain assessments described below (DASS-21 & CES-D), (b) the rumination scale was adapted from the work of Nolen-Hoeksema (2003), (c) a 16-item depression subscale was taken from the CES-D questionnaire (Radloff, 1977), (d) eight anxiety and three social anxiety items were based on the anxiety scale of the DASS-21 (Lovibond & Lovibond, 1995), and (e) seven items were created to address rumination. The number of items totaled 50 due to additional questions about demographic variables and the respondent's relationship status [i.e., "in a relationship" (married, engaged, living together, or living apart) versus "not in a relationship" (actively vs. not actively looking for a romantic partner)].

The Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) measures the severity and frequency of depressive symptomatology during the previous week. It is best utilized as a screening, rather than diagnostic tool, as it has not been validated in terms of accuracy of diagnosing clinically significant depression. It has been employed among both the general population and among specific clinical samples, including alcohol and drug abusers, the elderly, and cancer patients. It is useful for the purposes of the Valentine's Blues study due to the brief time period that the questions refer to because it is sensitive to changes as time passes after Valentine's Day. The test has a coefficient alpha (Spearman-Brown, split-halves) of at least .85 across studies.

The Anxiety scale from the Depression, Anxiety and Stress Scale—21 Items (DASS-21) (Lovibond & Lovibond, 1995) is a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect.

The stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset / agitated, irritable / over-reactive, and impatient. Scores for depression, anxiety, and stress are calculated by summing the scores for the relevant items. Antony et al. (1998) validated the DASS-21 by comparing scores on the different scales of this test (depression, stress, and anxiety) of various diagnostic groups. Groups with panic disorder scored significantly higher on the anxiety scale than normal volunteers and groups with

depression. Cronbach alpha for the DASS-21 anxiety subscale was .87.

Rating Scale Analysis

We analyzed the items in Table 1 using the Rasch rating scale model (Andrich, 1978). This model assumes that respondents r with trait levels R_r encounter rating scale questions q indicative of trait levels Q_q with internal category boundaries (or 'steps') B_g . Then, these respondents will select category b with probability $P_{r,q,b}$ subject to:

$$\ln\left(\frac{P_{r,q,b}}{P_{r,q,b-1}}\right) = R_r - Q_q - B_b \quad (1)$$

In the following, the quantities R_r and Q_q will also be referred to as the respondents' and items' locations, respectively. Note that all parameters are expressed in a common metric on the latent Rasch dimension. Given the log-odds in the left-hand side of Equation 1, the units of this Rasch dimension are called *Logits*.

Item Fit. The various model parameters and their standard error of measurement (SE) will be estimated using the *Winsteps* (Linacre, 2003a) and *Facets* (Linacre, 2003b) software. In addition to indices of reliability, this software also computes questions' mean-square deviation of the Rasch model, called their *Outfit*. The optimal value of this statistic is 1.0, but *Outfit* values ranging from 0.6 to 1.4 are generally acceptable (Bond & Fox, 2001). Items with $Outfit_q > 1.4$ are said to be 'noisy' as such values result from response patterns with greater variability than is implied by Equation 1. Noisy items form a greater threat to the Rasch model than do 'muted' items ($Outfit_q < 0.6$), i.e., items receiving responses that are too predictable (e.g., due to item redundancy). Since noise may reflect lack of unidimensionality, multidimensional models will be fitted using *Conquest* (Wu et al., 1998). This software provides competitive model tests, as well as estimates of factors' direct (i.e., attenuation-corrected) correlation.

Item Shifts. The *Facets* software optionally provides statistical tests to determine whether items' relative locations differ across subgroups of respondents *regardless* of these groups' average response levels. Identifying such "shifts" is important because this means that questions have a group-specific semantics (for discussions, see Lange et al., 2000, 2001). Conversely, the absence of item shifts indicates that scaling results generalize across subgroups. In addition, large shifts (e.g., greater than 0.5 *Logits*) impede measurement as this biases the estimates of respon-

dents' trait levels (Wright & Douglas, 1975). This research will address item shifts as related to the respondents' demographics.

RESULTS

Preliminaries

The 34 items in Table 1 were scaled using the *Winsteps* software. As is indicated under the heading 'Item fit,' all but three items show acceptable fit to a unidimensional Rasch model (i.e., *Outfit* < 1.4). All items are positively correlated with the latent Rasch variable ($M = 0.57$), and the overall Rasch reliability of respondents' measures is 0.92 (Cronbach alpha = 0.94). The preceding indicates that (almost all) items form an actual hierarchy, in which items with higher locations consistently receive lower ratings than do items at lower locations.

Item Hierarchy

As an aid in interpreting the Rasch dimension, the items in Table 1 are shown sorted according to their 'locations' (or *Logit* positions). That is, items with the lowest endorsement rates (high Q_q) are listed first and items with the highest endorsement rates (low Q_q) are listed last. It can be seen that almost all rumination items tend to be endorsed before any of the other items—i.e., such items define the lowest form of depression. Indicators of low levels of depression (e.g., "feelings of being depressed, lack of enjoyment, trouble sleeping") occur next, followed by more severe signs such as "feeling like a failure, crying spells, and lack of appetite." Finally, the highest levels of depression are characterized by signs of anxiety like "trembling, feeling close to panic, and breathing difficulties." Interestingly, signs of social anxiety (i.e., "feeling lonely, feelings of being disliked, and others being unfriendly") occur across the entire hierarchy.

Dimensionality

As a dimensionality-check, the Depression, Social Anxiety, Anxiety, and Rumination items as identified in Table 1 were entered as separate factors in a four-dimensional Rasch model using *Conquest*.¹ Indicative of multidimensionality, the four-factor model provides significantly better fit ($\chi^2_{12} = 837.19, p < .001$) than does the one-dimensional version consisting of all 34 items.

