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Cognitive Egocentrism Differentiates Warm and Cold People

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Abstract

Warmth-coldness is a fundamental dimension of social behavior. Cold individuals are egocentric in their social relations, whereas warm individuals are not. Previous theorizing suggests that cognitive egocentrism underlies social egocentrism. It was hypothesized that higher levels of interpersonal coldness would predict greater cognitive egocentrism. Cognitive egocentrism was assessed in basic terms through tasks wherein priming a lateralized self-state biased subsequent visual perceptions in an assimilation-related manner. Such effects reflect a tendency to assume that the self's incidental state provides meaningful information concerning the external world. Cognitive egocentrism was evident at high, but not low, levels of interpersonal coldness. The findings reveal a basic difference between warm and cold people, encouraging future research linking cognitive egocentrism to variability in relationship functioning.

Keywords

personality; coldness; warmth; egocentrism; cognition; relationships

There are two primary ways in which people differ in their interpersonal behavior. Some people are more dominant whereas others are more submissive (Wiggins & Trapnell, 1996). Additionally, some people are warm whereas others are cold (Wiggins & Trapnell, 1996). These are independent dimensions of personality and social behavior (Locke, 2011; Moskowitz, 2010). People want to know about the warmth-coldness of others first and foremost before interacting with them (Hogan, 1996). There are good reasons for possessing this knowledge. The warmth-coldness dimension is a primary predictor of relationship quality (Markey & Markey, 2007), personality disorders (Locke, 2006), aggressive behavior (Martin, Watson, & Wan, 2000), criminality (Edens, 2009), and lack of social support (Smith, Traupman, Uchino, & Berg, 2010).

Underlying warmth-coldness, we suggest, is a basic stance toward others that is socially egocentric (cold individuals) versus not (warm individuals). For example, cold individuals value autonomy to a greater extent, whereas warm individuals value nurturance to a greater extent (Wiggins & Broughton, 1991). Cold individuals view others as less trustworthy, whereas warm individuals view others as more trustworthy (Moskowitz, 2010). Cold individuals often seek to isolate the self from others, whereas warm individuals are, if anything, sometimes too dependent on others and motivated to please them (Strack & Lorr, 1994; Wiggins & Pincus, 1989). A communal (Bakan, 1966) label for this dimension is apt because warm individuals score higher in femininity and quite a few other motivations and

traits suggestive of a greater appreciation for others and goals to accommodate to others in everyday social interactions (Locke, 2011; Markey & Markey, 2007; Wiggins & Broughton, 1991). Cold people, by contrast, are less communal and more egocentric in their social relations (Wiggins & Trapnell, 1996).

By saying that cold individuals appear to be socially egocentric, we do not mean to suggest that they always manipulate others in a self-serving or self-enhancing fashion. Quite the contrary, they often do not. For example, cold individuals have internalizing symptoms such as anxiety and depression that cannot be viewed in terms of self-enhancement or related factors such as narcissism (Smith et al., 2010). Additionally, coldness is a predictor of social isolation (Smith, Glazer, Ruiz, & Gallo, 2004) and personality disorders associated with it (such as schizoid personality disorder; Wiggins & Pincus, 1989). Thus, although coldness is predictive of aggression (Bettencourt, Talley, Benjamin, & Campbell, 2006) and psychopathy (Jones & Paulhus, 2011), it is also predictive of avoiding others due to a distrust of them (Wiggins & Broughton, 1991). Regardless of whether coldness takes a manipulative or avoidant form, the underlying interpersonal dynamic seems the same: a self-centric perspective on relationships.

