Daily Stock Market Expectations from Oscillating Social Mood Factors

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ABSTRACT

Since 2006, there has been ongoing research into the correlation of a set of oscillating mood factors and socioeconomic, geopolitical, and natural events with the goal of forecasting increased risks of destabilizing events. While promising results have been forthcoming, it has been difficult to present models that allowed those outside a small circle of specialists to participate. Between July 2007 and June 2010, weekly social mood projections, as published in monthly issues of *MoodCompass*, were used to develop a model to convert four oscillating mood factors into stock market expectations. This model was modified to generate signals of projected stock market movement for the day. A further study was then performed between September 1, 2011 and October 27, 2011, scoring top internet searches with the same *Compass System*, and using those scores to generate daily market expectations from this *Market Mood Model*. A significant relationship between internet search trends and daily stock market movement ($p < 0.032$) was found. This implies a relationship between the societal focus of the moment (i.e. social mood) and the relative health of the stock market, and should bring to question the long term effectiveness of market interventions made by policy makers while the perceived well-being of society at large continues to decline. Also, by affirming that the model can be scaled down to daily signals, further study of the mood factors' relationship to the market and other areas of interest should be facilitated, and research more easily extended to others unfamiliar with the Compass System methodology.

KEYWORDS: social mood, forecast model, economic, socionomic, stock market, internet search trends

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With global economic stresses, various expressions of social unrest, widely impactful natural disasters, and precarious geopolitical situations all making headlines on a daily basis, the world might appear to be in a chaotic slurry of random events. Business owners, investors, policy makers as well as the average family may find it difficult to plan far beyond the immediate future as something else may be about to come along and undo all of the previous assumptions. Yet, if there were predictive patterns that could be tracked and forecasted that allowed for the planning of contingencies for rough times, as well as the hopeful expectations of good times when things seemed at their worst, could resources be managed more efficiently, and down times be handled less painfully? There has been promising research in this direction, that until recently was difficult to present in a way that could be measured and tested by those outside of a small circle of specialists.

In 2007, a preliminary study (Bourette 2007) was performed to determine the ability of a small cohesive group to reflect changes in the larger society. The measure of change used was the daily movement in stock market prices. A cohesive group was defined as one that contains people who interact with each other on a daily basis and demonstrate at least the appearance of connection with each other (e.g. friendly or unfriendly banter). As an arbitrary and convenient selection for a cohesive group, the CNBC morning staff was assessed on displayed affect (mood) by rating their clothing colors using the Compass System (Bourette 2011a, 2011b,) for 29 trading days from April 20, 2007 to May 31, 2007. The preliminary study indicated a relationship to a significant degree between several factors and the stock market, but it was unclear exactly how to model the relationship at that time.

Between July 2007 and June 2010, weekly social mood projections, as published in monthly issues of MoodCompass (A New Story 2011a), were used to develop a model to convert four oscillating mood factors into stock market expectations. Success with this model prompted a return to the previously gathered CNBC clothing scores. Using the CNBC study data to calibrate, the weekly projection model was slightly altered to accommodate the smaller scale of expected change in daily data points. The resulting model generates signals of projected stock market movement for the day. A further study was then performed between September 1, 2011 and October 27, 2011, scoring top internet searches with the same Compass System, and using those scores to generate daily market expectations from the *Market Mood Model*.

Social Mood and the Markets

Patterns found within social changes are an emerging interest of federal and state governments. For example, sophisticated analysis of available data can sometimes inform the Los Angeles Police Department of where or when a crime is more likely to be committed (Rubin 2010). According to the Office of Incisive Analysis (IARPA 2011, 4), "Many significant societal events are preceded and/or followed by population-level changes in communication, consumption, and movement." A proposed Open Source Indicators Program (IARPA 2011, 3-4) "seeks to develop methods for continuous, automated analysis of publicly available data in order to anticipate and/or detect significant societal events." They aim to "beat the news" by "fusing early indicators of events from multiple publicly available data sources and types."