Table 2 shows the reliability of the four subsets of items, as well as their Pearson correlations (above diagonal) and their direct (i.e., unattenuated) correlations (below diagonal). It can be seen that all but one direct cor-

TABLE 1. Summary of Scaling Analyses

Item	Type ^a		Item fit			DIF Analyses					χ^2_4
			Location ^c	Outfit ^d	Item - Total r	Age	Gender ^{e,f} 19 or younger	20 to 29	30 to 39	40 or older	
27	A	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness)	1.46	0.91	0.54	-0.01	1.35	1.75	2.07	1.41	9.50
23	A	I felt I was close to panic.	1.24	0.77	0.59	0.09	1.22	1.20	1.50	0.65	5.98
21	A	I felt scared without any good reason.	1.04	0.88	0.59	0.00	1.08	0.99	1.15	0.41	6.50
25	A	I experienced trembling (e.g., in the hands).	1.01	0.95	0.55	0.01	0.80	1.58	1.66	0.82	23.15
26	A	I was aware of dryness of my mouth.	0.98	1.12	0.49	0.35	0.92	1.17	1.21	0.73	2.23
15	SA	People were unfriendly.	0.90	0.95	0.52	0.09	0.91	1.01	0.97	0.41	6.73
22	A	I was aware of the action of my heart in the absence of physical exertion	0.89	1.32	0.46	0.13	0.75	1.08	1.47	0.19	15.77
2	D	I did not feel like eating	0.69	1.06	0.50	-0.17	0.67	0.66	0.92	0.41	1.48
10	D	I felt fearful.	0.56	0.91	0.57	0.17	0.75	0.28	0.30	0.57	14.45
24	A	I was worried about situations in which I might panic and make a fool of myself.	0.51	0.99	0.55	0.26	0.33	0.81	1.24	0.65	20.65
17	D	I had crying spells.	0.49	0.96	0.58	-1.28	0.48	0.48	0.26	0.65	1.54
9	D	I thought my life had been a failure.	0.38	0.80	0.66	0.29	0.43	0.40	0.20	0.19	3.91
31	R	I am decisive ^b	0.28	2.72	0.24	-0.22	0.34	0.36	0.32	-0.14	1.36
13	D	I talked less than usual.	0.11	0.93	0.54	0.21	0.14	0.07	-0.01	-0.01	0.93
19	SA	I felt that people dislike me.	0.03	0.80	0.65	0.02	-0.08	0.40	0.41	0.19	13.49
20	A	I could not get going	0.00	0.75	0.65	0.11	0.10	-0.04	-0.53	-0.15	11.22
11	D	My sleep was restless.	-0.02	0.99	0.54	0.06	0.10	-0.05	-0.44	-0.47	9.29
1	D	I was bothered by things that usually don't bother me.	-0.11	0.81	0.59	-0.15	-0.04	-0.13	-0.32	-0.28	3.42
7	D	I felt that everything I did was an effort.	-0.17	1.38	0.41	0.22	-0.05	-0.30	-0.44	-0.08	6.19
3	D	I felt that I could not shake off the blues even with help from my family or friends.	-0.21	0.84	0.66	-0.11	-0.18	-0.13	-0.49	-0.28	2.14
16	D	I enjoyed life.	-0.31	0.75	0.65	0.13	-0.27	-0.28	-0.51	-0.15	0.46
12	D	I was happy.	-0.36	0.72	0.65	0.08	-0.32	-0.48	-0.76	-0.08	5.96
4	D	I felt that I was just as good as other people.	-0.37	1.26	0.51	-0.17	-0.52	-0.19	0.22	0.19	15.74
8	D	I felt hopeful about the future.	-0.43	1.21	0.48	-0.08	-0.42	-0.41	-0.76	-0.15	3.23
5	D	I had trouble keeping my mind on what I was doing.	-0.51	0.96	0.55	0.00	-0.54	-0.47	-0.16	-0.60	4.70
6	D	I felt depressed.	-0.60	0.70	0.71	0.09	-0.55	-0.62	-0.87	-0.28	2.50
34	R	No matter what I do, I can't get my mind off my problems.	-0.62	1.00	0.67	0.12	-0.68	-0.56	-0.48	-0.66	1.24
18	D	I felt sad.	-0.64	0.65	0.71	-0.11	-0.61	-0.72	-0.87	-0.28	2.91
29	R	I tend to focus on upsetting situations and events happening in my life.	-0.73	1.16	0.61	-0.01	-0.71	-0.87	-0.74	-0.69	2.09
33	R	I think a lot about why I do the things I do.	-0.96	1.59	0.52	0.08	-0.98	-1.17	-0.82	-0.76	7.10
32	R	I spend time alone wondering why I feel the way I do.	-0.97	1.34	0.62	-0.04	-1.02	-1.01	-0.77	-0.44	4.71
14	SA	I felt lonely.	-1.08	0.86	0.66	0.25	-1.00	-1.24	-1.45	-0.60	6.64
30	R	I can think about a problem for hours, and still not feel that the issue is resolved in my head	-1.15	1.26	0.60	-0.17	-1.17	-1.22	-1.09	-0.94	2.21
28	R	A loved one snaps at you. You ...	-1.34	1.54	0.43	-0.15	-1.22	-1.56	-1.69	-1.61	9.13

^aD = Depression, SA = Social Anxiety, A = Anxiety, R = Rumination

^bRating scores reversed

^cThe SE of each item's location is about 0.04 Logits

^dValues outside the range 0.6 to 1.4 are marked in bold

^eNegative (negative) Logit difference reflect that men's (women's) ratings are lower than those of women (men) with similar trait levels.

^fDue to varying error terms, smaller effects may reach statistical significance, whereas larger effects do not.