Cognitive Egocentrism, Social Egocentrism, and Warmth-Coldness

Developmental and clinical researchers have proposed that cognitive egocentrism underlies social egocentrism. Cognitive egocentrism can be defined and operationalized in different manners, but its central feature is that the self's perspective or state is favored even when it cannot be a good guide to the perspective or state of another. Piaget (1932) developed several cognitive measures of egocentrism. Egocentrism, for example, is revealed to the extent that the child fails to correct for his/her own visual perspective when describing an object to another person with a different visual perspective (Lempers, Flavell, & Flavell, 1977). Such tasks, in addition to others that employ similar logic (Wimmer & Perner, 1983), have proven their worth in understanding how children become less socially egocentric as they age (Hobson & Hobson, 2008). A cognitive view of social egocentrism is not limited to children, however, as adults with autistic features perform poorly in such tasks as well (Volkmar, 1998). There is also evidence in social psychology that perspective taking – defined in terms of a cognitive appreciation of another's distinct goals and viewpoint and typically assessed in trait-related terms (Davis, 1983) – results in less stereotyping and prejudice as well as outcomes consistent with greater accommodation to the needs and wishes of others (Galinsky, Ku, & Wang, 2005).

There is no extant research linking the warmth-coldness dimension of the interpersonal circumplex to cognitive egocentrism, but such results would make sense given the literatures reviewed above. In addition, another purpose of the studies was to resurrect a very basic form of cognitive egocentrism that displayed promising findings in the 1940s and 1950s. Eschewing complicated verbal scenarios where demand could also be present, Werner, Wapner, and colleagues (e.g., Wapner, Werner, & Chandler, 1951; Werner & Wapner, 1952; Werner, Wapner, & Bruell, 1953) showed that priming a lateralized self-state often biased subsequent visual perceptions in a manner consistent with cognitive egocentrism. For example, leftward (relative to rightward) head-tilt typically results in impressions that the visual world has tilted with the self. Although very basic, this is a form of cognitive egocentrism because it presumes that the self's activated state corresponds with the nature of external reality when this is not so.

The utility of such probes of cognitive egocentrism was further established in a monograph by these investigators (Wapner & Werner, 1957). In this monograph, it was shown that individuals more prone to such biases were prone to them across many different tasks. Such

results suggest that perceptual probes of cognitive egocentrism may capture something both inherent to and fundamental about the person. Wapner and Werner further showed that such biases exhibited a clear developmental trend from early childhood (larger biases) to young adulthood (smaller biases), consistent with Piaget's (1932) cognitive-developmental perspective of egocentrism. Finally, they suggested, but did not show, that their paradigms might offer significant insights into adulthood levels of social egocentrism.

In relation to such paradigms, lateralized auditory primes resulted in the clearest evidence of assimilation-related effects on subsequent visual perceptions (Wapner & Werner, 1957) and such procedures were accordingly used. In this sort of paradigm, cognitive egocentrism is established to the extent that visual perceptions are biased leftward following auditory primes to the left ear and rightward following auditory primes to the right ear, essentially revealing a pattern in which the particular person presumes – at a very implicit but nonetheless potentially important level – that the external world corresponds to an activated state of the self when this is not so. We hypothesized that priming effects of this type would be pronounced at high levels of interpersonal coldness and potentially absent at low (i.e. warm) levels of interpersonal coldness. Two studies were conducted to investigate this hypothesis.

Study 1

A cognitive task was created in which lateral auditory primes preceded a visual perception task. Participants were told that the two phases of each trial were independent, yet we expected cold individuals to be influenced nonetheless. An additional interest, and an orthogonal one, was whether positively-valenced sound clips would produce assimilation effects to a greater extent than negatively-valenced sound clips, as people are generally motivated to approach pleasant stimuli and avoid unpleasant stimuli in the environment (Lang, Bradley, & Cuthbert, 1997; Lewin, 1936).

Method

Participants and General Procedures—Participants were 81 (47 female) undergraduate volunteers from North Dakota State University who received course credit. Sessions consisted of groups of six or less. General instructions mentioned that the study involved different types of perceptions. Computer monitors had a screen height of 13.65 inches and the screen resolution was set to 1280×1024 pixels. The cognitive egocentrism assessment was programmed using E-Prime software and run on a 32-bit distribution of the Windows XP operating system. Interpersonal coldness was subsequently assessed via MediaLab software.