The most extensive research that has been done to explore and document the relationship between social mood and the stock market has been Robert Prechter's (2003) pioneering work in what he calls Socionomics. Prechter (1999) demonstrates that human social behavior

manifests itself in specific forms, or waves, called Elliott Waves (after the late R.N. Elliott). Studying the relationships between social mood and stock market price behavior, Prechter has found that in times of expanding positive social mood, the stock market manifestation is a bull market, and stock prices in general increase. This positive mood is reflected socially by values of wholesomeness, family as priority, and relationships centered on love. In times of contracting or decaying social mood, the stock market manifestation is a bear market, and stock prices in general decrease. This negative mood is socially indicated by such things as movies with high gore content, zombies, and vampires; values such as sex without love, and bizarre fashions. Prechter has found that patterns within the stock market waves can be correlated with periods of heightened risks of war, disease outbreaks, and civil unrest.

Summing up "today's scientific view," Prechter (1999, 436) states, "there may exist a principle of collectives that underlies the self-organization of all self-organizing things, at all scales." He concludes that if there is a principle of universality for human collective action, or of progress against entropy in general, that the Wave Principle is either that principle or a manifestation of it. Prechter proposes **phimation** (after phi or Fibonacci) as "the universal *force* or *field* that impels what is essentially a *striving against entropy."*

In an attempt to track stages of collapse in the face of peak resources, the author, in conjunction with A New Story Foundation, developed The MoodCompass Project (A New Story 2011a). By tracking oscillating mood factors found in current events, and extrapolating those out to future dates, patterns are analyzed for signs of socioeconomic distress, geopolitical risks, and possible natural disasters. At the end of August 2008, the monthly publication MoodCompass (A New Story 2008) warned of "The Great Market Crash of 2008". Almost two

weeks before the Japan earthquake and tsunami in March 2011, a public advisory was issued in a video blog cautioning travelers to far east Asia and advising against eating food from the region "until more is known about this event (A New Story 2011b)."

Model Description

The Market Mood Model utilizes a framework called **One Wheel**, a conceptual "model of everything" first developed by Daniel Reader in 1982 (Bourette 2011b). It has been further developed, and made adaptable to systems type problem solving using a combination of qualitative and quantitative information by the author. This adaptation, the **Compass System**, has been demonstrated to effectively model real world events and systems (Bourette 2011a, Bourette 2009, Light 2007).

The Compass System uses eight dynamic archetypal categories adapted from One Wheel, combining metaphor with mathematics. The categories are mutually exclusive and specific, but being metaphorical, they are not precisely defined. Use of the Compass System is most effective after a period of training and experience in recognizing each of the categories in events, places, and people. While category names may vary according to specific use (Bourette 2011b), for the purposes of this study the generic names of N, S, E, W, NE, SW, SE, and NW will be used. These represent the eight points of a compass, hence the Compass System. Table 1 lists some of the qualities and attributes associated with each category, but is not meant to be exhaustive.

N: grounded, peaceful, quiet, material, food, home, brown and other earthtone colors
S: fiery, spirited, active, bright, loud, crowded, busy, bright colors, especially bright red
E: intellectual, factual, verbal, rational, data, clarity, conscious, pastel and neutral colors, yellow
W: dreamy, emotional, deep, artistic, musical, imagery, unconscious, deep blue or black colors
NE: nurturing, friendly, inviting, mediation, domestic, colors like teal and mauve; soft pink or silver
SW: leader, warrior, rugged, sporty, abundance, liveliness, expansive, gold or deep purple colors
SE: manic, chaotic, annoying, anxiety-provoking, deceptive, electronics, technology, overselling, "junk" food, florescent lights, neon colors, bright orange
NW: somber, ordered, controlled, uniformity, disease, decay, gothic, gray color.

Table 1. Sample qualities and attributes of the 8 Compass System Categories. Source: author.

A number of factors are considered by the Market Mood Model for each output signal. Table 2 shows a list of the major mood configurations tracked by the model, and their corresponding social manifestations.

Configuration	**Name**	**Expected Social Manifestation**
SE & NW high, NE & SW low	Hi Entropy	Perception of decline, destabilization, or disaster
NE & SW high, SE & NW low	Hi Phimation	Perception of growth, “green shoots,” or new start
SE & NW close together	Survival	Survival instincts in high gear; bad for business
Slope of SE and NW parallel	Entropy ||	Perception of decline, destabilization, or disaster
N factors high, NE highest	Constraint	People feel constrained, channeled, or cornered.
N factors high, NW highest	Relief	Perception that things are settling down
S factors high	Acceleration	Whatever has been occurring, seems to be accelerating; increased risk of violence
E factors high, NE highest	Good News	Data or fact focus; news seen through “Rose colored glasses,” (i.e given a positive spin)
E factors high, SE highest	Bad News	Data or fact focus; news negatively interpreted
W factors high, SW highest	Panic!	Emotional or irrational period; panic likely
W factors high, NW highest	Denial	Emotional or irrational period; false hope likely