TABLE 2. Sub-Scale Reliabilities and Correlations between the Four Sub-Scales

Subscales	Sub-Scale	Sub-Scales				Sub-Scale ^d
	Reliability	D	A	SA	R	All 34 items
Depression (D)	0.86	1	0.71 ^a	0.80	0.66	0.93
Anxiety (A)	0.41	0.82 ^{b, c}	1	0.78	0.50	0.80
Social Anxiety (SA)	0.69	0.98	0.85	1	0.75	0.83
Rumination (R)	0.73	0.81	0.66	0.82	1	0.82

^a Pearson correlations are shown above the diagonal

^b Direct (i.e., attenuation corrected) correlations are shown below the diagonal

^c All direct correlations are based on sub-sample of 602 respondents (see text)

^d Pearson correlations

relation exceeds 0.80, the exception being that between rumination and anxiety (0.66). Given these high direct correlations, the items were treated as a unidimensional measure of generalized depression in most analyses. However, selective multivariate analyses were performed as well, and their results are reported whenever some subscales show significantly different patterns.

Differential Item Functioning (DIF)

To detect whether the items' locations are statistically similar within subgroups, omnibus test for differential item function were performed across various groups using the *Facets* software. As is shown in Table 3, the time

expired between Valentine's Day and taking the questionnaires, respondents' sexual orientations (heterosexual vs. gay or lesbian), their countries of residence, self-reported conditions, or whether they received gifts for Valentine's Day did not appreciably alter the Rasch locations of the 34 questionnaire items (all $p > .15$). In other words, the item hierarchy generalizes across the aforementioned independent variables. However, Table 3 also shows that items' locations differed significantly across respondents' relationship status ($\chi^2_{102} = 175.6, p < .001$), gender ($\chi^2_{68} = 128.0, p < .001$) and age ($\chi^2_{136} = 228.5, p < .001$). We discuss each DIF effect in turn, as well as their overall impact on measurement.

TABLE 3. Omnibus Tests for DIF for Eight Independent Sub-Variables

DIF Variable ^a	χ^2	df	p
Weeks since Valentine's Day (1, 2, 3 or more weeks)	59.8 ^b	102	> 0.50
Sexual orientation (M-F + F-M, M-M, F-F)	105.0	102	>0.35
Country where respondents reside (Canada, UK, US, Other, Unknown)	130.4	170	>0.50
Self reported psychological condition (No, Yes)	74.8	68	>0.20
Received gift (No, Yes)	79.7	68	>0.15
Relationship status (In relationship, Single-not looking, Single-looking)	175.6	102	<0.001
Gender (Men, Women)	128.0	68	<0.001
Age group (10's, 20's, 30's, 40+)	228.5	136	<0.001
Gender by Age interaction	444.7	272	<0.001

^a Only cases with known values for independent variables were included

^b *Facets* reports results with one decimal only



Relationship Status

Separate respondent groups were created by first dividing those in relationship (i.e., married, engaged, living together, or living apart) versus those not in a relationship. This last group was then further divided into those who were currently looking for a romantic partner versus those who were not. Although Facets' omnibus DIF test was significant, the individual item shifts were very small, ranging from -0.13 to 0.18 Logits ($SD = 0.049$). As these changes are relatively small (Wright & Douglas, 1975) they are not further discussed.

Gender Effects

The 'Gender' entries listed in Table 1 reflect the *Logit* difference between men and women's item locations. Statistically significant differences are marked in boldface, and it can be seen that men and women differ significantly ($p < .01$) with respect to four items. That is, relative to men with similar levels of generalized depression, women disproportionately think that "my life is a failure," and they are more aware of "dryness of my mouth." By contrast, men seem

more likely report being "less decisive" than do comparable women (note that this item was reverse scored). Further, in agreement with cultural stereotypes, men are far less likely (by 1.26 Logits) to report having "crying spells" than did women with similar levels of generalized depression.

Age Effects

The item locations R_i (in Logits) in the "19 or younger," "20 to 29," "30 to 39," and "40 and older" groups are listed in the right side of Table 1. As indicated by the χ^2_4 value listed in the final column of this table, six items show significant age related DIF ($p < .01$). For instance, Item 25 ("I experience trembling [e.g., in the hands]) respectively assumes locations $0.80, 1.58, 1.66,$ and 0.82 in the four age groups, and these locations differ significantly ($\chi^2_4 = 23.15, p < .001$). The preceding indicates that those 19-or-younger, or 40-or-older are more likely to report trembling (lower item locations) than those with similar levels of overall depression but aged between 20 and 29, or between 30 and 39 years (higher item locations).

While no clear pattern in the individual items' age DIF can be discerned, the item-location distributions clearly