Cognitive Egocentrism Assessment—Participants were informed that we were interested in their ability to alternate between two very different tasks. The first task involved attending to sounds and the second task involved making visual judgments. These tasks were to be treated as independent and, in fact, were independent in terms of procedural variables. Nevertheless, our primary interest was in whether lateralized sounds would bias subsequent visual perceptions in an assimilation-related manner. There were 60 such paired trials.

Participants wore headphones during the cognitive egocentrism assessment. The headphones were set such that we were able to present auditory stimuli to either the left or right ear rather than both. The experimenter ensured that the headphones were worn properly such that the left headphone speaker was over the left ear. Auditory primes consisted of 20 six-second sound clips from the International Affective Digitized Sounds (IADS) database (Bradley & Lang, 1999). Ten were positive (e.g., applause, laughing) and 10 were negative

(e.g., explosion, gunshot). On the basis of the 1–9 rating norms of Bradley and Lang, the positive stimuli were more pleasant ($M = 7.49$; $SD = .25$) than the negative stimuli ($M = 3.22$; $SD = .18$), $F(1, 19) = 1922.83$, $p < .01$. Positive and negative stimuli were, however, equally arousing ($M = 5.90$; $SD = 1.00$ for positive stimuli & $M = 6.33$, $SD = .65$ for negative stimuli), $F(1, 19) = 1.3$, $p > .25$.

Sounds were selected at random and randomly assigned to the left or right ear prior to each visual perception judgment, with two constraints. Each sound was presented three times (i.e., random selection without replacement). Such procedures guarded against the possibility that the same sound would be repeated across consecutive trials. In addition, the program ensured that there were 15 trials each for positive/left, positive/right, negative/left, and negative/right combinations, thus maximizing the number of trials per cell of this design.

Subsequent to each auditory prime, the visual perception portion of the trial began. A small (5-pixel) white dot was presented at one-fourth distance from the bottom of the computer screen. Its position was randomized such that it was 100 pixels left of horizontal center, 50 pixels left, at horizontal center, 50 pixels right, or 100 pixels right. Such procedures precluded the possibility of ignoring the actual position of the dot. Simultaneously, a line of 20-pixel width appeared at one-fourth distance from the top of the computer screen. Participants were to move their mouse cursor (which originated at center screen) to the portion of the line directly above the presented dot for the trial and then make a left mouse click. They were given 3000 ms to make such visual judgments.

Because the actual position of the dot varied by trial, we quantified visual perception biases – that is, the extent to which visual perceptions were biased relative to the actual position of the dot. We did so by subtracting the horizontal pixel position of the dot from the horizontal pixel position perceived to be directly above it. Negative scores indicate visual perceptions biased leftward and positive scores indicate visual perceptions biased rightward. By contrast, a score of 0 would indicate a veridical judgment for that trial. Bias scores were averaged, separately so, for cells of the 2 (side) by 2 (valence) auditory priming design.

Warmth-Coldness Assessment—Wiggins (1979) revitalized an interpersonal approach to personality with his Interpersonal Adjective Scales (IAS). Such scales were then revised and improved in psychometric terms and in terms of predictive validity (Wiggins, Phillips, & Trapnell, 1989). Accordingly, we assessed warmth versus coldness using the IAS-R (Wiggins, Trapnell, & Phillips, 1988). Participants rated the extent to which (1 = extremely inaccurate; 5 = extremely accurate) they possessed 16 personality trait adjectives marking the warmth-coldness dimension. The 8 cold markers included coldhearted, ruthless, and unsympathetic, whereas the 8 warm markers included charitable, sympathetic, and tenderhearted. We scored the dimension such that high scores reflected greater interpersonal coldness by reverse-scoring the warmth markers and then averaging across all 16 items ($M = 2.13$; $SD = .79$; $\alpha = .93$). For comparison purposes, we also assessed the dominance-submission axis of the circumplex, with higher scores reflecting greater dominance ($M = 3.21$; $SD = .63$; $\alpha = .89$).