SW high, NE low	Heroic	Courage or bravery is high; interest in expansion and issues abroad
NE high, SW low	Domestic	Perception of vulnerability; interest in economy and issues close to home
SE high, NW low	Manic	Perception of instability; irrational exuberance; increased risk of protests and terrorist activity
NW high, SE low	Somber	Serious or depressed mood; often accompanied by stories of disasters, death, or dying in the news

Table 2. Major Social Mood Configurations. Source: author.

This is a summary of what the model evaluates: 1) Is SE and NW > both NE and SW? If so, this has a negative effect. 2) Is NE and SW > both SE and NW? If so, there is a positive effect. 3) Is SE – NW a low number? If these two factors are very close that has a negative effect. 4) What are the relative slopes of SE and NW since yesterday? If they are running near parallel, that has a negative effect. 5) Are the two North factors > the two South factors? If so, which one of those is greater, and by how much? If NE is greater there is a negative effect; if NW, a positive effect. 6) Are the two South factors > the two North factors? If so, yesterday's direction is emphasized by their difference. 7) Are the two East factors > the two West factors? If so, which one of those is greater? If NE is greater there is a positive effect; if SE, a negative effect. 8) Are the two West factors > the two East factors? If so, which one of those is greater? IF SW, there is a negative effect; if NW, a positive effect. 9) Is SW the highest factor and NE the lowest? If so, how far apart are they? There is a positive effect by that much. 8) Is NE, the highest and SW the lowest? If so, how far apart are they? There is a negative effect by that much. 10) Is SE the highest and NW the lowest? If so, how far apart are they? There is a positive effect by that much. 11) Is NW the highest and SE the lowest? If so, how far apart are they? There is a negative effect by that much.

CNBC Study

The CNBC morning staff's clothing was scored by color in each of the eight categories of the Compass System (Bourette 2007). The raw scores for the eight categories are combined so that only four categories result. Since the model to convert mood to stock market movement relies on NE, SW, SE and NW, those are used. All N scores are added to NE and NW as 0.5 NE and 0.5 NW, all S scores are added to SW and SE as 0.5 SW and 0.5 SE and so on. The combined scores for each day are normalized by dividing the total for each combined score by the number of people assessed that day and multiplying by 100. This ensures that each day is weighted equally. Next, a three day moving average is computed for these scores, which will serve as the inputs to the Market Mood Model. The Model takes four normalized scores (NE, SW, SE, and NW) as inputs. Its output or *signal* is a scalar which reflects the expected change in the S&P 500 for the day[1]. Table 3 lists the normalized scores of clothing color for the CNBC staff for this study, the signal generated, and the daily stock market movement.[2]

Date	NE	SW	SE	NW	Signal	Δ S&P	Signal Cum	S&P Cum
4/20/2007	34.6	7.7	7.7	50				
4/23/2007	30	16	10	44				
4/24/2007	31.6	7.9	23.7	36.8	6.8	-0.5	6.8	-0.5
4/25/2007	17.9	25	35.7	21.4	2.8	14.7	9.7	14.5
4/26/2007	26	12	14	48	-2.8	-1.5	6.8	13.3
4/27/2007	22.5	20	17.5	40	-0.3	-0.2	6.5	13.1
4/30/2007	19.2	19.2	3.8	50	-1.5	-11.7	5	1.4
5/1/2007	25	8.3	19.4	47.2	3.5	3.3	8.5	5.4
5/2/2007	30.8	15.4	23.1	30.8	5.1	9.5	13.5	15.0

[1] The output actually reflects the current rate of change per day expected in the S&P 500. However, for the purposes of this study, with the signal generated before market open, and the output evaluated once at the end of the day, it is essentially the expected changed in the S&P 500 for the day.

[2] Δ S&P is the S&P 500 closing price minus opening price each day. S&P Cum is the cumulative change in the S&P for the duration of the study (today's close - close on 4/23/2007).