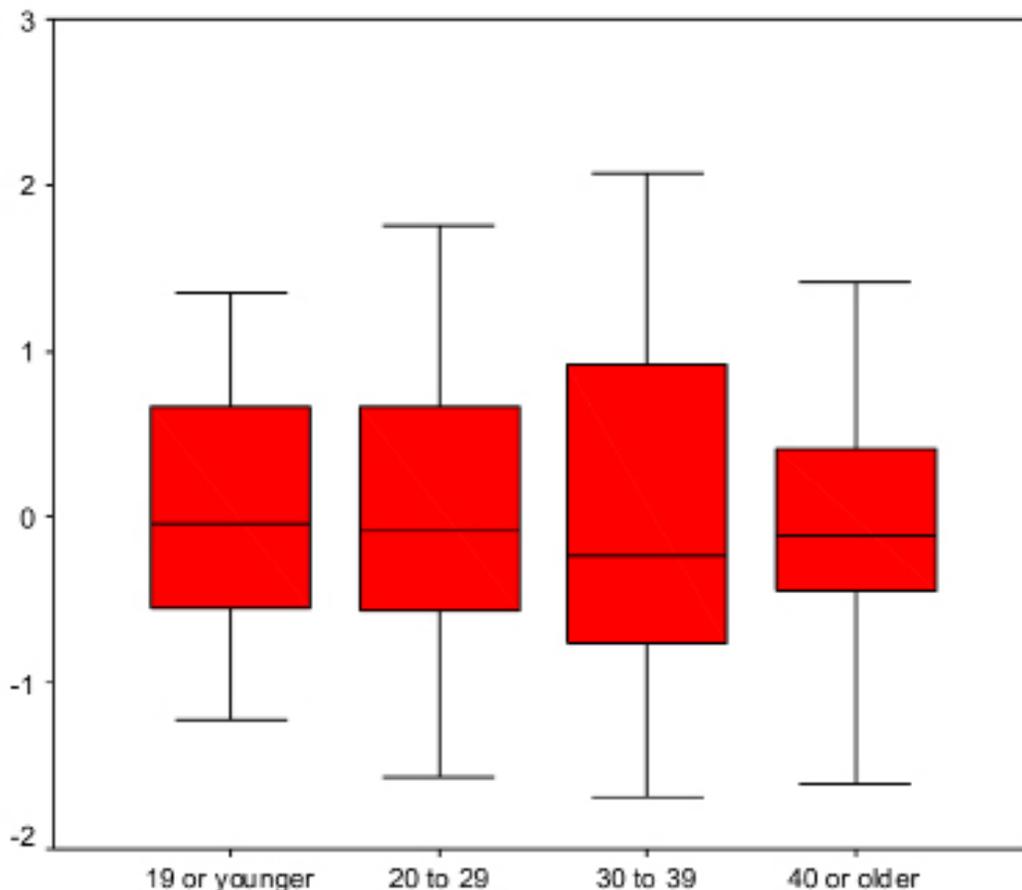


Figure 1. Boxplots of item locations by respondent's age categories.

differ in the 19-or-younger, 20 to 29, 30 to 39, and 40-and-older groups (see Figure 1). Specifically, the variance of the Q_i in these groups are 0.53, 0.72, 0.92, and 0.36, respectively, and these quantities differ significantly (Levene's test, $F_{3,132} = 3.50, p < 0.02$). The greater variance in the 30 to 39 group (i.e., 0.92) indicates that "easier" items (i.e., with lower Q_i) received disproportionately high ratings, whereas "harder" items (higher Q_i) received disproportionately low ratings in this age group. The 40-and-older group shows the smallest variance (0.36), signifying that these respondents gave disproportionately low ratings to 'easy' items (thus making them appear 'harder') and disproportionately high ratings to 'hard' items (thus making them appear 'easier'), thereby blurring the distinction among the items. Taken together, the variance differences suggest that Valentine-related issues gain in importance with increasing age, but then quickly lose importance for older individuals (i.e., > 40 years of age).

Impacts

We already noted that pronounced item shifts could distort the estimation of the Rasch person measures. Ac-

cordingly, the raw-sum to Logit transformations were computed *separately* for respondents in the "19 or younger," "20 to 29," "30 to 39," "40 and older" groups. Figure 2 shows the estimated *Logit* values (Y-axis) as a function of the raw sums (X-axis), together with pooled local errors of estimate (vertical lines) based on the combined sample of respondents. Note that in many places the raw-sum to Rasch translation for the 40-and-older group falls outside the band formed by +1 SE around the common estimates—thus yielding less extreme Rasch estimates for the lowest and highest raw-sums. This pattern is reversed in the 30–39 year old group, which shows more extreme Rasch estimates for the lowest and highest raw-sums. In other words, the item-level age DIF effects are sufficiently strong to introduce systematic distortions into the measurement of overall depression across the age levels studied here. Similar analyses by relationship status and gender indicate that the raw-sum to Rasch translation curves (not shown) nearly coincide in the sub-groups defined by these variables. Thus, the DIF associated with relationship status and gender introduced no noticeable bias into the measurement process.