Results

Initial Analysis—We examined the normative effects of the auditory primes in a 2 (auditory side) by 2 (auditory valence) repeated-measures ANOVA. An egocentric frame of reference would be revealed to the extent that lateralized auditory inputs biased visual perceptions in an assimilation-related manner – i.e., leftward following left ear stimulation and rightward following right ear stimulation (Werner & Wapner, 1949). This normative prediction was confirmed by a significant main effect for Auditory Side, $F(1, 79) = 7.26$, p

$< .01$, partial eta-squared = .09. On average, visual perceptions were biased leftward following left auditory primes ($M = -41$ pixels; $SD = 106$) and rightward following right auditory primes ($M = 17$ pixels; $SD = 93$).

We had thought it possible that positive sounds would bias visual perceptions toward their side (e.g., rightward in relation to right sounds), whereas negative sounds would bias visual perceptions away from their side (e.g., leftward in relation to right sounds). There was, however, no main effect for Auditory Valence, $F(1, 79) = 2.65$, $p > .10$, nor was there an Auditory Valence by Auditory Side interaction, $F < 1$. Accordingly, the biasing effects of auditory primes in this paradigm appear to be basic and non-hedonic in nature. Valence was therefore dropped from the primary analyses.

Primary Analyses—We hypothesized that interpersonal coldness would predict higher levels of cognitive egocentrism. To examine this hypothesis, we conducted a General Linear Model (GLM) analysis. Such analyses are uniquely able to simultaneously model the effects of continuous personality variables in combination with discrete within-subject manipulations (Robinson, 2007). Continuous variations in interpersonal coldness were z-scored in this analysis (Aiken & West, 1991) and added to the repeated-measures auditory prime design. We omit presenting the normative results, which were parallel to those reported above.

In the GLM, there was no main effect for Interpersonal Coldness, $F < 1$. Thus, coldness did not predict whether perceptions were generally biased leftward or rightward. On the other hand, and as hypothesized, there was a significant Interpersonal Coldness by Auditory Side interaction, $F(1, 78) = 4.02$, $p < .05$, partial eta-squared = .05. To understand the nature of the interaction, we computed estimated means as a function of low (-1 SD) versus high ($+1$ SD) levels of interpersonal coldness following left-sided versus right-sided auditory primes. These estimated means are graphically displayed in Figure 1.

Figure 1 suggests that individuals high in interpersonal coldness exhibited cognitive egocentrism – i.e., there appeared to be a pronounced auditory side priming effect – but that individuals low in interpersonal coldness did not. This would represent a powerful contrast of warm and cold individuals. Accordingly, we adopted the procedures of Wilkowski and Robinson (2007) for examining the effects of a within-subject manipulation at a given level of a continuous personality trait. The effect of the auditory side manipulation was turned into a difference score: Visual perception biases following right primes minus visual perception biases following left primes. We then performed two simple regressions, one in which coldness was altered to reflect a low (warm: -1 SD) level of it and one in which it was altered to reflect a high (cold: $+1$ SD) level of it (Aiken & West, 1991). If the intercept is significant, cognitive egocentrism is evident. At the low level of coldness, there was no cognitive egocentrism, $t = -0.48$, $p > .60$. On the other hand, at the high level of coldness, cognitive egocentrism was robust, $t = 3.32$, $p < .01$.

Additional Analyses—Cold individuals may have been more impulsive in their responding and may have exhibited stronger priming effects for this reason. This was not the case in that higher levels of interpersonal coldness were not associated with faster reaction times in making the visual judgments, $r = .06$, $p > .60$. A GLM parallel to the primary analysis revealed no hint that dominance was predictive of cognitive egocentrism (as defined by the Auditory Side by Dominance interaction), $F < 1$. Men often score higher in interpersonal coldness (e.g., Wiggins & Trapnell, 1996). It therefore seemed of value to examine whether the key results reported above varied by participant sex. In a GLM analysis, sex did not moderate the Interpersonal Coldness by Auditory Side interaction, $F < 1$. The results reported in Figure 1 are therefore equally characteristic of men and women.