5/3/2007	15.2	23.9	30.4	30.4	-0.3	6.4	13.2	21.5
5/4/2007	19.4	22.2	22.2	36.1	-0.3	2.2	12.9	24.7
5/7/2007	15.2	21.7	19.6	43.5	-4.5	3.9	8.4	28.6
5/8/2007	23.8	16.7	16.7	42.9	-5	-1.6	3.4	26.8
5/9/2007	10.5	23.7	15.8	50	4.3	6.8	7.7	31.6
5/10/2007	14.3	23.8	23.8	38.1	4	-20.3	11.7	10.5
5/11/2007	21.9	18.8	18.8	40.6	2.4	14.4	14.1	24.9
5/14/2007	19.4	19.4	30.6	30.6	-0.4	-2.6	13.7	22.2
5/15/2007	13.2	26.3	26.3	34.2	-0.3	-8.6	13.4	20.3
5/16/2007	17.4	34.8	10.9	37	1.2	13.4	14.6	33.2
5/17/2007	12.5	27.5	20	40	4.4	-1.3	19	31.8
5/18/2007	30	20	33.3	16.7	2.3	1.8	21.3	41.8
5/21/2007	13.6	25	13.6	47.7	2.4	2.4	23.7	44.2
5/22/2007	17.6	20.6	20.6	41.2	-5.4	-1.0	18.3	43.2
5/23/2007	15.9	25	11.4	47.7	1	-1.8	19.4	41.3
5/24/2007	27.1	27.1	12.5	33.3	4.6	-14.6	24	26.6
5/25/2007	25	25	21.9	28.1	-0.2	8.2	23.8	34.8
5/29/2007	35.3	5.9	20.6	38.2	3.1	2.6	26.9	37.2
5/30/2007	23.7	15.8	26.3	34.2	3.1	12.6	30	49.3
5/31/2007	26.2	16.7	11.9	45.2	4.7	-4.7	34.7	49.7

Table 3. Normalized daily clothing color scores for the CNBC staff, model signal, and stock market change. Source: author; market data from Google Finance.

When the Market Mood Model was applied to a 3 day moving average of the normalized CNBC staff scores, the correlation ($R = 0.045$) of individual signals with daily stock market movement was not significant. However, when a running total of each day's expected movement was compared with the cumulative changes in the stock market, the correlation was 0.848 over the 27 days observed. While the significance of a correlation of cumulative sums can be considered inconclusive, the high correlation was useful in scaling the weekly model outputs to daily S&P movement expectations. Figure 1 shows the scaled result. The preliminary indication is that the Market Mood Model may be capable of outputting overall

stock market trend from social mood data, but might have limited value in estimating any particular day's market movement.