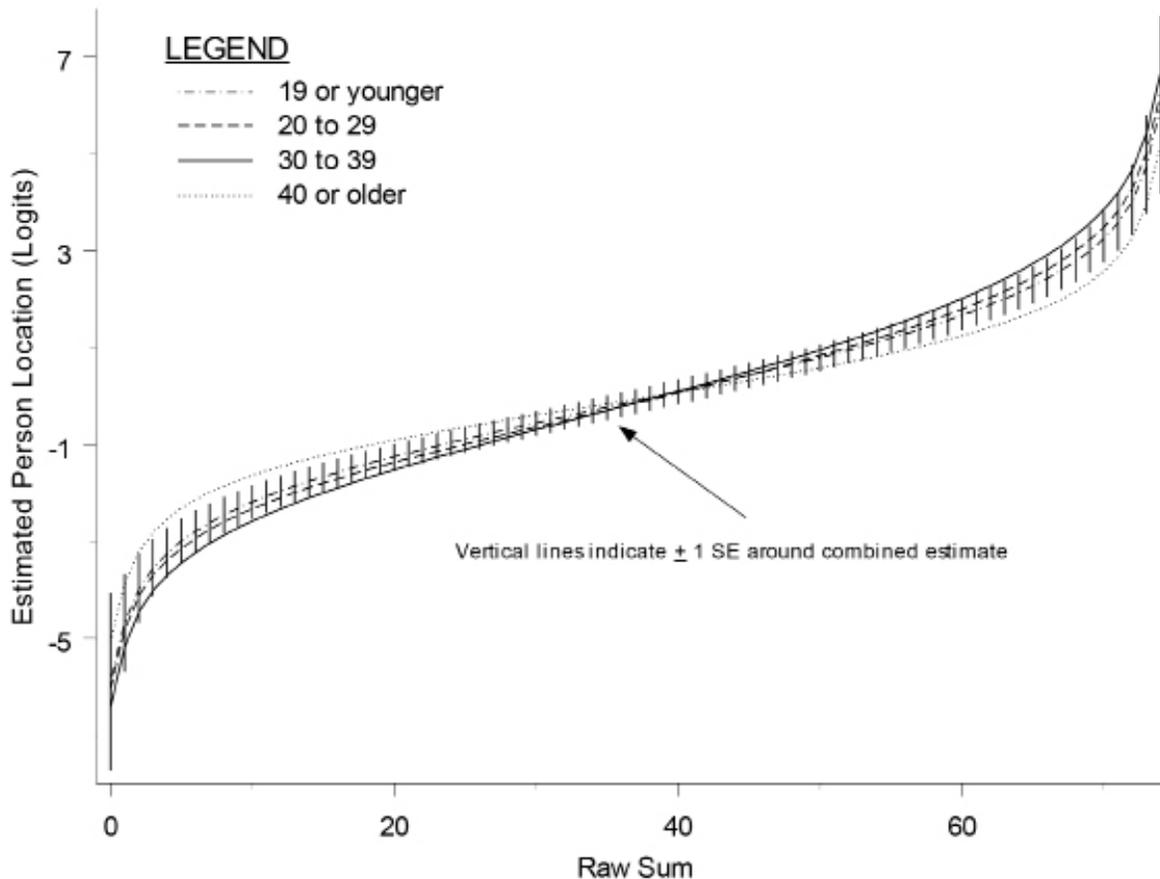


Figure 2. Raw-sum to Rasch Person Measure Transformation in four age groups.

Group Comparisons

This section reports the effects of age, gender, gift, relationship status, and the time elapsed since Valentine's Day on respondents' measures on the Rasch Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination subscales. These dependent variables can be rescaled arbitrarily—hence, for ease of interpretation z-score versions of these dependent variables are used throughout. We note that, due to missing data (see Methods section) the independent variables cannot all be crossed simultaneously. Instead, separate analyses were performed by (a) age, (b) gender, elapsed time, and gift across all respondents, and (c) gender, relationship status, elapsed time, and gift for the youngest respondent group (under 20 years of age) only.

Given the severe biasing effects of respondent's age, any main or interaction effects involving this variable must

be treated with caution. We note that a Multivariate Analysis of Variance (MANOVA) over the Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination subscales by Respondent Age (19 or younger, 20 to 29, 30 to 39, and 40 or older) showed a significant main effect ($F_{12,4371} = 6.86, p < 0.001$). Figure 3 shows that all five variables decrease with increasing age (smallest univariate $F_{3,1458} = 7.88, p < .001$).

Univariate Analysis of Variance (ANOVA) by Age with repeated measures over the Depression, Anxiety, Social Anxiety, and Rumination subscales showed a significant interaction effect ($F_{7.28, 3537.35} = 4.67, p < 0.001$),² indicating that this age effect is not uniform across these dependent variables. As is shown in Figure 3, the age decrease in Anxiety and Social Anxiety is less pronounced than that in Depression and Rumination. However, the differences are quite small, and they are also susceptible to the age-related distortions that were described earlier (see Impact). Hence, while respondents' age was ignored in all major