Discussion

The most important results involved cognitive egocentrism. Despite the irrelevant nature of auditory primes, activating either a leftward or rightward self-state prior to the visual perception task resulted in assimilation-related effects. The external world, then, seems to shift its horizontal axis in accordance with a momentary state of the self. Such results not only resurrect the experimental work of Wapner and Werner (1957), but do so in relation to the greater precision afforded by personal computers.

Of more importance, we sought to link the interpersonal trait realm to the basic cognitive realm. On the basis of the correlates of interpersonal coldness, we hypothesized that high levels of this trait would predict cognitive egocentrism, whereas low levels of this trait would not. This novel hypothesis was supported in that cognitive egocentrism was evident at a high, but not low, level of interpersonal coldness. Such biasing effects were not due to impulsive responding and appear important in understanding this dimension of personality, but not dominance.

The New Look movement sought to examine influences of stimulus valence on perception (Bruner, 1951) and this interface is of interest to contemporary social psychology as well (Balcetis & Lassiter, 2010). The fact that auditory valence did not produce assimilation-related effects on visual perception (e.g., positive right primes did not prime rightward visual perceptions, nor did negative left primes), thus, suggests boundary conditions for such effects. It is possible that other designs might be more sensitive to valence effects, but the conclusion of greatest importance is that colder individuals were cognitively egocentric independent of the valence of auditory primes, thus implicating a more basic phenomenon.

Study 2

Given that stimulus valence proved uninformative in Study 1, the Study 2 auditory primes were affectively neutral. For purposes of conceptual replication, the visual perception task was also changed. The Study 1 visual perception measure was certainly sensitive in that it defined assimilation-related effects in pixel-based terms. On the other hand, more dramatic evidence might be obtained to the extent that a discrete visual object is misperceived. Accordingly, we presented a target box on each trial and asked individuals to match its size to one of several comparison boxes presented at bottom screen. We hypothesized that auditory primes would bias size estimations leftward following left auditory primes and rightward following right auditory primes. Of more importance, we hypothesized that such effects would be pronounced at high levels of interpersonal coldness and potentially absent at low levels.

Method

Participants and General Procedures—Participants were 86 (54 female) undergraduate volunteers from North Dakota State University who received course credit. General procedures were identical to Study 1. For example, participants were run in groups of six or less, the experimenter stated that the study was broadly concerned with perception, and cognitive egocentrism was assessed before interpersonal coldness. Nonetheless, the cognitive egocentrism assessment was altered for the sake of conceptual replication. Levels of interpersonal coldness were assessed using the same IAS-R (Wiggins et al., 1988) markers of Study 1 ($M = 1.97$; $SD = .72$; $\alpha = .92$). Dominance was also assessed ($M = 2.98$; $SD = .82$; $\alpha = .87$).

Cognitive Egocentrism Assessment—Headphones capable of unilateral auditory stimulation were worn. Participants were told that they would be asked to make perceptual

judgments in the context of sounds that should be ignored. Auditory primes were the same for all trials and were non-affective in nature, consisting of the “Windows XP Ringout.wav” tone included in Windows XP distributions. The tone was presented continuously until the perceptual judgment was registered for the particular trial. The auditory tone was randomly assigned to the left or right headphone speaker, subject to the constraint that an equal number of primes were presented to each speaker.

Simultaneous with the onset of the lateralized sound for the trial, a white-outlined box against a black background was presented at one-fifth distance from the top of the computer screen. Participants were to determine its size. For this reason, the presented boxes varied in size and were either 73, 77, 81, 85, or 89 pixels squared, the exact size for each trial chosen at random, subject to the constraint that each box size was presented equally often in relation to left versus right auditory primes. Located at one-tenth distance from the bottom of the computer screen, a horizontally centered comparison box array was presented. Its boxes ranged from 70 squared pixels to 92 squared pixels in 2 pixel steps. The order of the boxes was counterbalanced across participants, either from smallest (left) to largest (right) or vice versa.

After a 1000 ms blank delay, a mouse cursor was presented at center screen. Participants were given 5 seconds to move the mouse cursor to the comparison box that best matched the size of the target box for the trial and then make a left mouse-click. There were 40 (auditory prime then visual perception) paired trials in all.