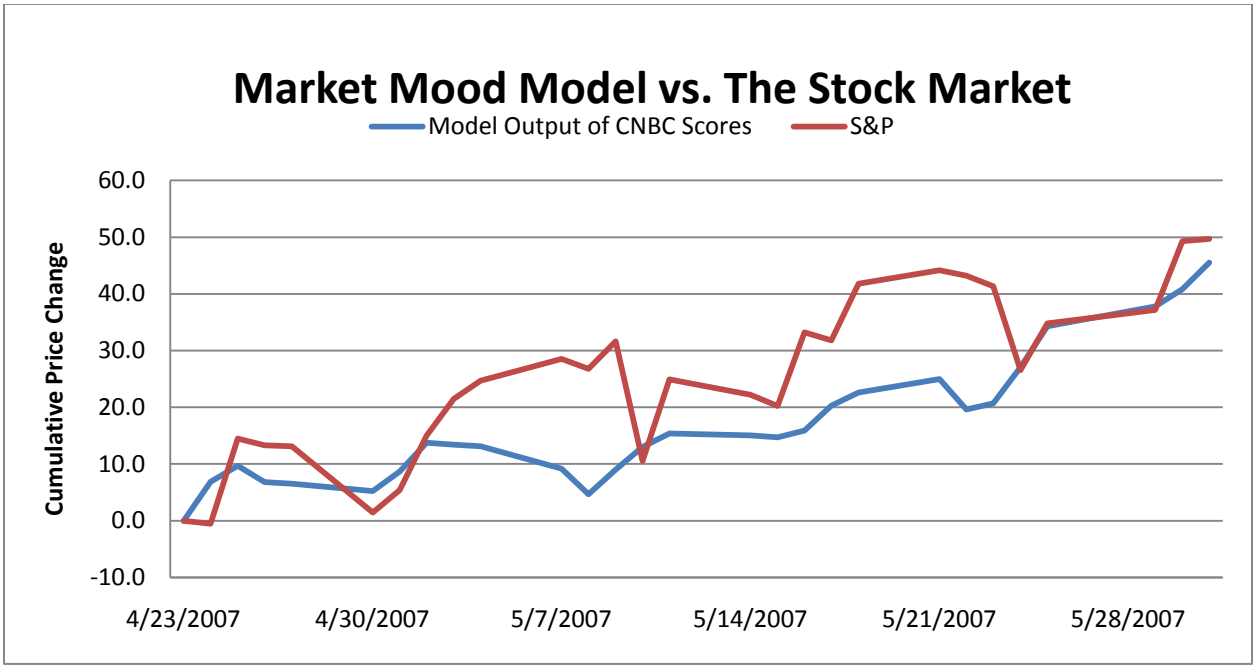

Figure 1. Cumulative Market Mood Model Signal vs. The Stock Market. Source: author; market data from Google Finance.

Internet Searches Study

For forty trading days (September 1, to October 27, 2011), the Market Mood Model was applied to top internet searches each morning at 9am ET (before Wall Street opened). The top 5 internet searches (Google 2008) were scored each morning using the Compass System. The words themselves were not scored, but the qualities of the news stories associated with them were. For example, the search for "apple juice," on September 16, 2011 was associated with a story of Dr. Oz's claim of high arsenic levels in apple juice, and the rebuttals by the FDA. The qualities scored were poison, food, and conflict, or NW, N, and SE. As with the CNBC scores, N, S, E, and W scores were merged into the NE, SW, SE, and NW scores, and the day's internet

search scores were normalized. A three day moving average was used as the input to the Market Mood Model as before; however, the moving averages for all non-market days (e.g. weekends and holidays) were averaged together with the first trading day's moving average. In other words, the three day moving average as of Saturday, the three day moving average as of Sunday, and the three day moving average as of Monday would all be averaged together as Monday's input to the Market Mood Model. This is to accommodate the cumulative effects, should there be any, of the weekend's mood configurations on the next trading day. Table 3 shows a sample of search terms used, how they were scored, and the day's normalized score.

Date	Search term	Raw score	Day's normalized score
8/30/2011			12.5 NE 12.5 SW 50 SE 25 NW
	daryl hannah	N NE SW NW	
	dts	W SE	
	chaz bono	SE SE NW	
	verizon wireless	SE	
	nancy grace	SE SE	
8/31/2011			33.3 NE 23.3 SW 23.3 SE 20 NW
	arian foster	E NE SW SE	
	bill o reilly	NE SE NW	
	melaleuca	S SW NW	
	venus williams	E NE SW NW	
	evelyn lozada	NE	
9/1/2011			26.9 NE 30.8 SW 23.1 SE 19.2 NW
	avant garde	E SW SE SE NW	
	chris johnson	E NE SW	
	irs	N NE NW	
	mississippi state football	SW	
	bowling	SW	
9/2/2011			28.1 NE 28.1 SW 15.6 SE 28.1 NW
	baylor	SW	
	labor day	N NE SW	
	kinesiology	N E S NW	
	coleman	NE SW	
	t.i.	N E SW SE NW NW	

Table 3. Internet search terms and scores. Source: author.

Effectiveness of the model was evaluated by viewing theoretical profit or loss as a "paper trade," and by evaluating the correlation between the generated model signal with the daily stock market movement. For the “paper trade,” profit or loss was determined by the number of S&P points hypothetically gained or lost by following the model vs. how many points the S&P gained or lost that day. Correlation was determined using the Pearson Product Moment.

Results for the paper trade are shown in Table 4 below[3]. There was a profit of 266.7 S&P points, with a maximum drawdown of 52.6 points over a three day period. 24 out of 40, or 60% of the "trades" were successful. To translate into monetary terms, in a trading account of $20,000 that traded one e-mini futures contract each day using this model, this would have resulted in a gain of $13,000 with a maximum drawdown of $2630. The correlation between individual signals and daily S&P movement was 0.34 ($p < 0.032$). This implies that top internet search trends (via the Market Mood Model) and daily stock market movement are likely related (it is 96.8% likely that the correlation value obtained would have been worse if there was no relationship between the Market Mood Model output and daily S&P movement).