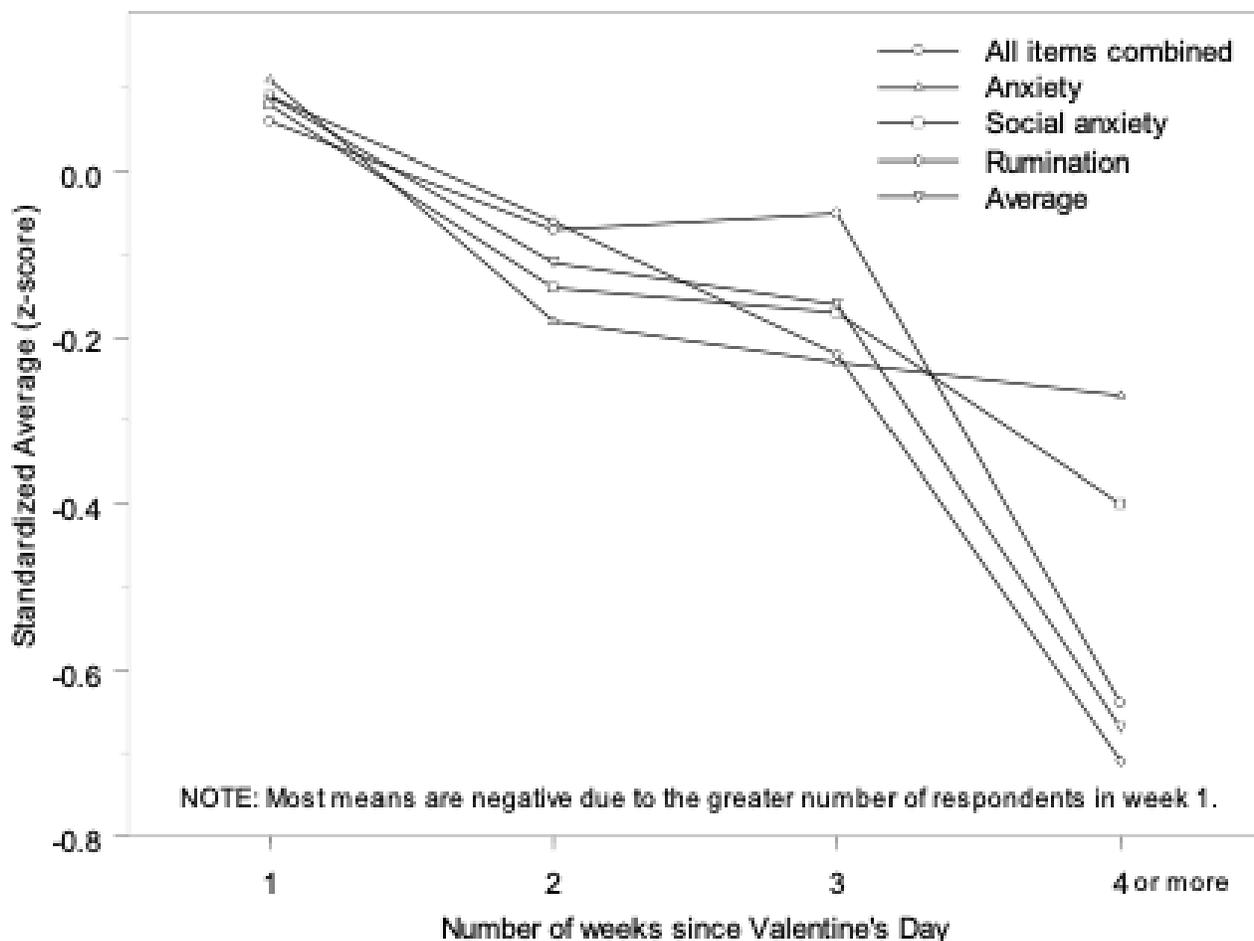


Figure 3. Average over all subscales, Anxiety, Social Anxiety, Rumination, and generalized measure derived from all 34 items by age (all variables were standardized).

analyses reported below, additional tests were performed to determine whether age distortions might explain particular effects.

Gender, Elapsed Time, and Gift Interactions

The standardized Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination Rasch subscales were subjected to a Gender x Gift (Received gift: No vs. Yes) x Elapsed Time (No. of weeks since Valentine's Day: Up to 2 weeks, 2 to 3 weeks, and 4 or more weeks) MANOVA. The findings showed significant multivariate main effects of Gender ($F_{4,1393} = 5.46, p < 0.01$) and receiving Gifts ($F_{4,1393} = 5.07, p < 0.01$), as well as Gender x Time ($F_{8,2788} = 1.95, p < 0.05$) and Gender x Time x Gift ($F_{8,2788} = 1.94, p < 0.05$) interactions.

To gain greater insight, a univariate ANOVA was performed which treated the Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination Rasch subscales as repeated measures (see Note 1). Consistent with the literature, a main effect of Gender indicates that women report slightly more intense depressive symptoms across the four subscales than do men ($M_{\text{Women}} = 0.06$ vs. $M_{\text{Men}} = -0.09, F_{1,1396} = 8.05, p < .01$). Additionally, and as hypothesized, respondents who received gifts reported less intense depressive ($M = -0.10$) symptoms than those who did not ($M = 0.07$) ($F_{1,1396} = 10.29, p < .001$). As indicated by significant Gender x Measure ($F_{3,3450} = 5.90, p < .001$) and Gift x Measure ($F_{3,3450} = 3.42, p < .05$) interactions, these effects vary slightly across the subscales. In particular, men and women differ somewhat less with regard to Anxiety than the other variables. Further, receiving a gift yielded somewhat

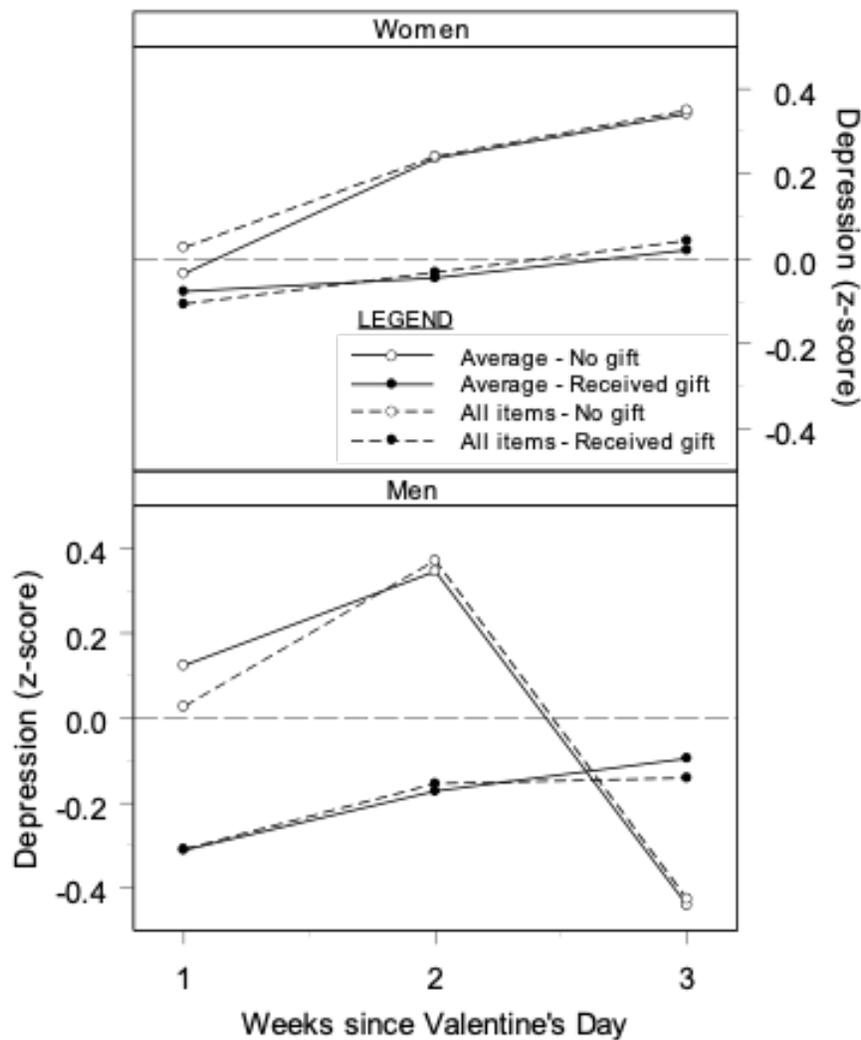


Figure 4. Overall Depression by Gender, Time Elapsed Since Valentine's Day, and Gift.

greater decreases in social anxiety and rumination than in non-anxiety depression and anxiety. However, both interactions are ordinal and they are not further discussed.