As in Study 1, our interest was in the potential biasing effects of lateralized auditory primes on visual perceptions. If the participant chose a comparison box just to the left (right) of the actual (target) box size, the trial was scored -1 ($+1$). If the participant chose a comparison box two steps to the left (right) of the actual box size, the trial was scored -2 ($+2$), etc. The dependent measure thus reflects the extent to which box selections were biased leftward or rightward relative to the actual size of the target box presented. Such bias scores were averaged, separately so, for trials involving left versus right auditory primes.

Results

Initial Analysis—By design and for the sake of generality, the Study 2 visual perception task was quite different than the Study 1 visual perception task. It was therefore of interest to examine whether, normatively, unilateral auditory primes produced assimilation-related effects, here defined in terms of leftward box selections following left auditory primes and rightward box selections following right auditory primes. A repeated-measures ANOVA showed that normative biases of this type were quite robust, $F(1, 85) = 15.72$, $p < .01$, partial eta-squared = .16.

Primary Analyses—We hypothesized that lateralized auditory primes would affect visual perceptions primarily, and perhaps exclusively so, at high levels of interpersonal coldness. To examine this hypothesis, visual perception biases were analyzed in a GLM as a function of z-scored levels of interpersonal coldness in combination with the within-subject manipulation of auditory side. We omit presenting the normative main effect, which was consistent with that above.

Of more interest were the findings involving interpersonal coldness. There was no main effect for Interpersonal Coldness, $F(1, 84) = 1.93$, $p > .15$. Irrespective of auditory primes, then, coldness did not predict more leftward or rightward visual perceptions. On the other hand, and as hypothesized, there was a significant Interpersonal Coldness by Auditory Side interaction, $F(1, 84) = 9.08$, $p < .01$, partial eta-squared = .10. Estimated means (Aiken & West, 1991) for this interaction are displayed in Figure 2 as a function of low (-1 *SD*)

versus high (+1 *SD*) levels of coldness. The figure again suggests that lateral primes appeared to bias visual perceptions at high levels of interpersonal coldness, but not at low levels of interpersonal coldness. This is a dissociation worth establishing if possible and we therefore performed follow-up analyses.

As in Study 1, the within-subject effect of the auditory prime manipulation was turned into a difference score (Wilkowski & Robinson, 2007): Visual perception biases following right auditory primes minus visual perception biases following left auditory primes. We then followed Aiken and West (1991) in simple slope testing involving continuous variables. When interpersonal coldness was altered to reflect low (−1 *SD*) levels of it, the intercept defining the priming manipulation was not significant, $t = 0.79$, $p > .40$. On the other hand, when interpersonal coldness was altered to reflect high (+1 *SD*) levels of it, the intercept was significant, $t = 3.01$, $p < .01$. The results of Study 2 are therefore exactly parallel to those of Study 1 in suggesting that cognitive egocentrism was present one standard deviation above the mean in interpersonal coldness and absent one standard deviation below the mean.

Additional Analyses—An additional GLM analysis revealed that dominance did not moderate the effects of lateralized auditory primes, $F < 1$. Recall that the order of comparison boxes was varied from smallest (left) to largest (right) or from largest (left) to smallest (right). This counterbalancing factor did not moderate the Coldness by Auditory Side interaction, $F(1, 82) = 1.02$, $p > .30$, nor did participant sex, $F < 1$. As in Study 1, interpersonal coldness did not predict the speed with which visual judgments were made, $r = -.13$, $p > .20$. In sum, cold (relative to warm) individuals exhibited cognitive egocentrism independent of sex, counterbalancing factors, or hasty responding and dominance did not predict cognitive egocentrism.