	Date	Signal	Δ S&P	P/L	P/L Cum	S&P Cum
1	9/1/2011	-0.9	-14.7	14.7	14.7	-14.7
2	9/2/2011	-0.1	-29.9	29.9	44.6	-44.6
3	9/6/2011	29.7	-8.7	-8.7	35.9	-53.4
4	9/7/2011	8.9	32.8	32.8	68.7	-20.6
5	9/8/2011	-8.1	-12.1	12.1	80.7	-32.7
6	9/9/2011	-5.7	-31.1	31.1	111.9	-63.8
7	9/12/2011	6.4	8.8	8.8	120.7	-55.0
8	9/13/2011	-18.5	10.3	-10.3	110.4	-44.8
9	9/14/2011	-7.6	10.3	-10.3	100.1	-34.5

[3] Δ S&P is the S&P 500 closing price minus opening price each day. S&P Cum is the cumulative change in the S&P for the duration of the study (today's close - close on 8/31/2011).

10	9/15/2011	-1.2	19.7	-19.7	80.4	-14.8
11	9/16/2011	-3.2	6.8	-6.8	73.6	-8.0
12	9/19/2011	-33.5	-10.9	10.9	84.5	-18.9
13	9/20/2011	9.3	-2.4	-2.4	82.1	-21.3
14	9/21/2011	-6.5	-36.9	36.9	119.0	-58.2
15	9/22/2011	-8.6	-35.0	35.0	154.0	-93.2
16	9/23/2011	11.3	7.6	7.6	161.6	-85.6
17	9/26/2011	3.5	26.0	26.0	187.6	-59.5
18	9/27/2011	-6.5	12.1	-12.1	175.6	-47.5
19	9/28/2011	-28.4	-24.3	24.3	199.9	-71.8
20	9/29/2011	-5.1	8.7	-8.7	191.2	-63.1
21	9/30/2011	-14.7	-28.5	28.5	219.8	-91.7
22	10/3/2011	17.1	-32.0	-32.0	187.8	-123.6
23	10/4/2011	16.9	26.5	26.5	214.3	-97.1
24	10/5/2011	16.1	20.0	20.0	234.3	-77.1
25	10/6/2011	12.2	20.9	20.9	255.2	-56.2
26	10/7/2011	-8.3	-9.6	9.6	264.7	-65.8
27	10/10/2011	8.9	36.7	36.7	301.5	-29.1
28	10/11/2011	-18.6	0.9	-0.9	300.5	-28.1
29	10/12/2011	-16.8	11.1	-11.1	289.5	-17.1
30	10/13/2011	-39.0	-3.3	3.3	292.8	-20.4
31	10/14/2011	-0.7	18.9	-18.9	273.9	-1.4
32	10/17/2011	-27.3	-23.6	23.6	297.5	-25.0
33	10/18/2011	-4.8	24.6	-24.6	272.8	-0.4
34	10/19/2011	-30.5	-13.6	13.6	286.4	-14.0
35	10/20/2011	-1.1	5.5	-5.5	280.9	-8.5
36	10/21/2011	7.5	22.9	22.9	303.8	14.3
37	10/24/2011	6.2	15.5	15.5	319.3	29.8
38	10/25/2011	1.6	-24.8	-24.8	294.5	5.0
39	10/26/2011	0.3	12.8	12.8	307.3	17.8
40	10/27/2011	-2.1	40.6	-40.6	266.7	58.4

Table 4. Results of paper trading with the Market Mood Model. Source: author; S&P data from Google Finance.

Conclusion

The stock market cannot be independent of the society of which traders, politicians, businessmen, and consumers are a part. This is implied by a significant correlation between the Market Mood Model's translation of top internet search trends and actual daily stock market movement. The relationship between social mood and economic well-being, and its implications warrant serious further study. Attempts to manipulate interest rates, prop up corporations too big to fail, and other interventions solely focused on stock market numbers and corporate profits, will not succeed if the society at large is in a strong downward trend of negative mood.

This study by itself does not expand research on the oscillating mood factors outside the MoodCompass team. However, by scaling the Market Mood Model from weekly to daily, more data will be available with less expense. Work has been underway to develop a generic word list that any interested party unfamiliar with the Compass System can use to obtain scores for the mood factors. Publication of a follow-up study should include this word list and detail the relative success of using that method. If successful, this will allow others to further research these oscillating mood factors, and develop models for application in their field of study.

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