Most importantly, a powerful Gender x Gift x Elapsed Time interaction was observed ($F_{2,1396} = 5.08, p < .01$). Consistent with the Gift main effect, the solid lines in Figure 4 indicate that men's overall level of depression is greater when not receiving a Valentine's Day gift than when receiving such a gift—but only for up to four weeks after Valentine's Day. Women who did not receive gifts report more intense depressive symptoms as well, but their overall level of depression continues to rise over the entire period studied. In other words, while men rather quickly rebound from the depression induced by not receiving gifts, for women who did not receive a Valentine's Day gift the greater depression remains. As a result, the Gender x Time ($F_{2,1396} = 4.71, p < .01$) and Gift x Time ($F_{2,1396} = 3.38, p < .05$) interactions are significant as well.

We note that similar findings are obtained when the Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination Rasch subscales are averaged (dotted lines). This finding supports our conclusion that the Gender and Gift by Measure interaction effects on generalized depression described above are essentially meaningless.

Relationship Status, Gender, Elapsed Time, and Gift Interactions

As before, a MANOVA over the Rasch Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination subscales was performed. The results showed qualitatively similar main effects of Gender, receiving Gifts, as well as significant Gender x Time and Gender x Time x Gift interactions with analogous interpretations (all $p < .05$). Rather unexpectedly, Relationship Status did *not* show a statistically significant main effect ($F_{4,977} = 1.33, p > 0.30$), and all interactions involving Relationship Status also failed to reach statistical significance (all $p > 0.05$). This pattern was confirmed by follow-up analyses in which Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination were treated as repeated measures. In interpreting the above, we should emphasize that the available cases consist almost exclusively of younger respondents only (i.e., under 20 years of age, see Methods section). The possibility thus remains that future research will find that relationship status does play a significant role for older individuals (> 40 yrs).

DISCUSSION

Our title asked whether the 'Valentine's Day Blues' is a valid psychosocial phenomenon. The present findings

strongly suggest that it is, although the concept should not be sensationalized as a form of so-called 'toxic stress' (see Scheeringa, 2022). Like the experience of Lily in the Introduction, our respondents reported significant levels of adverse emotions and cognitions coinciding with this holiday. This distress was neither gender-specific nor restricted to singles that identified themselves as specifically looking for a romantic relationship. These findings speak to Baier's (1988) assertion that the 'holiday blues syndrome' is a situational stress reaction related to social demands and unmet expectations. However, previous literature on depression and romantic relationships extends this idea to help explain the differential pattern of findings that we observed.

First and foremost, the term 'blues' alone is an inadequate descriptor of this phenomenon, since reports of distress around Valentine's Day extend beyond depressive feelings to include anxiety, social anxiety, and rumination. Younger respondents tended to score higher on all these symptoms, which is generally consistent with the results of Joyner and Udry (2000). Those authors found that both male and female adolescents experience higher levels of depression, demonstrate higher levels of delinquency and problems with alcohol, and report more issues with school performance and parents when they become involved in romantic relationships. So, regardless of the events surrounding a given Valentine's Day, the potential angst and turmoil of adolescent love could be reflected in our findings.

The findings further imply that 30-to-40-year olds may be of greater clinical concern than adolescents. It seems reasonable to assume that individuals in this age range have different expectations concerning relationship than other age groups. While adolescents and 'twentysomethings' are still exploring the brave new frontier of romantic relationships, 30-to-40 year olds likely feel social pressures to develop relationships that match specific expectations concerning monogamous and long-term commitment. The celebration of Valentine's Day provides evidence of such commitment, while signaling compliance with social norms if the gift giving and other ritual expressions of love were carried out in accordance with cultural expectations. Flowers, roses, and candlelit dinners all send a message that the relationship—and the individual's life at this point in time—is 'on track.' At this age romance is expected to have solidified into marriage or a long-term, committed relationship. By contrast, not receiving Valentine's Day gifts indicates failure and, especially for women, a running out of time to 'get it right.' However, those age 40 and above are more likely to have experienced a full relationship cycle that includes marriage and divorce, and they are thus no longer subject to the pressures of the never-

married. They also may have grown past the age of investing heavily in society's approval concerning their love life.

As was anticipated, respondents who received a Valentine's gift reported fewer symptoms of psychological distress than those who did not receive a gift—and this effect was robust irrespective of their gender. We interpret this as support for Boden and Williams' (2002) argument for the commodification of love in Western culture, as well as the sheer volume of participation in Valentine's Day consumerism. That is, when we engage in shopping and gift-giving to such an extent, there can be no question about the social pressures to be included in the game. Our findings thus indicate that those who are left out demonstrate a response not only to their internal emotional cues (depression, anxiety), but to external societal cues as well (social anxiety).

But while men and women both seem to experience psychological distress related to Valentine's Day, and this distress persists over time for both, our data suggest that men rebound earlier than do women. For example, the men reported a marked decrease in psychological distress following the second week after Valentine's Day, whereas the symptoms of distress in the women actually appeared to increase over the weeks following the holiday. Some caution is needed when interpreting these findings, however, since our data are based on a cross-sectional rather than longitudinal sample.