Discussion

The priming effect observed in Study 1 was subtle in the sense that it involved pixel misplacements along a continuous horizontal line. It would have been nearly impossible to select the correct (0-bias) pixel in the Study 1 task. For this reason, the Study 2 task focused on more clearly erroneous visual perceptions – that is, misperceiving the size of a box in relation to discrete comparison alternatives. Individuals were generally quite accurate in the task (see Figure 2), yet again lateralized auditory primes resulted in robust assimilation-related effects. Relative to Study 1, then, the results of Study 2 are perhaps more dramatic in their demonstration of cognitive egocentrism. Further, such biasing effects were present at high levels of interpersonal coldness and absent at low levels of interpersonal coldness. Such results also replicate Study 1 in suggesting that cognitive egocentrism characterizes cold but not warm individuals.

General Discussion

In multiple manners, cold individuals appear to be egocentric in their social relationships. They seek to distance themselves from others, are quarrelsome, less caring, and less cooperative (Moskowitz, 2010; Smith et al., 2004; Wiggins & Broughton, 1991). According to multiple theories, cognitive egocentrism underlies social egocentrism (Baron-Cohen, Leslie, & Frith, 1985; Galinsky et al., 2005; Piaget, 1932) and we therefore predicted systematic relations between interpersonal coldness and a very basic form of cognitive egocentrism (Wapner & Werner, 1957) that, we think, holds great promise as a probe of it. As hypothesized, higher levels of interpersonal coldness were associated with higher levels of cognitive egocentrism and a further analysis revealed that cognitive egocentrism was simply not evident at a prototypically warm (−1 *SD*) level of the warmth-coldness continuum. In the General Discussion, we revisit the basis for our predictions and discuss implications and future directions.

Assessing and Quantifying Cognitive Egocentrism—The social-personality literature has assessed cognitive egocentrism in terms of low levels of perspective taking, a self-report scale (Davis, 1983). This method presumes that people have insights into their levels of cognitive egocentrism, which they may or may not. Certainly, people are often unaware of just how egocentric their cognitions can sometimes be (e.g., Gilovich & Savitsky, 1999). The developmental and clinical literatures have used scenario-based methods, typically those determining whether one can recognize that another person, because of parameters of the scenario, must have a different perspective than the self (Lempers et al., 1977; Wimmer & Perner, 1983). Such scenarios are sometimes quite complicated, performance in them is multi-determined (Thornton, 2002), and their use precludes many trials.

For certain purposes, at least, a more basic probe of cognitive egocentrism may be useful. Even without presenting social scenarios or inquiring about the self, we can gain insight into cognitive egocentrism by priming a self-state and determining whether it biases subsequent visual perceptions in an assimilation-related manner. We note that Wapner and Werner (1957) showed, convincingly so, that performance in such tasks has a clear developmental trend that covaries with social development and skills such as theory of mind (Piaget, 1932). They further theorized that their tasks may provide insights into individual differences in social egocentrism among adults, but did not provide data in support of this point. Our data and results were, however, as predicted. Aside from validating the insights of Werner and colleagues (Wapner et al., 1951; Werner & Wapner, 1952; Werner et al., 1953), probes of the present type should be used in future research (see below). To facilitate this work, we favor the neutral auditory priming procedures of Study 2 in combination with the visual perception task of Study 1.

Implications in Understanding Interpersonal Coldness—Cognitive egocentrism was robust at high levels of interpersonal coldness. Such findings, we suggest, are informative in understanding how such individuals function in their transactions with the environment. Cognitive egocentrism, first and foremost, is cognitively self-centered (Piaget, 1932) just as cold individuals seem to favor the self in their social interactions (Wiggins & Trapnell, 1996). Cognitive egocentrism also involves distortions of external reality in a self-favoring direction (Wapner & Werner, 1957) just as cold individuals seem to possess a deficient understanding of the states of their potential interaction partners (Moeller, Robinson, Wilkowski, & Hanson, 2012). Finally, such a self-centric approach to personal relationships would lead to the sorts of relationship difficulties encountered by cold individuals (Smith et al., 2004) according to prominent theories of relationship functioning (Finkel & Rusbult, 2008).

Cognitive egocentrism was absent among warm individuals. Such results, too, make sense. Warm individuals report greater empathy for others (Wiggins & Broughton, 1991), which would seem to require a less egocentric mode of perception (Baron-Cohen et al., 1985). Warm individuals compromise with others to a greater extent (Moskowitz, 2010), likely so because they are able to distinguish the self's perspective from the other's perspective in their interpersonal transactions (Finkel & Rusbult, 2008). Warm individuals, finally, are likely to have more egalitarian and better relationships as a consequence (Graziano & Eisenberg, 1997). In sum, the results provide significant insights into a basic difference between cold and warm people in a manner informing the cognition-personality interface (Robinson & Gordon, 2011).

In appreciating the findings, it may be useful to contrast three accounts of them. A first view is that cold people direct attention toward the self, whereas warm people direct attention toward the external world. We doubt whether this is a sufficient account of the findings. It is

not clear how this view would predict the priming effects observed and surely every reasonably-functioning person has to be aware of both what is happening in the self and what is happening in the external world. A second view is that all people are self-centric in their perceptions, but that warm people correct for such self-centric perceptions, whereas cold people do not. Correction processes are almost never perfect (Wilson & Brekke, 1994) and therefore it is implausible that the lack of cognitive egocentrism observed among warm individuals is a result of such correction processes. Moreover, correction processes are those that take time (Wilson & Brekke, 1994), yet there was no correlation between interpersonal coldness and the speed with which the visual task was completed in the present studies. A third view, and one that we favor, is consistent with Wapner and Werner's (1957) analysis. A cognitively egocentric individual views the world through the self's state, whereas a non-egocentric person simply does not. Just such a dissociation appeared to distinguish cold and warm people in the present studies.

Future Research Directions—It would be valuable to correlate the present assessment of cognitive egocentrism with other purported assessments of it. A promising task is that of Galinsky, Magee, Inesi, and Gruenfeld (2006). These investigators asked individuals to draw an "E" on their foreheads. Some individuals did so by drawing the letter such that it favored the self looking outward (a self-centric perspective), whereas other individuals did so by drawing the letter such that its orientation favored another person looking at the self. We would expect that cognitive egocentrism, as we have assessed it, would predict a self-centric manner of letter drawing and further that cold and warm people should differ in this other assessment of cognitive egocentrism.

Warmth-coldness is a broad and fundamental axis of the interpersonal circumplex (Wiggins & Broughton, 1991; Wiggins & Trapnell, 1996) and it was for this reason that we focused on interpersonal coldness in the present studies. Yet, cognitive egocentrism may predict more specific traits associated with this axis. For example, it seems plausible, but yet to be demonstrated, that trait anger would correlate positively, and trait empathy negatively, with cognitive egocentrism. In addition, potential relationships between cognitive egocentrism and the "dark triad" of personality (Paulhus & Williams, 2002) should be investigated. Based on the fact that dominance did not predict cognitive egocentrism in the present studies and the analysis of Jones and Paulhus (2011), cognitive egocentrism might be particular to psychopathy among the dark triad. Such a study would be valuable in differentiating these traits.

Warmth-coldness is a strong predictor of social support and social well-being (Smith et al., 2010). Accordingly, we might expect that people lower in cognitive egocentrism, as we have assessed it, would have greater social support and greater social well-being. Self-centric perspectives on personal relationships are ultimately damaging to them (Finkel & Rusbult, 2008) and it would therefore be of interest to examine whether cognitive egocentrism predicts lower-quality personal relationships. Finally, it would be useful to examine whether cognitively egocentric individuals are less cooperative and more competitive in decision-making games. For example, it is quite plausible that people with higher levels of cognitive egocentrism would allocate less money to another in the Dictator Game (Engel, 2011). These are but a few research directions that would seem potentially generative on the basis of the present results.

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Figure 1.
The Effects of Incidental Auditory Stimulation on Visual Perception at Low and High Levels of Interpersonal Coldness, Experiment 1

Figure 2.
The Effects of Incidental Auditory Stimulation on Visual Perception at Low and High Levels of Interpersonal Coldness, Experiment 2