We interpret our findings as representing different reactive styles in men versus women. For instance, Nolen-Hoeksema (1987) argued that men's responses to dysphoria tend to be more behavioral and distracting and therefore dampen their dysphoric episodes, whereas women's responses to dysphoric episodes tend to be more ruminative and therefore amplify and prolong dysphoria. Nolen-Hoeksema and colleagues have repeatedly shown in laboratory and questionnaire studies that ruminative and self-focused responses to distressed states exacerbate and prolong depressed mood and that active distraction remedies distressed mood. Furthermore, women are more likely than men to use ruminative responses but are no less likely to use distraction (Nolen-Hoeksema et al., 1993). Nolen-Hoeksema (1987) argued that the sex differences in rates of depression arise because women's ruminative response styles amplify and prolong their depressive episodes" (p. 276). According to this view, ruminative responses may prolong distress by "enhancing the effects of depressed mood on thinking, interfering with instrumental behaviors, and interfering with effective problem solving" (Nolen-Hoeksema, 1993, p. 311). This contrasts with men's distracting responses that allow for more positive thinking, generation of solutions, and increases in positive mood.

Therefore, while men may ruminate initially over Val-

entine's Day, perhaps they are characteristically adopting a *reflective* style of rumination that propels them to engage in some kind of problem-solving behavior which leads to a resolution, or simply brings closure. In contrast, women tend to engage more in *brooding*. Thus, they may not reach conclusions about next-steps or problem-solving actions that could ameliorate their symptoms. Rather, brooding tends to increase their negative emotional state, and thus symptoms worsen rather than abate. Further research is needed here since as gender differences in everyday stress might play a role as well—for example, gender role perspectives contend that women are inherently more distressed than men as their roles expose them to more stressors (for a discussion, see Almeida & Kessler, 1998).

Future studies might best use measures of *reflective* and *brooding* forms of rumination (cf. Treynor et al., 2003, pp. 248–251) in the context of longitudinal designs to confirm these and other hypotheses for holiday-related stress. New research can also leverage other improvements to overcome limitations of the present study. For instance, the presence of symptoms associated with psychological distress does not automatically elucidate their ultimate source(s) or cause(s). Our results clearly implicate situational stress reactions to the commercial holiday itself, but contextual influences like demand characteristics or expectancy-suggestion effects might also play a key role. Thus, the degree to which the 'Valentine's Day Blues' involves 'reflexive' (or naturally-occurring) symptoms versus 'factitious' (or performative) symptoms should be examined. We also note that retrospective and case-control studies can be important tools for model-building although their findings should form the basis on which prospective research is planned (Talari & Goyal, 2020).

In the meantime, we might offer some guidelines for addressing the 'Valentine's Day Blues' based on the implications from this study coupled with previous work on stress reactions:

— For those not in a relationship, Valentine's Day can be an occasion to engage in deliberate acknowledgement and acceptance of oneself. One's degree of self-compassion directly influences the capacity to love others and be loved (Neff & Beretvas, 2013). Moreover, adult singles who exhibit happiness and contentment in their life can be positive role models for adolescents, who are especially susceptible to premature romantic relationships due to psychological and social pressures.

— When social pressures to celebrate through consumption become intense, individuals can respond on their own behalf just as couples do for each other. Shopping for one's own Valentine's gift is empowering if it is not a se-

cret act, but instead an act of self-expression (e.g., Sirgy et al., 2016). Alternatively, a reasoned choice to refrain from spending can act as a gift to one's financial health, with the simpler pleasures in life serving as cost-free substitutes.

— Gestures of love need not be limited to the romantic sort on Valentine's Day. Donations of time, money, and creativity through volunteering tend to benefit the donor as much as the recipient (Yeung, Zhang, & Kim, 2017). Seeing firsthand the real-life needs of the less fortunate can help keep romantic disappointment in perspective.

— A 'partner-less' Valentine's Day can serve as a call-to-arms when individuals take the time to self-reflect and correspondingly define what they are looking for in a romantic relationship, the obstacles to achieving their goals in this area of their lives, and what steps are needed for success (e.g., Stein & Grant, 2014).

Lastly, planning ahead to stay active during the day and evening can help prevent the rumination and escalation of dysphoria discussed earlier. Optimal choices will avoid prime dating environments, such as movies or romantic restaurants, and involve supportive friends and family members. But we should likewise note on balance that challenges and uncertainties carry over to those who find and sustain committed relationships. Indeed, the psychology of love and attachment exemplifies a topic that is squarely within mainstream science but nonetheless characterized by perpetual controversy and mystery (see, e.g., Basili & Sacco, 2020; Finkel et al., 2012; Masuda, 2003).

IMPLICATIONS AND APPLICATIONS

This preliminary research underscores the point that ideas or claims originated, or reinforced, by pop psychology are not necessarily dubious. At the same time, common health assumptions—including those that seem inherently reasonable—should always be rigorously scrutinized to promote public education and trust in science, as well as to inform responsible clinical approaches as needed. In this way researchers can combat the problem of medical sensationalism or misinformation from pop psychologists or activist platforms (Suarez-Lledo & Alvarez-Galvez, 2021). Moreover, we argue that Modern Test Theory is the best practice approach to validate, describe, and measure the phenomenology of symptom perception across various biomedical or psychological contexts, while also identifying nuances associated with demographic or cultural variables (Lange et al., 2000, 2002; Lange et al., 2015). To be sure, all forms of distress, including the formal psychiatric diagnostic categories of the DSM-5, are locally shaped (Ecks, 2016). This also certainly includes the measurement of core features, nuances, and confounds with perceptions

in altered or anomalous experiences (e.g., Houran et al., 2019; Lange, 2017; Lange et al., 2019; Lange et al., 2004a; Merckelbach et al., 2017).

NOTES

¹ Fitting a four-factor model over all respondents proved to be prohibitively time-consuming. For this reason, the analyses are based on a randomly selected subset of 602 respondents.

² The Greenhouse-Geisser method was used to correct for the violation ($p < .001$) of the assumption that the error covariance matrix of the orthonormalized transformed dependent variables should be proportional to an identity matrix.

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